

DALLENBACH, KARL M. (1887–1971), American psychologist. Dallenbach was born in Champaign, Illinois, the son of John Dallenbach and Anna Mittendorf, farmers. In 1906, he entered the University of Illinois as an undergraduate with the intent of going into law. In his second year, however, he took a course in psychology from John Wallace Baird, who had come to Illinois from Cornell where he had studied under Edward B. Titchener. Baird's lectures and Titchener's *Textbook* (1910) interested Dallenbach, and he later took other courses in psychology at Illinois. Dallenbach's laboratory notes in Baird's experimental psychology course were so impressive that Baird had them bound. Later, when Titchener came to Illinois to give a lecture, he saw the notes and suggested that Dallenbach come to Cornell for his doctorate in psychology. In the meantime, after graduating from Illinois in 1910, Dallenbach received his master's degree in 1911 from the University of Pittsburgh. He then went to Cornell to study under Titchener. He received his doctorate in psychology in 1913 with a dissertation on the topic of attention. Titchener's influence would stay with Dallenbach through the remainder of his career.

After a summer in Germany studying with Oswald Külpe, then in Bonn, Dallenbach returned to America and took an appointment at the University of Oregon. The following year he went to Ohio State University. Then, in the fall of 1914, he returned to Cornell as a faculty member, where he would teach until 1948.

During World War I, Dallenbach served in the newly established Psychological Testing Corps commanded by Robert M. Yerkes. He was offered an applied position in personnel testing after the war but chose to return to Cornell and academic life.

It was in the early 1920s that Dallenbach, believing he was negotiating for a consortium of Cornell professors, purchased the *American Journal of Psychology* from G. Stanley Hall, the journal's founder. Dallenbach soon

discovered that the others did not have liquid assets, including Titchener, and so had to borrow against his inheritance to purchase the journal. Titchener became its editor and Dallenbach its business manager. It was a grand gesture on Dallenbach's part in honor of his major professor and became a commitment for the remainder of his career. Titchener resigned as editor in 1925 in a dispute with Dallenbach; thereafter, the journal continued in a joint editorship that included Dallenbach.

Dallenbach continued his research on attention in which he became a world authority. With John G. Jenkins, he carried out the experiment on the effect of sleep versus activity on the retention of learned material. It was the crucial experiment on the interference versus disuse theories of forgetting.

Dallenbach also conducted research in the field of tactual sensation, involving the mapping of various sensory areas on the skin, including pain and temperature. He invented a temperature stimulator that became standard laboratory equipment which bears his name. In the 1940s and early 1950s Dallenbach and his students produced classical studies on the localization of objects in space by the blind (Supa, Cotzin, & Dallenbach, 1944). This research disproved William James's "facial vision" hypothesis and led to the modern research in auditory localization and lateralization. During World War II Dallenbach did psychological testing and served as chair of the Emergency Committee in Psychology of the National Research Council.

After the war, he returned to Cornell, where he became the Sage Professor of Psychology. In 1948, Dallenbach left Cornell and went to the University of Texas, where he served as chairman of the department of psychology. He obtained a new building for psychology and designed its laboratories. In 1958, he stepped down as chair and returned to teaching until his retirement in 1970, although he continued his research

work. In 1965, he published an experimental article on single-trial learning.

Dallenbach is noted especially for his stewardship of the *American Journal of Psychology*, which he edited and coedited faithfully from 1926 until 1968.

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Rand Evans

DANGEROUSNESS. See Violence Risk Assessment.

DARWIN, CHARLES R. (1809-1882), English naturalist. Darwin's 1859 book, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*, transformed the life sciences. Although the notion of evolution or "transmutation" of species had been proposed by earlier figures including Jean-Baptiste Lamarck (1744-1829) and Charles's grandfather Erasmus Darwin (1731-1802), it had not seriously challenged the traditional belief in the independent and separate creation of all species. By offering in-depth support for natural selection as a plausible mechanism or natural process by which transmutation might occur—something earlier evolutionary theories had lacked—the *Origin* literally demanded that evolution be taken seriously.

Briefly summarized, the theory of natural selection rests upon two key assumptions: (1) that a broad range of small but inheritable variations exists within every breeding population, on innumerable characteristics including size, shape, coloration, and conformation of organs; and (2) that within every breeding population more individuals are born than will live to reproduce, so there is a competition for survival and procreation. Darwin reasoned that, within differing environments, differing patterns of variations will inevitably offer

slight advantages or disadvantages for survival and procreation. Thus, "nature" will preferentially "select" different adaptive characteristics to be propagated within the different environments, in somewhat the same way domestic animal breeders select and mate only the best representatives of the breeds they are developing or maintaining. Carried on over countless generations, such a process should result in distinctly different populations derived from originally identical stock, who have diverged sufficiently from each other to become separate species. There are no absolute standards of best or worst in this process, only differing degrees of adaptation to particular environmental circumstances. And since those circumstances are subject to change, both geographically and over time, constant pressures are in place for the gradual change and evolution of all species. Assuming an evolutionary past of many millions of years, Darwin argued that the present great diversity of life forms could be accounted for in this way.

Virtually all of Darwin's examples in the *Origin* dealt with physical characteristics and were drawn from non-human species, but he wrote prophetically in the book's Conclusion: "In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation. . . . Light will be thrown on the origin of man and his history" (Darwin, 1859, p. 488). That future was actually not so distant, as both Darwin himself and several of his followers quickly took up his lead. Psychology, particularly in Great Britain and America, took on a distinctly Darwinian cast, which it retains today.

Darwin's Early Life

Charles Darwin was born into a wealthy and distinguished family in Shrewsbury, England, on 12 February 1809. His father, Robert Darwin, ranked among the most highly paid of all English provincial physicians, following in the footsteps of his eminent father Erasmus (who besides promoting evolution had been a famous physician, inventor, poet, and general man of science). Charles's mother, Susannah Wedgwood Darwin, came from the famous chinaware manufacturing family. An indifferent classical scholar, young Charles languished at the local Shrewsbury school, but developed a strong extracurricular passion for natural science. Two years of medical training in Edinburgh provided some useful scientific background, but he could not bear to be present at operations performed without anaesthesia, and abandoned medicine. He went to Cambridge in 1827, expecting to prepare for a career as a country parson. Again he failed to shine in the required classical and mathematical subjects, taking his nonhonors degree in 1831. Darwin participated vigorously in Cambridge's extracurricular scientific activities, however, and be-

came friendly with such scientifically oriented faculty as the geologist Adam Sedgwick (1785–1873) and the botanist John Stevens Henslow (1796–1873).

In 1831, Henslow recommended Darwin for “by far the most important event in my life” (Darwin, 1969, p. 76)—an opportunity to sail aboard the surveying ship H.M.S. *Beagle* as an unpaid “naturalist” and dining companion to its captain Robert FitzRoy, on what became a five-year voyage. While circumnavigating the globe with extended stays along the coasts of South America, and stopovers at the Galapagos Islands, Tahiti, New Zealand, Australia, and South Africa, Darwin honed his scientific skills. He sent home specimens and observational reports from these exotic locales that immediately established his reputation as a gifted naturalist.

His geological reports offered crucial support for the disputed theory of uniformitarianism—the notion that the earth’s primary geological features are the result of gradual and relatively “uniform” processes extending over vast stretches of time. The competing and then dominant theory of catastrophism attributed the earth’s major geological features to a relatively small number of massive cataclysms such as the Flood. Darwin found fossilized sea shells high in the Andes and personally experienced an earthquake that raised some Chilean coastal features a few feet higher than they had been before. Surely the elevation of the fossils was more likely the result of a large number of similar earthquakes occurring over vast ages of time, than of a single, cataclysmic event. Darwin also proposed that the geology of many oceanic islands was best accounted for by gradual uniform processes such as undersea volcano eruptions, coral growth, and the slow rising or subsidence of the ocean floor. Besides turning the tide of British geological opinion toward uniformitarianism, these findings accustomed Darwin himself to assuming a very extended history for the earth, marked by gradual change and development.

Darwin also made important biological observations, the full implications of which he did not appreciate until after his return. He found the fossilized remains of extinct creatures with skeletal structures similar to modern sloths, armadillos, and llamas—and although he doubted FitzRoy’s assertion that these were remains of animals who had been left off Noah’s ark, he had no alternative explanation for them at that time. Darwin also observed peculiarities in the geographical distributions of similar but distinct living species, such as giant tortoises with slightly differing shells and finches with differently shaped bills, in the Galapagos Islands.

The Origin of *Origin of Species*

After his return to England in late 1836, Darwin’s published accounts of his *Beagle* observations and adven-

tures established him as a leading naturalist and popular travel writer. Thoughts of ordination disappeared when he realized he would have sufficient independent income to devote his life to scientific pursuits. In 1837, he began seriously and systematically reflecting upon the implications of his *Beagle* observations for various biological issues, including that “mystery of mysteries,” the origin of species. The traditional, creationist answer to that mystery relied heavily on the argument from design—the assertion that the vastly divergent species were so wonderfully adapted to their particular environments that they could only have been separately and deliberately designed by an omniscient Creator. Darwin’s alternative answer—the hypothesis of natural selection—occurred to him in the autumn of 1838, after he had been reading the economic theorist Thomas Malthus’s (1766–1834) argument that most human beings are destined to live in poverty because their rate of reproduction will always eventually outstrip the rate at which they can produce food to sustain themselves. This idea led Darwin to the thought that for any species, many more individuals are conceived than can survive to reproduce. Further assuming a range of inheritable variations within each species and a variety of environments in which differing characteristics will prove adaptive, Darwin had the essentials for his theory of evolution by natural selection.

Knowing that this theory would encounter stiff and emotional resistance from upholders of the traditional creationist view, Darwin held back from publishing his theory until he had collected an enormous amount of supporting argument and documentation. Only in 1856 did he begin writing *Natural Selection*, a work he projected to be several thousand pages in length. In 1858, however, he received a short paper from Alfred Russel Wallace (1823–1913) outlining a theory virtually identical to his own. This precipitated a meeting of the Linnean Society at which Wallace’s paper was read, along with brief extracts from two of Darwin’s earlier unpublished works describing the theory. This first public presentation of natural selection failed to make much impression, however, being (as Darwin expected) much too brief and schematic to fully illustrate the theory’s power. Nevertheless, Darwin now rushed to prepare an intermediate-length “abstract” of the theory: the 490-page *Origin of Species*, which duly appeared in late 1859. This proved sufficient to show that Darwin had seriously grappled with the argument from design and other major objections to the theory and immediately made evolution a concept to be taken seriously. The retiring Darwin shied away from the clamor aroused by his unstated but clearly implied assumption that humans are descended from apelike creatures, but his cause was vigorously taken up and defended by supporters such as the botanist Joseph Hooker (1817–

1911) and, most spectacularly, “Darwin’s bulldog” Thomas H. Huxley (1825–1895).

Darwin’s Influence on Psychology

Within a decade much of the clamor had subsided, and in the 1870s Darwin published three works that helped lay his promised “new foundation” for psychology. *The Descent of Man* (1871) argued that virtually all human characteristics—including such “higher” and psychological qualities as courage, kindness, and reasoning—can be found in rudimentary form in many “lower” species; hence there is no reason not to see them as having evolved. *The Expression of the Emotions in Man and Animals* (1872) made the complementary case, namely, that human beings’ emotional expressions betray many remnants of an inherited ancestral “animality.” And with his 1877 paper, “A Biographical Sketch of an Infant,” Darwin pioneered the genre of “baby biography” while describing his young son’s psychological development as an approximate recapitulation of the evolutionary past of the human species.

Darwin’s evolutionary perspective directly stimulated many important developments in psychology. His theoretical emphasis on variation and adaptation lent particular new significance to the identification and measurement of individual differences and their role in adaptive behavior. Following this lead, Darwin’s cousin Francis Galton (1822–1911) proposed the development of what we now call intelligence tests to measure hereditary individual differences in “natural ability.” In his controversial efforts to demonstrate the hereditary determination of intelligence, and his promotion of the eugenics movement, Galton also defined the modern “nature/nurture” issue and laid many of the foundations for the modern field of behavior genetics. Darwin’s insistence that human beings are related by evolution to other species lent new theoretical importance and relevance to the study of animal behavior, and he actively encouraged his young friend George Romanes (1848–1894) to launch the new discipline of comparative psychology.

Darwin’s general influence became especially strong on British and American psychologists, who focused heavily on issues of process, adaptation, function, measurement, and individual differences. The “pragmatic” psychology of William James (1840–1910) was one example of this trend, followed by the functionalism of James Angell (1869–1949), John Dewey (1859–1952), Edward Thorndike (1874–1949), and Robert Woodworth (1869–1962), among others. G. Stanley Hall (1844–1924) adapted the recapitulation hypothesis from Darwin’s “Biographical Sketch,” while pioneering “developmental psychology” as a major subdiscipline at Clark University. The school of behaviorism explicitly relied on the Darwinian theory of evolution, while ar-

guing for the relevance of animal studies for human beings.

A school of “social Darwinism” arose shortly after Darwin’s death in 1882, promoting unbridled competition and laissez-faire capitalism on the grounds that “survival of the fittest” would inevitably hasten social and economic, as well as biological progress. The school actually owed much more to Herbert Spencer (1820–1903) than to Darwin, however; for, unlike Spencer, Darwin denied that evolution could be equated with “progress” in any ultimate or moral sense. For him, evolution was a consequence of adaptation pure and simple, devoid of any other values.

In more recent times, a sometimes controversial approach known as sociobiology has attempted to account for the evolution of social behavior. To explain the persistence of such apparently nonadaptive characteristics (for individual survival) as altruism, sociobiologists have proposed one important shift in emphasis from Darwin’s. Whereas Darwin identified the basic reproducing unit in evolution as the individual organism, sociobiologists have hypothesized that it is the individual gene—a concept that did not even exist in Darwin’s time. Richard Dawkins’s conceptualization of the “selfish gene” as a self-replicating mechanism is perhaps the most influential presentation of this idea. Dawkins also proposed the concept of the “meme” as a unit of cultural evolution corresponding to the gene in biology. Cognitive psychologists and computer scientists have provocatively combined these ideas with developments in the fields of computational theory and artificial intelligence (e.g., Dennett, 1995). Steven Pinker (1997) has interpreted the human mind as a collection of mechanistically operating, computational “modules,” each one independently evolved to meet survival needs in the not too distant past. Whatever the ultimate fate of specific ideas such as these, Darwin’s general concepts of adaptation, competition, and evolution will surely continue to influence psychological theorizing for the foreseeable future.

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Raymond E. Fancher

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Dashiell was born on 30 April 1888 in Southport, Indiana, the ninth child in a family of 12 children of John W. and Fannie S. (Myers) Dashiell. His father was a Methodist minister who frequently moved his family around the state of Indiana. As an undergraduate at Evansville College, Dashiell earned both a bachelor of literature degree in 1908 and a bachelor of science degree in 1909. He was outstanding in college sports as well as in academic work and briefly considered a career in professional sports, trying out as a pitcher with the New York Yankees baseball team.

After graduation, Dashiell entered Columbia University to study philosophy and psychology. There

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[Many of the people mentioned in this article are the subjects of independent biographical entries.]

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W. Grant Dahlstrom

DATA ANALYSIS. The physicist Stephen Hawking has defined a scientific theory as “a model of the universe, or a restricted portion of it, and a set of rules that relate quantities in the model to observations that we make.” Psychologists use a wide variety of models to explore human behavior and thinking. For example, mathematical models have been developed to represent basic processes in vision and learning. Similarly, psychologists have developed computer models of such diverse phenomena as associative learning and personality. However, the type of model most widely used in psychological research is represented by the class of sta-

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tistical models. This class is especially useful in studying human behavior and thought because a distinguishing characteristic of statistical models is that they are stochastic, which means that the model includes a probabilistic component reflecting the inherent uncertainty of the data. As will be described in greater detail later in this chapter, this feature has two important advantages in psychology: it acknowledges the unique nature of individuals, and it provides a foundation for making inferences beyond the specific individuals included in any single study.

As Hawking's quote suggests, statistical models can be used to derive information from observations. Most often, statistical models are applied to quantitative observations, such as scores on a personality inventory or reaction times on a cognitive task. In some cases, however, even when the observations are qualitative rather than quantitative, statistical models can still be used. For example, females and males might be compared to one another on their preferences during a forced-choice task in which the available choices differ from one another along purely qualitative grounds. [See Analysis of Counts.] Regardless of whether observations are quantitative or qualitative, statistical models can help researchers examine relationships among variables, which Kerlinger has defined to be the primary goal of behavioral research.

Statistics is often conceptualized as consisting of two distinct but related sets of methods for obtaining information from data. First, descriptive statistics consists of methods for organizing data through numerical summaries and ways of describing data through graphs. The last decade has seen increasing interest in exploratory data analysis as a collection of methods for investigating various properties of data, especially understanding the nature of the relationships between variables. [See Exploratory Data Analysis.] Second, inferential statistics consists of methods for making inductive inferences about the extent to which observed properties of data might be expected to maintain themselves in populations over and above the properties displayed in a sample of individuals. Inferential methods are especially important in psychology, because psychologists typically observe relatively small samples of research participants but hope to generalize conclusions to a broader universe of potential individuals. Statistical methods use probability theory to make such inductive inferences possible.

Psychologists employ a wide variety of statistical models in their research because the discipline explores such a vast array of research questions. As Cronbach (1957/1975) pointed out, scientific psychology has developed from two largely unrelated historical traditions. One tradition, the experimental approach, tends to examine situational factors that are presumed to have a consistent influence on individuals. The correlational

approach, on the other hand, tends to examine consistent differences between individuals. Thus, psychological methods and statistical models have often developed along two different trajectories, the first designed to identify environmental influences that make individuals behave similarly to one another, and the second designed to identify characteristics of individuals that make them different from one another.

Parameter Estimation and Inference

Regardless of whether the ultimate goal involves situational effects or personal characteristics or some combination of the two, a statistical model is usually formed to represent the presumed relationship among two or more variables. For example, one of the simplest research designs involves randomly assigning individuals to either a treatment group or a control group, and then measuring each individual on some characteristic of interest subsequent to the experimental manipulation. The ensuing question involves the relationship between scores on the characteristic of interest (referred to in this context as the dependent variable) and group membership (referred to as the independent variable). The most typical statistical model for data arising from this design is $Y_{iT} = \mu_T + \varepsilon_{iT}$ for individuals in the treatment group and $Y_{iC} = \mu_C + \varepsilon_{iC}$ for individuals in the control group. The uppercase letter Y on the left side of the equation represents the dependent variable, i.e., the characteristic whose value may depend on the experimental condition. The subscripts (either iT or iC) show that each individual i may have a distinct value of Y. Potential influences on Y are shown on the right side of the equation. This simple model includes only two types of influence. First, μ_T and μ_C are parameters that represent the mean value of Y in the treatment and control conditions, respectively. Second, ε_{iT} and ε_{iC} are random (or stochastic) terms that acknowledge that the Y score of any specific individual i may well be different from the mean score (i.e., either μ_T or μ_C) for that group.

One of the major goals of data analysis is to estimate the parameters of the presumed statistical model. In the example given above, observations are collected in order to estimate μ_T , the mean of a treatment group, and also μ_C , the mean of the control group. The values of these parameters generally are unknown even after collecting observations, because observations are obtained for a sample, which is typically only a very small subset of the entire population of interest. For example, if a treatment is designed to alleviate depression, the population of scientific interest may consist of all depressed individuals in the world (perhaps even including those not yet born), but it is clearly impossible to include all such individuals in a single research study, which might make one doubt the point of collecting data in the first place. However, one of the major con-

tributions of statistics is that it provides methods for using a sample of individuals to obtain estimates of the population parameters of a statistical model. Furthermore, it is often possible to prove mathematically that certain methods provide optimal estimates of parameters contingent on specific additional assumptions. In particular, when the data are normally distributed, the sample mean is the best estimator of the corresponding population mean. (However, when the data are not normal, other estimators may be superior to the sample mean, and, indeed, the search for estimators that perform well under a wide range of distributions is a current research area in statistics.)

Suppose the sample means in our simple example turn out to be 46 for the treatment condition and 50 for the control condition. If lower scores indicate less depression, our best estimate is that μ_T is 4 points less than μ_C , which would imply that the treatment produces an average 4-point improvement on this measure of depression. In order to interpret this difference, two questions must be addressed. First is whether a difference of this magnitude is important from a scientific and/or practical perspective. While this is ultimately a question of content and not methodology, methodologists have nevertheless developed a number of indices of "effect size" to help researchers address this issue. Second, without some indication of the precision of the estimates of the two parameters μ_T and μ_C , it is difficult to know how much confidence to place in this estimated four-point effect. In particular, even if the treatment has no effect in reality whatsoever, the specific sample of individuals in the treatment group could simply be less depressed than the sample in the control group, even in the absence of any true effect produced by the treatment. No matter how sophisticated the research design, this possibility cannot be entirely eliminated. Fortunately, statistical methods allow a researcher to stipulate the precision of the estimated effect, and in particular to test whether the observed effect can truly be distinguished from zero, that is, a null effect. [See Hypothesis Testing.]

Statistical methods allow a researcher to specify a level of confidence to be associated with an interval surrounding the single best estimate of the difference between the parameters. Psychology and most other disciplines that use statistics have adopted a common standard of 95% confidence. After having specified this level of confidence, an interval can be formed based on the observed data. The width of the interval depends on three factors: the level of confidence desired, the variability of scores within each group, and the sample size of each group. To help understand the implications of forming such an interval, suppose that in our hypothetical study this procedure produces an interval estimate of the treatment effect ranging from 0.5 points to 7.5 points.

The fact that this interval does not contain zero is especially important, because it implies that a zero treatment effect is implausible in these data. Forming this confidence interval provides the information needed to test a (null) hypothesis that the difference between μ_T and μ_C equals zero. In these data specifically, this null hypothesis would be rejected because the confidence interval does not contain zero. While forming a confidence interval provides one mechanism for testing the null hypothesis, a t-test can also be performed to test the hypothesis. The t-test rejects the null hypothesis (or yields a statistically significant result) if and only if the confidence interval does not contain zero, so in this respect the confidence interval communicates all of the information contained in the hypothesis test. Regardless of how the test is conducted, this rejection is necessarily probabilistic because the entire population has not been observed. However, the formation of a 95% confidence interval controls the probability of incorrectly rejecting the null hypothesis when it is true at 5%. Unless the entire population is observed, there is always some risk of rejecting the null hypothesis when it is really true, but statistical methods allow researchers to set this probability at some prespecified value, typically 5%. Rejecting the null hypothesis when it is true is referred to as a type I error, and the corresponding probability of committing a type I error is typically denoted α .

Notice that such an interval is centered around the single best estimate (in our example, this is 4 points), but acknowledges that the 4-point estimate is not entirely precise. Upon reflection, however, it is also true that the interval from 0.5 to 7.5 points is not entirely precise, because one cannot be 100% certain that such an interval contains the value of the true population difference between the parameters. The level of confidence can be increased beyond 95% but it can never reach 100% unless the entire population is observed. Furthermore, once the data have been collected and a method of analysis is chosen, the only way to increase the level of confidence is to increase the width of the interval. For example, for a total sample size of 30, the corresponding 99% confidence interval for these data would be from -0.7 points to 8.7 points.

The interval from -0.7 to 8.7 points has the advantage that a higher level of confidence can be attached to it. As a result, the probability of a type I error has been reduced from 5% to 1%. However, the new interval is 35% wider than the original interval, displaying the inevitable trade-off (all other things being equal) between confidence and precision. It is especially noteworthy that the 99% interval, unlike the 95% interval, contains zero. Thus, the 99% confidence interval does not provide sufficient grounds for rejecting the null hypothesis, that the true treatment effect is zero.

From the perspective of testing the null hypothesis,

researchers are at risk of making either of two types of errors. The first type, already mentioned, is rejecting the null hypothesis when it is true. The other possible error is failing to reject the null hypothesis when it is false. This is referred to as a type II error. Notice that by increasing the level of confidence from 95% to 99% (and thereby reducing α from .05 to .01), it has become more difficult to reject the null hypothesis. In fact, in our hypothetical example, the null hypothesis was rejected for 95% confidence but was not rejected for 99% confidence. Thus, all other things being equal, reducing the probability of a type I error necessarily raises the probability of a type II error.

Fortunately, the situation is not so bleak as it may seem because all other things do not have to be equal. In particular, by changing the research design or by increasing the sample size, it is possible to reduce or at least maintain the type I error rate at a desired level while simultaneously lowering the probability of a type II error. Researchers often prefer to conceptualize this issue in terms of statistical power, which is simply the probability of rejecting the null hypothesis when it is false. As such, power is the probability of correctly rejecting the null hypothesis, and simply equals 1 minus the probability of a type II error. Methodologists have devoted considerable attention to procedures for increasing power, especially by developing procedures for calculating necessary sample sizes to achieve a desired level of statistical power for a wide variety of research designs.

While specific models should be chosen according to the research design and the scientific questions to be addressed, the overall goals of statistical analysis remain much the same. Arguably the most basic goal is to assess the adequacy of the model. Even a simple independent-groups t-test assumes that data are normally distributed, that scores are equally variable within the two groups, and that scores are independent of one another. In some cases violations of such assumptions call into question any model inferences, while in other cases procedures have been shown to be robust to violations of assumptions. When assumptions may be doubtful and robustness is questionable, other methods such as nonparametric approaches can be advantageous. [See Nonparametric Statistics.]

After having assessed the adequacy of the model, the next goal typically involves estimating parameters of the model. While the meaning of such parameters clearly depends on the specific model and the research design that generated the data, the overall structure of the statistical phase of the research nevertheless tends to remain much the same. In addition to estimating the parameters of the model, researchers usually also hope to infer model characteristics for the population. This step typically consists of forming confidence intervals and/or testing null hypotheses about model parameters,

either individually or as a group. While simultaneous inferences about multiple parameters can be useful for making inferences about the global characteristics of models, it is almost always important to conduct more focused investigations of individual parameters as well.

Additional Examples of Statistical Models

The specific example discussed up to this point involves comparing the means of two groups of individuals. Even within the restricted domain of comparing means, methodologists have developed a wide array of research designs and accompanying statistical techniques. In general, analysis of variance refers to a collection of statistical models whose parameters represent population group means. [See Analysis of Variance.] In the simplest extension of the example presented earlier, there might be a second treatment group, potentially necessitating an additional parameter in the model. More generally, analysis of variance models allow a variety of structures among groups, including factorial and nested designs, as well as repeated measures designs, in which each individual is measured on more than one occasion. Repeated measures designs are especially important in psychological research for two independent reasons. First, by repeatedly observing the same individual over a variety of treatment conditions, statistical power can be increased without having to increase the number of research participants. Second, many psychological questions involve a consideration of how individuals change over time, so repeated observations of the same individual over time may be of interest, frequently leading to a repeated measures design. In the latter case, notice that repeated observations are pertinent because individuals may naturally be changing over time, whereas in the former case repeated observations are obtained because the experimenter has chosen to vary the treatment condition to which each individual is exposed. Both cases lead to a repeated measures design, or a within-subjects design, as it is sometimes called. Analysis of variance encompasses a wide variety of designs and thus can serve as a viable statistical model for a wide range of statistical questions. However, a potentially serious disadvantage of analysis of variance models is that all variation within a group is regarded as error, when in most psychological studies a substantial component of within-group variability may reflect true individual differences. Analysis of covariance provides an extension of the analysis of variance that allows the inclusion of one or more individual-difference variables.

While mean comparisons are central to some psychological investigations, oftentimes the research question leads to other types of statistical methods, necessitating approaches other than analysis of variance and analysis of covariance. One such method is multiple

regression analysis. Both analysis of variance and analysis of covariance models can be viewed as special cases of the multiple regression model, which expresses scores on a dependent variable Y as a linear additive function of one or more predictor variables. For example, the following model states that the score for individual i on variable Y can be expressed as a weighted linear combination of the three predictor variables X_1 , X_2 , and X_3 .

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \epsilon_i$$

The weights β_0 , β_1 , β_2 , and β_3 then become model parameters to be estimated based on sample observations. The multiple regression model is much more flexible than it might appear, because one or more of the X variables can be reexpressions of the original predictor variables. For example, some or all of the X variables can be coded to represent group membership, which is why the model subsumes analysis of variance and covariance. Furthermore, an X variable as entered in the model can be a transformation of an original variable. For example, instead of using reaction time as a predictor of some Y variable, a researcher might decide to use the logarithm of reaction time as the X variable in a regression model. Or, the researcher might choose to enter both reaction time and the square of reaction time as predictors in the model. Thus, the model can represent a variety of nonlinear forms of relationships among variables. Similarly, although the model may appear to be restricted to additive relationships, a single X variable might in truth be the product of reaction time and number of errors, which allows for a specific form of nonadditive (i.e., interactive) relationship.

The multiple regression model itself can be generalized in any of several ways. In particular, psychological research often involves the simultaneous consideration of multiple dependent variables. The general linear model expands the multiple regression model by allowing for multiple Y variables. For example, if there are p Y variables, the model includes p β_0 parameters, p β_1 parameters, p β_2 parameters, and so forth. The general linear model then encompasses a wide variety of procedures as special cases, such as analysis of variance, analysis of covariance, multiple regression, multivariate analysis of variance, multivariate analysis of covariance, and discriminant analysis.

The general linear model can in turn be generalized in two important ways. First factor analysis expands on the general linear model by allowing unmeasured latent variables to be included in the model. Notice that the general linear model and all its special cases outlined above require that at least one Y variable and at least one X variable be observed. Furthermore, a numerical score is obtained for each individual on each variable, although in some cases a variable may arbitrarily be coded to reflect group membership (e.g., in-

dividuals in a treatment group are coded 1 on X , while individuals in a control group receive a score of 0). However, in 1904 Charles Spearman developed a model called factor analysis, whereby the predictor variables are neither observed nor measured. For example, with four dependent variables this model might be written as:

$$Y_{1i} = \beta_{10} + \beta_{11}F_i + \epsilon_{1i}$$

$$Y_{12} = \beta_{20} + \beta_{21}F_i + \epsilon_{2i}$$

$$Y_{13} = \beta_{30} + \beta_{31}F_i + \epsilon_{3i}$$

$$Y_{14} = \beta_{40} + \beta_{41}F_i + \epsilon_{4i}$$

Although this model has the same appearance as the general linear model, there is a crucial difference because the F variable is not measured. Instead, it is a latent variable, or a factor. Even though scores on F are not observed, under certain specified conditions it is nevertheless possible to estimate the β parameters in the model and test relevant null hypotheses. For example, the model shown above would allow a researcher to test a hypothesis that a single latent variable explains common individual differences observed on the four Y variables. Factor analytic models have received much attention from psychologists over the years in part because, as Cronbach pointed out, the study of individual differences has been one of the two main traditions of scientific psychology. In recent years latent variable models have received additional attention also because of the realization that most theoretical constructs in psychology cannot be measured perfectly.

Second, although the general linear model allows simultaneous investigation of multiple dependent and multiple independent variables, it sometimes is not flexible enough to serve as an appropriate statistical model. One potentially major limitation is that it requires each variable to serve as either an independent variable or a dependent variable. However, it does not allow a variable to appear on both sides of the equation. In reality, however, a researcher may conceptualize some variables as both causes and effects in a broader system of variables. Structural equation modeling (also referred to as covariance structure modeling) generalizes the general linear model by allowing some variables to be included on the left side of an equation (thus constituting a dependent variable) but also on the right side of one or more other equations (thus constituting an independent variable in this context). Such models are especially useful for studying intervening relationships where one variable is thought to mediate the relationship between two others. For example, in a simple case, X_1 might be hypothesized to cause X_2 , which in turn

is thought to cause X_3 , so in this system X_2 plays the role of both cause and effect. Structural equation modeling has the important added benefit that it allows latent variables as well as observed variables to serve as both causes and effects.

Another recent generalization of the general linear model is multilevel modeling, also referred to as hierarchical linear modeling. Like the general linear model and the structural equation model, the multilevel model allows more than one equation. The distinguishing characteristic of the multilevel model is that the multiple equations pertain to different levels of data. For example, one popular application of the multilevel model is to longitudinal data, in which multiple individuals may be measured over multiple points in time. The multilevel model expresses such data in terms of two distinct equations. The first equation models the pattern of each individual's changing scores over time. In this idiographic model, one or more parameters are estimated for each individual. These parameters then essentially become dependent variables in another set of models based on between-individual characteristics. Multilevel models can be useful not only for modeling change over time, but also for studying individuals in environmental contexts. For example, an educational psychologist might be interested in studying individual-level and school-level correlates of math achievement.

Summary

The diversity of psychological inquiry and the complexity of behavioral research requires a sophisticated array of methodological tools. The development of new statistical methods allows psychological researchers to explore old scientific questions from new perspectives, as well as to point out entirely different ways of conceptualizing research questions. While psychological methodology is ever changing, basic principles of research design, measurement, and data analysis serve to unite the vast diversity of questions addressed by the discipline of psychology.

[See also Analysis of Counts; Analysis of Variance; Exploratory Data Analysis; Hypothesis Testing; Nonparametric Statistics; and Statistical Significance.]

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Scott E. Maxwell

DATA COLLECTION. [This entry comprises two articles: Field Research and Laboratory Research. Included for each article is an overview of the concept and its purpose, importance, and role in the field of psychological research, including its historical development, methodology, and various types. See also Artifact; Assessment; Case Study; Data Analysis; Direct Observation; Qualitative Research; Sampling; Statistical Significance; and Survey Methodology.]

Field Research

The term *field research* refers to a systematic investigation that is carried out in the field, as opposed to in a laboratory. There are numerous methods that can be categorized as field research, including experiments in naturalistic settings, ethnographic fieldwork, systematic observational methods, field surveys and interviews, and the use of unobtrusive methods.

Methods of Research

Ethnographic fieldwork aims to describe a society's culture. It identifies what people must have learned in or-

der to participate acceptably in the activities of the society. It describes also how people deal with one another. To do this the researcher first learns the language of the people in that setting and then categorizes the people, things, and events to which individuals in a given society respond. The investigator examines the dimensions that distinguish these categories, the distribution of the categories on those dimensions, and often describes how people govern themselves, ritual performances, and methods of conducting local affairs. To do a good job the ethnographer must keep good notes of daily observations, and store and retrieve the data in the field to form generalizations about the culture. Upon returning to their base, researchers often write a book (an ethnography) that summarizes the data and their generalizations.

Systematic observations in naturalistic settings specify how behavior is taking place in a particular setting. This approach requires specification of the units of study, such as categories of people, behavior, and settings. Systems of data recording vary on two dimensions: all-inclusive description (e.g., videotaping of social behavior) versus selective description (e.g., recording only who asks questions of whom), and behavioral replicas (e.g., films) versus transformations (e.g., trait ratings). Crucial issues include how to sample people, settings, and events. Should one record behavior rates or proportions of different types of behavior? How should interactional sequences be recorded? Should one record only motor behavior, verbal behavior, or both? Should the observer use instrumental aids (e.g., a written protocol and shorthand) or some coding system such as checklists? Coding has to specify time intervals, behavior boundaries, theoretical bases, breadth or detail of coverage. Distortions may be introduced while coders work, because they are susceptible to shifts in their levels of adaptation. For example, if they have coded a very large number of aggressive behaviors, a mildly aggressive behavior may be coded as neutral.

Surveys and interviewing examine the beliefs, attitudes, and values of samples of a population. Sampling of people, questions, and response formats are important issues. Questionnaires (administered to groups of people or through the mail) and face-to-face interviews have similar problems. Social disclosure is often problematic. [See Research Methods, *article on* Concepts and Practices.] The *authenticity* of the survey reflects the capability of the interviewer to get unbiased and genuine responses from the respondent. Authenticity depends on who the interviewer is (affiliation, image, similarity to interviewee, respondent relevance for the topic under investigation, interviewer bias); what the setting is (how relevant to the topic, social desirability of the setting, capacity to reach depth, length, and structure

of the interview or questionnaire). It also includes respondent factors (gap between private and public opinions, previous experience with similar methods, saturation with studies, response sets), and cultural factors (norms for giving answers, reticence, game playing with interviewers who are perceived as out-group members). The interviewers usually must be trained, and the preparation of a booklet that discusses the problems of interviewing is recommended in order to minimize artifacts. [See Artifact, *article on* Artifact in Assessment.]

Tests and inventories are used to measure abilities, personality, and attitudes. Projective techniques can also be used to measure motives. Many of the issues discussed under surveys and interviews are also relevant with tests and projective techniques. Construct validation where the measurements of the antecedents and consequences of a construct conform to the expectations of theory are especially important. [See Attitudes, *article on* Attitude Measurement; Projective Methods; Construct Validity; and Data Analysis.] Issues of data analyses, such as the comparability of the measurements across samples, must be considered.

Unobtrusive methods in which the participants are unaware that they are being studied, usually examine attitudes. These methods are especially appropriate when the issue under investigation is taboo, embarrassing, or the issue is subject to incompatible normative pressures. The classic description of these methods was presented by Eugene J. Webb and associates in *Unobtrusive Measures: Nonreactive Research in the Social Sciences* (Chicago, 1966/1981) and are discussed elsewhere in detail. [See Unobtrusive Methods.]

Concerns have been expressed about the ethical acceptability of unobtrusive methods, on the grounds that there is no informed consent. For example, the "lost letter technique" involves dropping 400 or so letters in a wide sample of locations in a city. The assumption is that people who see the letters would mail them. If they favor the recipient (addressee) they will be more likely to mail the letter than if they object to the recipient. Half the letters are addressed to a socially controversial recipient (e.g., a proabortion committee) and the other half, randomly determined, to a neutral recipient. The difference in the rate of return of the two sets of letters is used as an indicator of attitudes toward the controversial addressee. For example, if 100 of the 200 letters to the neutral recipient are mailed, but only 50 of the 200 letters to the controversial recipient are mailed, this would imply a substantial opposition to the controversial recipient. However, if people had heard of this method, the results would be distorted. That is, people who knew about the method would become suspicious if they found a letter that had been dropped near a mailbox; they might not mail it,

even if the letter was not part of an experiment. Thus, a further ethical concern is that a socially desirable act (mailing the letter that did not get into a mailbox) may not occur.

General Problems of Field Methods

All field methods raise issues of sampling, authenticity, reliability, and validity. Sampling people ideally should be done in such a way as to obtain a representative sample of the population to which the researchers wish to generalize. For example, one might use area probability sampling to represent the population of a city. This can be done by listing all the blocks of the city and taking a random sample of these blocks. Then in each block one can list all the addresses, and take a random sample of these addresses. Then at each address one can list all the individuals who are normally living or working at that address, and take either a random or systematic sample (e.g., all voters) of the people or study all these individuals. This method of sampling has the advantage that the error of measurement can be calculated at each step and the total error of measurement can be estimated for the particular survey. However, some individuals do not wish to be surveyed, which is especially true for those who are members of disadvantaged populations, do not speak the language of the interviewer, have a criminal record, or are trying to hide from the authorities (e.g., illegal immigrants). [See Reliability; Validity; and Sampling.]

Sampling a universe of questions that captures the important aspects of a construct is also important. Constructs can be broad or narrow. If the construct is broad (e.g., intelligence), then one should sample the various kinds of intelligence (verbal, quantitative, emotional, memory, creativity, etc.). The broader the construct, the less internal consistency there will be in its measurement. Ideally one needs to measure each of the different aspects of the construct separately. Thus the fidelity of measurement is usually inversely correlated with the breadth of measurement. If one examines a narrow aspect (e.g., memory for faces) one can get high levels of reliability, but the measure will be unrelated to other aspects of intelligence. If one measures the construct broadly (i.e., different aspects of intelligence), the internal consistency of the measurements (say, memory for faces would not correlate with verbal intelligence) will be low.

Sampling the response formats is also important. One can ask people to perform a variety of tasks, such as rate, rank, remember, freely associate, complete sentences, write stories that correspond to a picture, push buttons, recognize, interact with others, and so on. Again issues of breadth and fidelity will have to be considered. Rating may not correlate with ranking as well as one might expect. Two rating tasks will be correlated

with each other because they require the same type of response. This similarity suggests reliability, but it does not guarantee that one has obtained an adequate, useful measure.

The dissimilarity of interviewee and interviewer can introduce distortions. It can reduce authenticity (see above) and can result in avoidance of the interviewer. In some cultures women cannot be interviewed by male researchers. In some cultures it is mandatory to lie to an outsider, and one entertains one's friends by mentioning what lies one has told to the outsider.

Response sets such as social desirability, acquiescence (saying "Yes" or "Agree" to all questions), extreme response style ("Very Strongly Agree/Disagree"), or moderate style (using the middle of a scale, no matter what the question) can distort the results. [See Social Desirability.] Sometimes these response sets can be overcome by methodological strategies, but experts are concerned that some strategies can introduce their own distortions and artifacts.

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Harry C. Triandis

Laboratory Research

Data collection is a critical phase in all laboratory research. The term refers to many different kinds of activities, because data come in many different forms. Depending on the questions asked and the research techniques used, the data collected from participants may be responses on questionnaires, reaction times to stimuli presented on computer screens, recall or recognition of events that were recently experienced, physiological measures such as heart rate, or dozens of other measures designed by psychologists to explore behavior. The critical quality that researchers desire is for data to be unbiased, so that the hypothesis or question posed by the research can be put to a fair and accurate test. [See Data Collection, article on Field Research.]

In *Unobtrusive Measures* (Chicago, 1966), Webb, Campbell, Schwartz, and Sechrist pointed out that one

central dimension of data is whether they result from direct (obtrusive) or indirect (unobtrusive) measures. If participants are aware that the responses they produce are being measured, the data are said to be collected by direct or obtrusive measures. If other aspects of behavior are measured (e.g., speed of walking from the lab, or eye contact during an experimental session) without the participants' awareness, the measures are said to be indirect or unobtrusive. Direct measures are often appropriate. For example, if a researcher wants to test a person's recollection of recent events, the person must be made aware of this purpose in order to participate. However, in other cases, indirect measures may be appropriate, especially when a participant's behavior may change if he or she knows that observation is occurring. [See Hawthorne Effect; Artifact, *article on Artifact in Assessment*; and Unobtrusive Measures.]

Data collection is typically arranged to be as free as possible from bias. One type of bias is fraud: Researchers may discard data that disagree with their hypothesis, or they may fudge data in slightly less obvious ways. Many famous examples of fraud exist in science. However, because of the self-correcting nature of science, in which replication and confirmation of results by other researchers is part and parcel of the process, outright fraud (although reprehensible) may not, in the long run, pose too much danger to the scientific enterprise. Therefore, although cases of outright fraud do exist and must be guarded against, the typical problem of bias in data collection is more subtle [See Artifact, *article on Artifact in Research*.]

We consider several problems that can compromise data collection: (a) the effects researchers can unintentionally exert on data analysis; (b) experimenter expectancy effects; and (c) effects of participants and their expectancies on research. During data collection, many opportunities exist for bias to creep in. Some are very simple. If the experimenter collects the data by hand, he or she may simply misrecord what the participant did or said. (Automated research procedures, especially those using computers, make this error less likely). In a related vein, researchers may relax their criteria for collecting data over the course of the research, becoming more casual in the systematic and rigorous application of the procedure, and they may be unaware of doing so. This practice may change the data as they are collected over time.

More subtly, researchers may set criteria for elimination of participants' data that do not meet certain conditions of the experiment. For example, there may be a manipulation check to ensure that the experimental variable has had an effect. This practice is often a good one, and if it is applied in the same way to all conditions of the experiment, no bias should occur. However, if the criteria are applied slightly differently to the various conditions, then more participants may

be dropped from one condition than another, thereby influencing the results. Similarly, researchers measuring reaction times often drop responses that are outliers (those that are very different from the mean of the group). The idea is that the participant's attention may have wandered (or he or she may have fallen asleep) on that trial, and therefore the data should be discarded as unrepresentative. This seems fair, but if one condition of the experiment actually does produce more variable responding than does another condition, then more responses might be excluded from this first condition. The result is that behavior in the two conditions might look more similar than is really the case, because the outlying responses were eliminated from the first condition.

These subtle biasing factors are difficult to eliminate completely; after all, they are often produced by the desire to remove bias in the data, such as by eliminating outliers that are unrepresentative of the data. The best strategy is to provide multiple approaches to data analysis (different cutoffs for outliers, different criteria for excluding participants) to see if the same conclusions hold under all sets of assumptions. To the extent that the same conclusions hold across various practices, then the researchers may have more confidence in accepting the findings as valid.

Another problem is the experimenter expectancy effect, discussed by Robert Rosenthal in *Experimenter Effects in Behavioral Research* (New York, 1966): If an experimenter testing participants knows the condition in which they are being tested, the experimenter may behave differently in subtle ways and influence the outcome of the research. For this reason, research is often conducted under conditions in which the experimenter is unaware (or "blind") with respect to the condition in which the individual participates. This practice minimizes or eliminates experimenter expectancy from influencing the outcome of the research. In some computerized studies in cognitive psychology, the computer administers the various experimental manipulations without intervention of the researcher, which also circumvents the problem. When it is not possible to make the experimenter unaware of conditions, then he or she should work diligently to treat all participants in all conditions as similarly as possible; only the experimental manipulation should vary. [See Expectancy Effects.]

A third type of bias in data collection is that exerted by the expectancies of the participants themselves. For example, a procedure or strategy might be hypothesized to improve participants' memories in one condition (an experimental condition) relative to another (the control condition). However, if participants in the experimental condition know or expect that the procedure may improve memory, then they may try harder in this condition than do those participants in the control condition, therefore introducing a confounding factor and

biasing the data collection. It is difficult to guard against this problem in all types of research, because participants in psychological research often must be made aware of the topic of study in order to be tested. When participants can be rendered unaware of the condition of the experiment, they are also said to be blind to the condition of the experiment. An example occurs in testing the effects of drugs. If a drug is tested to improve mood in depressed individuals, it is necessary to have at least two conditions. Both groups are told that the study is about whether a particular drug elevates mood, but those in one group receive the actual drug, whereas those in the other group receive an inert substance (a placebo) that does not influence mood. The participants will not know if they are assigned to the drug or the placebo condition. Even the placebo control group's moods will probably improve during the course of the experiment, due to the expectancy or placebo effect; therefore, the question at issue is whether moods of those in the experimental group receiving the drug will improve more than the moods of those in the control group. If so, the conclusion could be drawn that the drug is effective. The placebo condition overcomes the pitfall of participant expectancy effects hampering conclusions that can be drawn from the data [See Demand Characteristics; and Placebo Effect in Research Design.]

In some cases it is possible to overcome both experimenter expectancy effects and participant expectancy effects simultaneously by using procedures in which both parties are unaware of the assigned condition of the participant. In these cases, the experiment is said to be conducted under "double-blind" conditions. Because neither the experimenter nor the participant knows what condition is being tested in double-blind studies, some third person keeps records as to the assignment of participants to conditions.

Data collection in the laboratory is a central aspect of most psychological research. Careful researchers provide safeguards so that the data will be unbiased and permit a valid test of the issue under study. Researchers must be on constant guard to show that the forms of bias discussed here do not cloud interpretation of their results.

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Henry L. Roediger III and Erik T. Bergman

DATE RAPE. See Rape.

DAY CARE. Three major, often conflicting, purposes for day care create the dilemma we see today. First, day care supports maternal employment, which is a necessity for individual families and for the economy. Second, child care (a term preferred over day care) serves children's development, which can be enhanced by high-quality early childhood programs, whether or not their mothers are employed. Third, child care has been used throughout the twentieth century to socialize economically disadvantaged and ethnic minority children to the cultural mainstream (Scarr & Weinberg, 1986).

The roots of child care are in the welfare and reform movements of the nineteenth century. Day nurseries, which evolved into the child care centers of today, began in Boston in the 1840s to care for poor and immigrant children, whose mothers had to work (Scarr & Weinberg, 1986). The primary purpose of day nurseries was to keep the children of the poor safe and fed while their mothers worked. Other benefits, such as early education, were secondary. By the late 1960s, educators and child development researchers recognized the value of nursery schools for poor children, who needed the stimulation and learning opportunities that such early childhood settings afforded children from affluent families.

By contrast, kindergartens and nursery school began in the early twentieth century with the purpose of enhancing the social development of middle- and upper-class children. For a few hours a week, the children could play with others and experience an enriched learning environment under the tutelage of trained early childhood teachers. Nursery schools existed to serve the developmental needs of middle- and upper-class children, whose mothers were not employed

(Scarr & Weinberg, 1986). Now that the majority of middle-class mothers are employed, distinctions between day care and early education are blurred.

In 1995, 62.3% of mothers with children under six years were employed. This rate was up more than 2% from 1994 and nearly 5% from 1993. Among mothers with children under two years, 57.9% were working in March 1995, up 3.5% from 1993. The ideal of a non-employed mother remained strong, however. One legacy for working mothers of the baby boom generation and beyond is guilt about their employment.

Varieties of Child Care Arrangements

When the focus is on early childhood education, whether for higher- or lower-income children, the setting is usually a center or preschool. When the focus is on care while parents work, the setting is often a home.

Family Day Care Versus Center Care. Family day care providers care for children in their own homes. The provider's own children are often included in the mix of ages from infants through schoolage children who come before and after school. Most family day care homes accommodate 6 or fewer children with one caregiver. Some larger homes care for 6 to 20 children and employ aides. States generally regulate larger homes.

Child care centers provide group care for children from infancy to school age in age-segregated groups with smaller ratios of children to adults at younger ages. Facilities vary from church basements to purpose-built centers with specialized spaces and equipment. The most notable differences between homes and centers are educational curricula and staff training, which centers are required to provide and homes are not. Parents prefer center-based care for preschool children and use more home care for infants and toddlers.

Licensed Versus Unlicensed Care. In all states child care centers must be licensed by a state department of social services or its equivalent. (In 11 states, church-sponsored child care is exempt from all but health and safety licensure.) Licensure includes regulations on health and safety, ratios of children to adults, group sizes, staff training, and often required play materials. Regular inspections are done in semiannual or annual visits, and more frequent visits if problems have been noted.

Most family day care providers care for fewer than six children and are therefore exempt from any state regulation or inspection. Availability of federal food subsidies to licensed homes, however, has encouraged more family day homes to seek licensure or registration. Family day care homes are rarely visited by state regulators.

Nonprofit Versus For-Profit Centers. In the United States, child care centers are sponsored by churches, nonprofit community groups, public schools,

Head Start, employers, for-profit independent providers, and corporations. The mix of public provision and private enterprise in U.S. child care reflects the ambivalence Americans feel about whether child care is primarily a publicly supported service for children or a business expense for working. Should tax dollars be used to supply child care only to poor children, or should all children be eligible for publicly supported child care? Should family day care and privately owned centers *profit* from the child care business, or should child care be a public service like primary education?

Where Are Children Today?

In 1995, there were nearly 21 million children under the age of 5 who were not yet enrolled in school. Of these, about 40% were cared for regularly by parents, 21% by other relatives, 31% in child care centers, 14% in family day care homes, and 4% by sitters in the child's home. These figures total more than 100%, because 9% of children have more than one regular care arrangement (Hofferth, 1996).

In 1965 only 6% of children were cared for in centers; by 1995, 31% were (Hofferth, 1996). Children from more affluent families and those from families on welfare were most likely to be enrolled in centers rather than cared for in homes. Families with more than \$50,000 annual income can afford center-based programs; those below the poverty line receive subsidies for child care. Working families with incomes below \$25,000 per year are the least likely to afford center-based care.

A Labor Force Perspective on Child Care Research

Today, 48% of workers are women; 80% of those women are mothers. Mothers (and fathers) are employed because their families need or want the income to enhance their standard of living. Two thirds of mothers are working to keep their families out of poverty (Scarr, Phillips, & McCartney, 1990). With welfare reform, this proportion has increased.

Gender Equality. Another reason for maternal employment is to promote economic, social, and political gender equality. The major reason for women's lesser compensation and career achievements is due to family responsibilities that fall more heavily on women, especially when there are small children in the home. Unequal child care responsibilities lead mothers to be less motivated to maintain continuous, full-time employment, which is the key to income advances. Income inequalities between men and women are largely explained by the lower labor force participation of mothers in their child-bearing years. In 1995, *childless* women in their 20s and 30s earned 98% of men's wages (*Wall Street Journal*, 1997).

If child care costs were more reasonable, national

surveys show that 10 to 20% more mothers would return to the labor force after giving birth. Accessibility and cost determine the impact of child care on parents (Prosser and McGroder, 1992). Travel time to a child care setting directly affects how likely a mother is to stay in the labor force. Middle- and upper-income mothers are much more likely to keep their jobs if they use day care centers, whereas labor force participation among low income mothers depends on the availability of relatives to care for children, because they cannot afford to pay market rates for child care (Collins & Hofferth, 1996).

Since the late 1980s, married mothers have been working at the same rate as single mothers (Scarr, Phillips, & McCartney, 1989). By the mid-1990s, public empathy for mothers supported by Aid for Families with Dependent Children (AFDC) to stay home with their children had evaporated. Reform of the welfare system rose to the top of the political agenda and was passed in 1996. Child care is *the* essential ingredient in welfare reform and mothers' employment.

Absenteeism and Productivity Effects. When child care arrangements break down, employed parents are more likely to be absent, to be late, to report being unable to concentrate on the job, to have higher levels of stress and more stress-related health problems, and to report lower parental and marital satisfaction. Break-downs in child care arrangements are frequent and stressful; in a Portland study, 36% of fathers and 46% of mothers who used out-of-home care reported child care-related stress. Leading causes of child care break-down are child illness and a provider who quits (Gallinsky, 1992).

A Child Development Perspective on Child Care Research

Since child care can extend from birth through adolescence, research involves a complex array of factors.

Infant Care. Nonmaternal infant care is the most controversial issue in child care research. From the mid-1980s to the present, dramatic claims have been made about the damaging effects of early entry into day care on infants' attachments to their mothers (Belsky, 1992). The NICHD Early Child Care Research Study (NICHD, 1997) of more than 1,000 infants shows no relationship between age at entry or amount of infant care and attachments, measured by the Strange Situation (for reviews, see Scarr, 1998). Naturally, less sensitive, less well-adjusted mothers are more likely to have insecurely attached infants. Several interaction effects suggest that higher quality day care may help to offset poor mothering (NICHD, in 1997).

Dimensions of Quality. Child care researchers and practitioners around the world agree that quality child care consists of warm, supportive interactions with adults in a safe, healthy, and stimulating environment,

where learning opportunities and trusting relationships combine to support individual children's physical, emotional, social, and intellectual development. Poor care is unresponsive to children's needs, not deliberately cruel.

Quality of day care in the United States varies from excellent to dreadful and is, on average, mediocre (NICHD, 1996; Scarr, Phillips, McCartney, & Abbott-Shim, 1993). Quality is measured in units that are regulated (such as ratios of teachers to children and teacher training) and in observations, such as adult-child interactions and appropriate activities. Although quality is a multifaceted concept, commonly used measures have similar dimensions (Scarr, Eisenberg, & Deater-Deckard, 1994).

Effects of Poor Quality. Poor quality child care has been reported to put children's development at risk for poorer language and cognitive scores and lesser ratings of social and emotional adjustment (for a review, see Scarr & Eisenberg, 1993). Measures of child care quality account for 1 to 2% of the variation in child measures, a small effect. The implications of even small effects are not straightforward, however, because the quality of care selected by parents is correlated with parents' personal characteristics (Bolger & Scarr, 1995), thereby complicating interpretations of any effects of child care per se.

Long-Term Effects of Day Care. Parents and policy makers want to know if quality differences in early child care have lasting benefits or detriments for children. Low-income children definitely benefit from quality child care, which has been used successfully to improve their early development (Field, 1991; Ramey & Ramey, 1992). For children from middle- and upper-income families, the long-term picture is far less clear. Long-term effects of day care quality were reported in longitudinal studies by Vandell, Henderson, and Wilson (1988) and Howes (1988), but recent studies fail to confirm those results. Our research group has conducted four longitudinal studies of child care quality and family effects on children's development from infancy to school age, with null results in all cases (Chin-Quee & Scarr, 1994; Deater-Deckard, Pinkerton, & Scarr, 1996; McCartney, et al., 1997; Scarr, Lande, & McCartney, 1999; Scarr, Phillips, McCartney, & Abbott-Shim, 1993; Scarr & Thompson, 1994).

Conclusion

Within a broad range of safe environments, the effects of quality variations in child care on most children's development are small and temporary. These results do not apply to children from low-income homes, for many of whom quality child care programs supply missing elements of emotional support and intellectual opportunities. Quality variation within the range of centers studied does not have a

major impact on the development of children from ordinary homes. Given the learning opportunities and social-emotional support that their homes generally offer, child care of mediocre to good quality is not a unique or lasting experience for them. For most children, parents supply the genes and the home environments, which correlate with the care they select for their children outside of the home.

[See also *Fathering*; and *Preschool Education*.]

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Sandra Scarr

DAYDREAMS. Daydreams are part of the stream of thoughts and images that occupy most of a person's waking hours. Some are fanciful mental episodes, such as those about special achievements, heroic rescues, hair-raising escapes, unrealistic athletic or supernatural feats, romantic or sexual escapades, uncharacteristic assertiveness, and improbable aggressive acts. More often daydreams are more or less realistic although unintentional thoughts about the daydreamer's real life, as in mind wandering or brief periods of inner distraction. Researchers have defined them in at least three different ways: (1) as unrealistic, fanciful thoughts (as implied by psychoanalysts since Sigmund Freud); (2) as thoughts unrelated to the immediate environment or tasks one is performing (as proposed by psychologist Jerome L. Singer, the pioneer of modern daydreaming research, and his colleague John Antrobus); or (3) as spontaneous, "undirected" or "respondent" thoughts that flit into and back out of consciousness unbidden with no apparent purpose (as I once proposed; Klinger, 1971). However, these definitions have been shown to refer to three largely independent properties of thought. For present purposes, daydreams are defined as *either* nonworking (unbidden, apparently purposeless) *or* fanciful thoughts, whether spontaneous or intentional.

These are usually distractions from whatever the daydreamer is doing.

Much has been learned about daydreams during the past century, much of it contrary to previous beliefs. The first work based on extensive observation of daydreaming, in this instance the author's own daydreams, was by the Dutch psychologist Julien Varendonck (*The Psychology of Day-Dreams*, London, 1921), who anticipated many of the general conclusions reached later with other methods. The next major advance was Singer's classic 1966 book *Daydreaming*, and since then, investigators have contributed both major theory and a great deal of data to an understanding of daydreams.

Most of the data have been collected with retrospective questionnaires, such as Singer and Antrobus's Imaginal Processes Inventory (Princeton, N.J., 1970) and psychologists Sheryl C. Wilson and T. X. Barber's Inventory of Childhood Memories and Imagining (in E. Klinger, Ed., *Imagery*, New York, 1981), or by means of thought sampling (also called consciousness or experience sampling, developed independently during the 1970s by psychologists Mihalyi Csikszentmihalyi, Russell Hurlburt, and Eric Klinger). In thought sampling, beepers or pagers interrupt research participants at unexpected times, at which point they report the thoughts, feelings, and activities that occurred just before each signal. Sometimes, they write down daydreams whenever they become aware of them. Sampling methods, though labor intensive, depend far less than retrospective questionnaires on the accuracy of the reporters' memories, but they sample only a tiny proportion of participants' thoughts.

About half the sampled thoughts of college students are daydreams. Psychologist Leonard Giambra, using the Imaginal Processes Inventory and experimental methods, found that daydreaming peaks in young adulthood and then gradually subsides, especially in extreme old age and especially if the daydreams are sexual, heroic, or hostile. In experiments by Singer, Antrobus, and colleagues, people daydreamed less while engaged in difficult tasks or when the stakes were high, but no experimental conditions they tried eliminated it.

Most daydreams are related to the goals daydreamers are pursuing, whether lofty or mundane, long-term or immediate, positive or aversive (Klinger, 1971, 1990). In Singer's terms, daydreams are about unfinished business. Experiments have shown that daydreams are triggered by the person encountering some cue associated with a goal pursuit, either external, such as something read or heard, or internal, such as one's own ongoing thought stream. If the individual can reasonably take overt action then toward the goal, he or she will; if not, the impulse becomes a purely mental response, often a daydream. Goal-related cues may depend for their daydream-triggering effect at least partly on their evok-

ing emotional responses. Therefore, emotion-arousing cues such as reminders of a pleasant vacation just ended or of a distressing failure may also trigger daydreams. Inasmuch as goal-related cues can interfere with other cognitive activity and, during sleep, can shift the course of dreams, the response to them appears to be involuntary and probably inexorable.

Views of the worth of daydreams have changed sharply. Daydreaming has traditionally been viewed as counterproductive, and, after Freud, as infantile, regressive symptoms of neurosis. Until the 1960s and beyond, textbooks for prospective teachers warned against allowing children to daydream lest they become so entranced by their daydreams that they retreat into them and become schizophrenic. None of these judgments has been borne out by empirical evidence. There is no consistent relation between enjoying daydreaming and any form of mental illness. Similarly, contrary to Freudian theory, people with the most active sex lives do the most sexual daydreaming, and even daydreaming about sex during sexual activity is virtually unrelated to mental health or overall satisfaction with one's partner. People who most need to escape into fantasy—for example, the depressed, the lonely—have daydreams that are on average more depressive or lonely and are therefore unattractive havens. Depressed individuals daydream on average more than others while ruminating or worrying about their troubles, which is no escape.

"Fantasy-prone" nurses studied by Wilson and Barber had by and large been a well-functioning professional group with normally satisfying social relationships. Psychologists Steven Lynn and Judith Rhue (*American Psychologist*, 1988, 43, 35–44) similarly found few links between mental disability and fantasy-proneness, although the most extreme group had modestly more encounters with the mental health system and with dissociative phenomena. However, the inventory they used also measures some behaviors other than daydreaming frequency that may be associated with mental illness.

Very little is known about the developmental course of daydreaming during childhood. There is, however, some agreement that it picks up where overt play leaves off. In that case, children's imaginative play is the precursor of fanciful daydreaming. Psychologists Jerome and Dorothy Singer (*The Child's World of Make-Believe*, New York, 1973), Roni Tower (*Imagination, Cognition, and Personality*, 1984–85, 4, 349–364), and colleagues have found the most imaginative children to be more confident, resourceful, self-controlled, assertive, and socially skilled, and less aggressive or distressed.

Researchers, beginning with Singer and Antrobus, have identified three ways in which individuals' daydreaming styles differ: positive-constructive daydream-

ing (which daydreamers enjoy having), guilty and fearful daydreaming, and poor attentional control. These daydreaming styles reflect the daydreamers' overall tendencies toward positive emotion, negative emotion, and other personality traits. German psychologists Julius Kuhl and Jürgen Beckmann (1994) have identified individual differences in "action orientation," the ability to put rumination aside and take action. Daydreamers who focus mainly on desired outcomes rather than how to attain them may, according to studies by German psychologists Peter Gollwitzer and Gabriele Oettingen (1997), be less successful in attaining them.

Daydreams probably perform important, even central, functions in human life. While a person is absorbed in one particular task they serve as continual reminders of the rest of the person's agenda. People gain knowledge by spontaneously reviewing their past experiences in daydreams and rehearsing for future situations. Daydreams appear to generate creative solutions to difficult problems. They are linked with greater empathy for others. They may be spontaneous but not entirely idle.

[See also *Dreams; and Fantasy.*]

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Eric Klinger

as a low-cost alternative to inpatient psychiatric care. The concept of day hospitals was first brought to North America in 1946 when the first of its kind was developed by D. Ewen Cameron at the Allan Memorial Institute in Montreal. This program was designed as an alternative to inpatient treatment for patients with acute illnesses. Shortly thereafter, a number of partial hospitalization programs were developed in both the United States and England as a solution to a shortage of inpatient resources. The first American partial hospitalization program was established at the Menninger Clinic in 1958.

Such programs remained scarce in the United States until the 1960s, at which time the development of partial hospitalization programs grew rapidly. Several factors contributed to their growth, including the development of more efficacious psychotropic agents, the development of group treatment techniques, milieu therapy, and the idea of the therapeutic community. The civil rights movement resulted in deinstitutionalization policies by both the American and Canadian governments, thereby increasing the demand for alternatives to inpatient care of psychiatric patients. In 1963, the U.S. Congress passed the Mental Retardation Facilities and Community Mental Health Center Construction Act, which made partial hospitalizations a mandated service in the community.

Although many partial hospitalization programs were developed in the 1960s with the expectation of being widely used, these programs have had a history of underutilization. The intent of the deinstitutionalization movement was that outpatient programs would grow as inpatients were discharged into the community. Most states, however, gradually decreased their funding for partial hospitalization programs, and third party reimbursement has been low relative to more traditional inpatient and outpatient services, resulting in the failure of these programs to be utilized as widely as was originally hoped. This underutilization was also reflected in the decrease in the number of publications pertaining to partial hospitalization programs during the 1980s.

Instead of being defined by their own qualities and strengths, partial hospitalization programs have often been referred to as an economical alternative to inpatient care. These programs have traditionally had a difficult time defining and establishing themselves as a beneficial therapeutic modality in their own right. The lack of clear definitions has resulted in confusion in the literature.

In an effort to provide a clear description of such programs, the American Association for Partial Hospitalization (AAPH) published, in 1982, a definition of partial hospitalization programs that emphasized the multidisciplinary nature of care within a setting less

DAY TREATMENT. Partial hospitalization programs were first developed in the Soviet Union in the 1940s

restrictive than inpatient hospitalization. In 1991, the AAPH modified this definition to include the ideas of time-limited treatment and a stable therapeutic milieu. The definition now reads:

Partial Hospitalization is defined as a time-limited, ambulatory, active treatment program that offers therapeutically intensive, coordinated, and structured clinical services within a stable therapeutic milieu. Partial hospitalization is a general term embracing day, evening, night, and weekend treatment programs which employ an integrated, comprehensive schedule of recognized treatment approaches. Programs are designed to serve individuals with significant impairment resulting from a psychiatric, emotional, or behavioral disorder. They are also intended to have a positive impact on the identified patient's support system. (Block & Lefkowitz, 1991, pp. 1-2)

Partial hospitalization programs have been described as "half time in plus half time out" (Weil, 1984). These programs strive to provide comprehensive treatment while permitting patients to remain in contact with their community, including family, friends, and work settings. The balance of intensive multidisciplinary treatment and community living is unique to this therapeutic setting.

Partial hospitalization programs can be divided into three broad categories according to their function: day hospitals, day care centers, and day treatment programs. Day hospitals are most closely tied to inpatient psychiatric hospital units because they provide the same types of services to acutely ill patients. In addition, day hospitals are designed to accommodate patients who are transitioning from inpatient to outpatient care. Day-care centers focus primarily on the maintenance of chronically ill patients. Although these patients do not need to be hospitalized, they require a more rigorous treatment program than can be provided by traditional outpatient services. Typically, patients in a day-care program are over the age of 50, suffer from schizophrenia, and are primarily dependent on family and social services. Finally, day treatment programs treat patients who are in remission from an acute psychiatric illness. The goal of day treatment is to reduce patients' symptoms and to enhance their overall functioning. Despite repeated calls in the literature, this nomenclature has not been widely used by psychiatrists and other mental health professionals, and there is little consistency across states—and even among programs within a given state—in the way partial hospitalization programs are described.

The AAPH specifies that the majority of programming at partial hospitalization programs should consist of active treatment that targets the presenting problems of the population (Block & Lefkowitz, 1991). Suggested treatment includes individual psychotherapy, psycho-educational therapy groups, family therapy, and medi-

cation evaluation and maintenance. Adjunctive therapeutic activities are also included in these programs, such as instruction in personal hygiene, social activities, and budgeting. Each individual in such a program has a designated staff member who coordinates the patient's entire treatment and monitors progress throughout his stay. The importance of a stable therapeutic community for a partial hospitalization program cannot be overstated. Efforts to create this therapeutic milieu include the establishment of scheduled activities and client and staff continuity. Activities such as daily community meetings and patient government also aid in the development of a therapeutic community.

Some programs have come under fire for failing to live up to these standards. Most criticism has focused on longer-term facilities serving chronically ill patients; some of which have failed to provide sufficient goal-oriented treatment and rehabilitative services, offering participants little more than pharmacotherapy in quasi-institutionalized settings.

Despite the wide variety of programs described in the literature and methodological problems inherent in much of the research in this area, there are some consistent research findings from which general conclusions may be gleaned. In terms of symptom improvement, familial adjustment, and relapse prevention, partial hospitalization programs have generally been found to be more effective than standard community-based treatment and equally effective as traditional inpatient settings for equivalent patient populations. For example, Rosie, Azim, Piper, & Joyce, (1995) evaluated the effectiveness of a model program from Edmonton, Canada, using a treatment versus delayed-treatment design to assess the progress of 60 matched pairs. The results demonstrated that patients in the treatment condition improved significantly more than those in control conditions on measures of symptomatology, life satisfaction, self-esteem, and interpersonal functioning. These treatment effects were maintained at a follow-up assessment conducted eight months later. There have been mixed findings as to whether partial hospitalization programs produce greater improvement in social functioning relative to traditional inpatient programs.

Research has consistently demonstrated that partial hospitalization programs are significantly less expensive than inpatient programs (for example, Endicott, Herz, & Gibbon, 1978). In terms of suitability, research indicates that anywhere from 15 to 72% of patients referred to partial hospitalization programs who might otherwise be referred to an inpatient setting were deemed appropriate for partial hospitalization programs (Klar, Frances, & Clarkin, 1982; Gudeman, Dickey, Evans, & Shore, 1985). The dropout and nonattendance rates at partial hospitalization programs are relatively high, ranging from a low of 20% to a high of 50%.

Specialized partial hospitalization programs have been developed to meet specific community needs, including treatment for diabetic, borderline, schizophrenic, eating-disorder, chronic-disease, mentally retarded, and substance-abusing patients. Stout (1993) described a therapeutic day-school program for children unable to function in traditional school settings. The program utilized the elements of partial hospitalization programs to help foster children's social, physical, academic, and emotional growth. The program provided academic services in addition to psychological services, including psychoeducational testing, behavioral-modification plans, and individual, family, and group therapy.

Critics of partial hospitalization programs have argued that most of the functions of such programs can and should be assumed by intensive outpatient treatment and assertive community rehabilitation programs (Hoge et al., 1992). These critics argue that the typical length of stay in partial hospitalization programs is greater than needed to stabilize symptoms yet not long enough to affect significant strides in psychosocial rehabilitation. Even the critics, however, acknowledge the usefulness of short-term day hospitals for acutely symptomatic patients. In addition, most criticism has focused on programs that treat primarily schizophrenic patients, and that rely on verbal psychotherapies as a primary therapeutic modality. There appears to be a growing recognition of the utility of traditional partial hospitalization programs for other disorders, including severe personality and mood disorders (Rosie et al., 1995).

There is significant diversity among partial hospitalization programs. Programs often specialize in treating specific populations, such as patients of a certain age or with a specific diagnosis. Staffing can also vary, with various combinations of social workers, teachers, counselors, psychologists, art therapists, music therapists, movement therapists, and psychiatrists. Programs differ in terms of their length of stay. In some programs, the length is predetermined, while other programs have more flexible time limits. Partial hospitalization programs also differ in terms of their function, with some programs focusing primarily on treatment whereas others emphasize rehabilitation.

The future of partial hospitalization programs is uncertain. Although there will likely continue to be a role for short-term programs serving acutely ill patients, the role of longer-term programs is increasingly being assumed by intensive outpatient services. The ultimate survival of this unique mode of treatment and rehabilitation will depend not only on further research demonstrating clinical effectiveness but more important on the ability to provide effective services that are economically competitive with alternative settings.

[See also Inpatient Treatment.]

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James D. Herbert and Suzanne G. Goldstein

DEAFNESS AND HEARING LOSS describe a physical condition with significant psychological implications. Physically, hearing losses are defined by the severity, type, and cause of hearing impairment. Severity refers to the degree to which a sound must be amplified to be heard. The type of hearing loss describes the physiological malfunction (e.g., conductive, sensorineural) that leads to the hearing loss. Hearing losses are unilateral (one ear) or bilateral (both ears). Finally, hearing loss is identified by etiology (e.g., maternal rubella, genetic syndrome).

Psychologically, the functional characteristics of hearing loss are more important than its physical char-

acteristics. Two features of hearing loss affect a person's functioning: (1) the severity or degree of hearing loss with appropriate amplification, and (2) the age of the person at hearing loss onset.

Severity or Degree of Hearing Loss with Amplification

Typically, the degree of hearing loss is associated with response to amplification. People with less severe (i.e., mild to moderate) hearing loss are more likely to benefit from amplification than people with more severe (i.e., severe to profound) hearing loss. However, individuals vary in response to amplification. For some, amplification can virtually eliminate functional difficulties, whereas for others, amplification is of no functional value in mitigating the impact of hearing loss.

Age at Onset

The timing of a hearing loss influences psychological and social development. Although physicians typically distinguish between congenital (i.e., present at birth) and adventitious (i.e., acquired after birth) losses, psychologists distinguish between prelingual (i.e., onset before acquisition of oral language) and postlingual (i.e., onset after acquisition of oral language) hearing loss. Postlingual losses may be further classified as late-adult onset losses, which are typically associated with aging.

Hearing loss onset and severity largely, but not entirely, determine how a person with a hearing loss will function in society. Three functional categories describe people with hearing losses: (1) hard-of-hearing, (2) deaf, and (3) deafened. Hard-of-hearing people have mild to moderate hearing losses with onset at any age. Deaf people have severe to profound hearing losses with prelingual onset. Deafened people have severe to profound losses with postlingual onset. Because people with hearing losses generally prefer disability-first language (e.g., "deaf people" is preferred to "people with deafness"), disability-first language is used in this entry.

Prevalence

The prevalence of hearing loss varies primarily by age, and by gender and ethnicity. Although 8.6% of the U.S. population has a significant hearing loss, 1.8% of children 3 to 17 years of age have a hearing loss, versus 15.4% of people over 65 years of age. Gender and age interact with hearing loss: whereas approximately equal numbers of males and females below seventeen years of age have a hearing loss, twice as many males as females 65 years or older have hearing loss. Likewise, the prevalence of hearing loss within people younger than 18 years of age is approximately equal for Whites and Blacks, but among people 65 years or older, hearing loss is nearly twice as common in Whites than

Blacks. If one defines "deaf" as a person who, at best, understands words shouted into the better ear, only 0.10 to 0.12% (i.e., about 1 in 1,000) of people under the age of 45 years are deaf; 2.48% of those over 65 are deaf (or, more precisely, deafened). Only 5.4% of deaf people experience onset prior to 3 years of age (i.e., prelingually), and about three in four have a hearing loss onset after 18 years of age.

There are four psychological issues related to deafness: (1) acquisition of language and culturally specific knowledge; (2) cognitive development and intelligence; (3) behavioral and emotional adjustment; and (4) social identity. Each of these issues raises the question of whether the relationship between deafness is best described as a deficit or a difference. Historically, the "deficit" orientation has dominated by framing deafness as a deficit in hearing, and by exploring how deaf people compare to people with normal hearing on various psychological measures. In the 1990s, scholars adopted a difference, not deficit, orientation, and so examined deafness and psychology primarily from a qualitative (not ordinal) difference orientation.

Culturally Specific Knowledge

Prelingually deaf children have substantial difficulties acquiring fluency in oral/auditory language. About nine in ten prelingually deaf children have two normal-hearing parents. Delays associated in identifying deafness, choosing responses to deafness, and the time needed to implement communication accommodations typically delay a deaf child's introduction to language. Many deaf children are not diagnosed until they experience significant delays in speech; consequently, educational interventions often start at an age where normal-hearing peers have already acquired basic grammar, syntax, and working vocabularies in the hundreds or thousands of words. Special accommodations to assist language learning (e.g., signing to the child, amplification) are often delayed and inconsistently applied due to technical, resource, and motivational obstacles. Consequently, prelingually deaf children frequently experience delayed, nonstandard, and inconsistent language exposure during their critical language development years (birth to 6 years of age). The vast majority of prelingually deaf children consequently show significant and persistent deficits in oral speech, reading, and writing throughout their life span.

Because prelingually deaf children have limited oral language bases, and limited communication channels, they exhibit significant and substantial delays in knowledge acquisition. For example, normal-hearing children learn to read by associating visual images (letters, words) with their existing auditory language base (phonemes, speech). In contrast, deaf children can see letters and words, but have no auditory language base.

Therefore, for deaf children, learning to read is often learning a language.

Acquisition of other knowledge also suffers. Deaf children exhibit substantially lower academic achievement than their normal hearing peers in all domains, but especially in language arts. The achievement gaps between deaf children and normal-hearing peers increase with age. The majority of high-school graduates served in special education programs for deaf and hard-of-hearing youth have achievement levels below functional literacy (i.e., the fourth grade level). However, deaf and hard-of-hearing children may acquire language and knowledge specific to deaf cultures, but such knowledge is not formally measured.

Cognitive Development

The impact of deafness on intelligence and cognitive development is mixed. Although deafness inhibits culturally specific knowledge and reasoning skills (i.e., crystallized intelligence), it has little impact on nonverbal reasoning skills (i.e., fluid intelligence). Deaf children show the same ordinal Piagetian development stages as normal-hearing peers, although they may achieve stages somewhat later in age. Deaf children apparently use information processing (e.g., memory) strategies similar to normal-hearing peers, but they may be less efficient in invoking and using strategies.

Other researchers suggest deaf children have different (not less efficient) information processing frameworks. Factor analyses of intelligence tests suggest that young deaf children organize cognitive tasks quite differently from their normal-hearing peers, but they become more similar to their normal hearing peers with age. The debate between those who argue deficits (e.g., deaf children have lower verbal knowledge or reasoning skills) versus differences (e.g., deaf children have similar knowledge and skills, but these skills are based in sign language and are not tapped by intelligence tests) is unresolved. There is much less debate about the relative lack of influence of postlingual deafness on cognitive abilities. Because postlingually deafened people have a well-developed internal language base, the impact of deafness on their cognitive abilities and development is generally limited to an inability to "overhear" (i.e., acquire incidental information).

Behavioral/Emotional Adjustment

Deaf children exhibit higher rates of externalizing behaviors, and externalizing disorders, than their normal-hearing peers. Whether these behaviors reflect insufficient internal regulation, or an adaptive response to communication difficulties, is a hotly debated issue. Deaf and normal-hearing adults have similar rates of psychoses (e.g., schizophrenia), but mild behavioral and psychological disorders (particularly externalizing or impulse-control disorders) are slightly more frequent

among deaf adults. Psychologists used to believe that paranoia was more common among deaf and deafened people (because their hearing impairment would lead them to believe that people were talking about them). However, paranoia is no more common among deaf people, although it may be a short-term reaction to recent hearing loss among deafened people.

Normal social-emotional development, especially the development of autonomy in young children, may be inhibited by limited communication between child and parent. Additionally, factors affecting all children with disabilities (e.g., parental denial, grief, guilt regarding the child's disability; altered family relationships) may affect the emotional development of deaf children. Once again, there is a continuing debate over the interpretation of behavioral and emotional differences between deaf and normal-hearing people, with some researchers viewing differences as evidence of elevated pathology, and others viewing the differences as adaptive responses to deaf people living in a normal-hearing world.

Social Identity

The timing and severity of hearing impairment influence social identity. People who are hard-of-hearing and postlingually deafened (especially late adult onset) identify with normal-hearing culture(s). However, prelingually deaf people with severe to profound hearing losses often identify with Deaf culture. These individuals use American Sign Language (ASL) as their primary mode of communication, and they share linguistic, historical, and cultural traditions based on ASL. Ironically, somebody who is deaf (that is, has a severe hearing impairment) is not necessarily Deaf (that is, a member of the Deaf community).

Deafness is unique in two ways. First, it is the only disability whose members share a common language different from the dominant (normal-hearing) society. Second, it is the only cultural group whose membership and language is not learned from the family. Most deaf children are socialized into the Deaf community via educational programs (especially residential schools for deaf students) and social and fraternal organizations (such as the Junior National Association of the Deaf).

However, a minority (about 4%) of deaf children have two deaf parents. These families use ASL, and they socialize their deaf children into the Deaf community. Research shows that deaf children of deaf parents have higher academic achievement scores, better social-emotional adjustment, fewer behavior disorders, and higher nonverbal IQs than deaf children of hearing parents. Although these differences may be due to language acquisition, parenting, and cultural assimilation, genetic factors may also enhance outcomes for deaf children of deaf parents.

Societal Responses to Deafness

The question of how society should best respond to deafness is extremely controversial. Educators vehemently disagree about the benefits of oral/aural approaches (that emphasize listening/speech), total communication approaches (that emphasize concurrent signing and speaking of English), and bilingual/bicultural approaches (that emphasize teaching ASL before English). Deaf community advocates oppose full inclusion of deaf students in general education and cochlear implants to cure deafness, because these initiatives seek to assimilate or eliminate deafness. In contrast, hard-of-hearing and deafened people welcome these initiatives as providing better access to normal-hearing culture. Because the debate regarding how society should respond to deafness is more often controlled by ideology than research, it is likely to continue unresolved for the foreseeable future.

[See also Auditory Impairment; Hearing; and Rehabilitation Psychology.]

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isc.rit.edu/~418www/) and Gallaudet University (<http://www.gallaudet.edu/>) are institutions of higher education devoted to serving deaf and hard-of-hearing adults.

Jeffery P. Braden

DEATH AND DYING. Psychology is usually regarded as a social and behavioral science. It is also a life science, however, and, as such, cannot encompass its subject matter without considering death. How could we hope to understand children's constructions of reality without learning what they make of withered plants and dead birds? How could we understand adolescent behavior without attention to the risk-taking behavior that all too often puts their lives in jeopardy? How could we understand an adult's disposition toward depression and disabling fear of relationship loss without recognizing that it might represent the enduring effects of childhood bereavement? How could we understand why people sometimes withdraw from friends who are terminally ill or bereaved? How can we understand why physicians have sometimes abandoned their terminally ill patients? How can we understand thought and language without attention to the diverse ways in which death is symbolized? How can we comprehend intimate relationships without insight into the fear of loss?

Nevertheless, for many years the human encounter with death had little place in psychological theory, research, education, or services. The cultural taboo against acknowledging mortality encompassed scholars and professionals as well as the general public. Psychologists, physicians, and clergy often completed their professional training with little guidance for discussing death or interacting with dying and grieving people. The subject of death was to be evaded in thought and conversation. Those who were frequently exposed to death-related situations had to rely upon a repertoire of stereotyped responses, usually marked by distancing body language and stock phrases. "Death," "dead," "dying," and "cancer" were among the words that could not be uttered. Even more unfortunately, people who had been touched by death were also to be avoided: "I wouldn't know what to say," was one typical apprehension; another was, "If I said the wrong thing, she would just lose all hope—it would be awful." So it was that at midcentury, psychology was still proceeding as though life could be understood without death.

Today, however, psychology contributes to the understanding of the human encounter with death in many ways. Some of this work is carried out within the established boundaries of psychology. Most studies of death anxiety and of children's understanding of death, for example, have been conducted by psychologists. However, psychologists also collaborate with

DEATH AND DYING. Table 1. Stages of death comprehension in childhood (Nagy, 1948)

Stage	Age Range	Interpretation of Death
1	3-5	Death is separation. The dead are less alive. Very curious about death.
2	5-9	Death is final—but one might escape it! Death takes the form of a person.
3	9-adult	Death is personal, universal, final, and inevitable.

health care professionals and scholars from a variety of other disciplines, for example, in the study of death-bed scenes or the training of hospice volunteers.

Death in Everyday Life

What is death? How should we cope with death? These two questions are closely related. The person who conceives of death as the transition to a spiritually evolved plane of being may live by a different set of rules than the person who fears death as punishment for sin, and both may differ from the person who believes that personal existence vanishes with the last breath. The mass suicide of Heaven's Gate members in 1997, for example, was predicated upon an unusual belief system that combined biblical with science-fantasy elements. The relationship between conception of death and behavior is far from simple, however, because belief systems themselves are products of complex individual and societal interactions.

Thinking about Death

Whatever else death may be, it is a thought, a mental construct. Adult conceptions of death require the ability to grasp abstractions that are considered beyond the cognitive scope of young children. These abstractions include:

- Futurity. Time is independent of our own experiences and desires. Things will change. We will change. Time will give and time will take away.
- Inevitability. Life will end no matter what one thinks, says, or does.
- Temporal uncertainty. One is always vulnerable to death, and death is certain to occur, but the time is uncertain.
- Universality. All that lives will die.
- Personal inclusion. It is not just that everybody else will die, I will die, too.
- Permanence. The dead stay dead.

Each of these concepts requires a degree of cognitive maturity and experience that is not present in early

childhood and that is not granted to all adults. Furthermore, it is necessary to coordinate all these separate concepts to achieve the basic adult construct of death. The gap between juvenile and adult conceptions of death can be illustrated by the basic presence-absence paradigm. Infants and young children live in a here-and-now world. When mother leaves the immediate time-space field there is no way to measure her distance except by response to a forlorn cry. The yearling cannot differentiate between mother's spatial displacement to the backyard or another city—or between a separation that will last for just a few minutes or forever. Adults are better equipped to withstand absences that they understand are temporary, whereas the young child responds to a departure with the anxiety adults usually reserve for extended or permanent separation. Something of the child's survival-oriented separation anxiety remains in adult life when people respond to a brief leave-taking with what would seem to be disproportionate apprehension and sorrow.

Acceptance of the basic adult model of death requires more than cognitive maturity; It also requires the willingness to surrender faith in magical control. Observations suggest that, even among adults, this surrender often is not complete. Stressful circumstances may lead us to revert to the belief that we can alter unwelcome reality through denial and the substitution of wish-fulfilling fantasies.

Research has confirmed the propositions that children's understanding of death is related to their general level of cognitive development, age, and experiences with death-related phenomena. Age is a helpful but rough guide to charting children's ideas about death. By early adolescence, if not before, children with normal intellectual endowment generally have mastered the set of constructs identified here. General level of cognitive development provides a more refined index, however. Children of the same chronological age differ to some extent in their grasp of such concepts as time, causality, and constancy. As one might expect, those children who have a more advanced command of basic concepts also have a more advanced understanding of death.

Field studies have added support for the influence of experience as well as age and developmental level. For example, Bluebond-Langner (1996) observed that children with chronic life-threatening illness and their healthy siblings often have a much more realistic view of dying and death than parents and caregivers realize.

Precisely how does the child's understanding of death develop? The most influential answer derived from a study by Hungarian psychologist Maria Nagy (1948) who interviewed children and asked them to draw death-related pictures. "Auntie Death," as she was affectionately called, found a stage-like progression, as summarized in Table 1.

These findings provide a useful database for contemporary studies although personifications of death in childhood have been relatively uncommon in subsequent studies, and the variables of developmental level and personal experiences with death have received more attention.

Five other points are worth consideration in comprehending the child's orientation toward death.

1. Even the youngest children are aware of separation and its threat to their survival. One does not have to understand the mature adult model of death in order to respond to the experience of loss.
2. Young children do occasionally express spontaneous insight into the finality of death, as when encountering a dead animal or withered plant; however, there is often a retreat from this realization and a return to more limited and wish-fulfilling ideas.
3. Children have a lively curiosity about death, leading at times to questions or little experiments that can unsettle adults (e.g., taking a caterpillar apart to see if it can be put back together again and made to go). The brightest and most observant children usually show the most curiosity.
4. Adults often exclude children from death-related conversations and respond to their questions with evasion and anxiety. A rule of silence regarding death applies in many homes, and with particular force to children.
5. Adults who are committed to preparing children for life should themselves be prepared to serve as mentors and guides as children encounter death in either reality or fantasy. Many parents have reported their discomfort in trying to help their children deal with death-related questions and experiences because they had so little guidance in their own childhood.

Adolescents' improved understanding of death often becomes part of a general anxiety about the future: All that one seeks lies ahead, but so does the risk of embarrassment, disappointment and failure, and the certainty of death. It is not uncommon for adolescents to develop a protective sheath of attitudes and a repertoire of behaviors designed to cope with the newly perceived vulnerability to death. An exaggerated sense of invulnerability may be expressed, coupled with risk-taking behavior that appears to taunt death (followed by the pleasurable experience of relief after escape). "Slash-and-gash" horror films and comic books draw most of their aficionados from the ranks of young men, although adolescents share this enthusiasm. Concern about body image and the increasing salience of sexuality may lead to intense and troubled interpretations of death. There may also be highly insightful and imaginative interpretations. With their newly enlarged perspectives on life and death, some youth have created memorable poetry (including, for example, the 17-year-old William Cullen Bryant's "Thanatopsis").

The basic adult model of death identified here is not favored by all people. Buddhist and Hindu conceptions of life and death offer alternative perspectives. The "new age" construction of death is viewed as one transition among others: "Death is just a change of clothes"; "Death is only a door we pass through." Such characterizations represent a selective borrowing from Eastern religions, coupled with an optimistic meliorism that is distinctively American.

There is no firm line between cognitive understanding and belief system, but it is useful to distinguish between those who do not comprehend universality, inevitability, permanence, and related concepts on the one hand, and those who comprehend but reject those ideas.

Attitudes and Coping Strategies

How do we move through life with knowledge of our mortality? "Anxiously" is the answer that has been proposed by influential observers and theoreticians. It is asserted that we are highly anxious about death as individuals and as a society. This anxiety leads us into avoidance and denial strategies, as though death will cease to exist if we stop thinking and talking about it. These propositions are often linked with advocacy for accepting death as a natural condition of life. Our focus will therefore be on death anxiety, denial, and acceptance, but we will also identify other attitudes and coping strategies.

Two extreme positions have been staked out by theorists. The early psychoanalytic approach rejected the idea that it is even possible to fear death. Freud heard many people express death-related fears, but he regarded those as disguised expressions of some other source of concern (e.g., a derivative of castration anxiety or a general loss of security). Why are we unable to fear death? Because death is an idea that does not translate into the language and *modus operandi* of the unconscious. Furthermore, we have never had the experience of death, so how can we fear it?

Our own death is indeed quite unimaginable, and whenever we make the attempt to imagine it we can perceive that we really survive as spectators. At bottom nobody believes in his own death, or to put the same thing in a different way, in the unconscious every one of us is convinced of his own immortality. (Freud, 1917/1959, p. 304)

These comments by Freud were seized upon by many others who were reluctant to deal straightforwardly with death-related fears. In his later years Freud took death far more seriously as a crucial issue, but it is the earlier formulation that proved more influential.

The existential position could hardly be more different, as articulated by Becker (1973). Fear of annihilation is said to be the root of all human anxiety. A per-

son who faces this terror without shield or illusion is in danger of psychosis. Becker believed that schizophrenia is an attempt to make a heroic response to the naked confrontation with mortality. Many other disturbed patterns of thought and behavior are also attributable to death anxiety. Moreover, according to Becker, when we do keep ourselves "normal," it is because we are conforming to societal patterns of denying death. It is much easier to deny death if we are all in the game together. Many other observers joined Becker in characterizing the United States as a society with a long-standing tradition of controlling death anxiety through denial. Indeed, one of the first tasks of the death awareness movement, which took hold in the 1970s, was to encourage people to break the anxious silence and enter into dialogue. The increased openness to discussion of dying and death created a more favorable climate for the introduction of hospice programs for palliative care of terminally ill people.

Despite their marked differences, psychoanalytic and existential approaches have important areas of agreement as well. Both hold that evasion and denial are not effective strategies. Psychoanalysts emphasize the expensive investment in keeping death-related thoughts under wraps, whereas existentialists point to a lack of authenticity in human relationships when people cannot accept and express their mortal fears. Both sides are joined by researchers and clinicians who emphasize the distortions, gaps, and misunderstandings in communication that occur when people cannot bring themselves to share their thoughts and feelings about death. Furthermore, there is a widespread belief that death anxiety, whatever its source, exists at a disturbingly high level in the United States.

Neither the psychoanalytic dismissal nor the existential enthronement of death anxiety have proven susceptible to definitive research. In fact, most of the abundant studies of death anxiety have been atheoretical. The typical study has employed fixed-choice questionnaire measures in a one-time sampling of available respondents. These studies have numerous limitations, including reliance on verbal self-report, lack of demonstrated relationships to behavior in real-life situations, and uncertainty regarding the meaning of low scores (low anxiety or high defensiveness?). Despite these limitations, four consistent findings have emerged from the numerous academic studies of death anxiety.

1. There is only a moderate level of self-reported death anxiety in the general population, usually well below the established scale midpoint. This finding is at odds with the assumption that most people in the United States are highly anxious about death. A tempting explanation is that most people are well defended against death anxiety, hence the relatively low scores. This *ex post facto* explanation, however, raises its own questions, including the purpose of using death anxiety

scales in the first place if one reserves the right to ignore the findings.

2. Death anxiety scores are consistently higher for women. The interpretation most in accord with research findings and field observations is that women are more aware both of their feelings and of psychological imperatives. It has long been evident in the death awareness movement that women provide services to terminally ill and grieving people much more frequently than men, and also comprise the majority of people who enroll in death education courses. The relatively higher self-reported death anxiety for women appears, in general, to be a motivating rather than a disabling influence.

3. Death anxiety does not necessarily increase with advancing age. Most studies either find no age-related differences or lower levels of anxiety among older adults. This finding serves as a reminder that objective distance from death and subjective interpretation of mortality cannot be assumed to correspond.

4. Fears of pain, helplessness, dependency, and the well-being of surviving family members are usually more salient than anxiety about annihilation. Most people are less concerned about the ontological nature of death than about the palpable ordeal that might be experienced during the end phase of life. The theoretician's death anxiety is replaced by individual and family concerns about the dying process.

Clinical reports supplement these findings with the observation that death anxiety increases when people are overwhelmed by stress from any source. For example, death may become a symbol for the sense of having lost value, esteem, and control when an important relationship has been sundered. This condition (with its indirect support for the psychoanalytic hypothesis) often subsides when the person again feels worthwhile and in control. Concerns about death may represent either an actual crisis regarding mortality and loss, or a symbolic way of expressing one's sense of abandonment, dread, and overwhelming stress.

A few studies have examined death anxiety at two or more levels of assessment (e.g., self-report, perceptual response to death words or images, projective tests, and psychophysiological responses). Those studies indicate that people frequently have a more intense response to death-related signals outside their awareness than what appears in verbal self-reports. When Feifel and Branscomb (1973) posed the question, "Who's afraid of death?" the emerging answer was "Everybody!"—once we move past verbal self-report.

The role of death anxiety in everyday life has been illuminated by research to some extent. For example, Santer (1997) has found that people who donate blood are also more willing to donate their bodies for organ transplantation. The blood/body donors seemed to have less anxiety about death, as well as less fear of physical

injury and loss of control. There are probably many other ways in which people with higher and lower levels of death anxiety differ in their decision making. It has also been found by various studies that both high self-esteem and a well-developed sense of humor are associated with a less anxious response to death-related stimuli and situations.

Perhaps it is useful to step back from the two grand theories of death anxiety, the psychoanalytic and the existential, and consider a commonsensical alternative. The creatures who will live to see another day are those who will overcome various threats to their continued existence. It might not be justifiable to speak of a survival instinct within the context of today's evolutionary biology, but there is abundant evidence for the existence of a vigilance orientation that is followed by both general and particularized stress-adjustment responses. The chances of survival are improved by vigilance, and vigilance has some of the experiential and behavioral characteristics of anxiety. On this view, it would not be useful to impair the organism's ability to detect possible threats to its survival, just as it would not be useful to be paralyzed or disorganized by excessive and prolonged vigilance. In other words, some death anxiety may be a necessary condition for continued survival.

The emphasis on anxiety as a response to death has somewhat obscured the other ways in which people orient themselves toward mortality. There are often feelings of sorrow, regret, and resignation. The prevailing mood is not one of hyperalertness and apprehension, but, rather, sadness in contemplating the prospect of life's end. Individual variations on this theme are often subtle and unique. We learn about sadness, regret, and resignation from conversation and personal documents rather than fixed-choice questionnaires. With death in prospect, people often review their entire lives, attempting to affirm and discover meaning. These narratives and diaries can tell us much about the perceived shape of a completed life, as well as one's interpretation of death.

Quite a different type of response occurs along a dimension ranging from peaceful acceptance to ecstatic fulfillment. These responses have been lodged primarily in cultural and religious belief systems that have not often been studied empirically. Studies of death personification, however, have yielded pertinent findings. The image of a gentle comforter has been the most prevalent representation of death as a person in studies conducted in the 1970s and repeated in the 1990s (Kastenbaum, 2000). This image is most often presented as a firm but kind elder who places mortals at ease before escorting them from life. Terrifying images of death are not uncommon, but are consistently outnumbered by the gentle comforter. The more extreme positions on the acceptance dimension often take the form of anticipated reunion with a loved one or being gathered to

the bosom of God. Of particular interest are the sexualized versions in which death is conceived as the opportunity for ecstasy that has been denied on earth. There have been episodes in cultural history in which sexualized death was celebrated in literature and drama and may have encouraged suicidal behavior. Romantic and erotic transformations of death can be found today, most obviously in some areas of youth culture, but have not yet been studied systematically.

That we live more fully and wisely when we have come to terms with our own mortality is a proposition that has strong support from all major schools of thought and is consistent with the available research findings.

Confrontations with Dying and Death

The emphasis shifts here from thinking about death in the midst of everyday life to those situations in which death has become a salient and immediate concern. Particular attention will be given to the communicational interactions through which we exchange either guidance and comfort, or pain and confusion.

Barriers to Death-Related Communication.

Several barriers to death-related communication have been documented repeatedly since social and behavioral scientists turned their attention to this topic shortly after 1950:

1. Weak response repertoire in death-related situations. What should we say to a person who has been given a terminal diagnosis? To a person who is actively dying? To the family? At a funeral? Many people are at a loss in such situations. Mainstream culture has provided little in the way of guidance or effective models for interacting with people in the shadow of death. It is common to fall back upon homilies and evasions.
2. Fear of saying or doing the wrong thing. The lack of effective preparation that many people bring with them into death-related situations contributes to exaggerated concern about the possible effects of their own interactions. Afraid that one slip of the tongue might destroy the other person's hope, there is a strong tendency to keep conversation within narrow limits if it cannot be avoided entirely. In turn, the resulting tension and artificiality increases the discomfort of both parties.
3. Development of rigid defensive strategies. Those who interact repeatedly with terminally ill, dying, and grieving people have often adopted coping techniques to protect themselves from the anxiety associated with limited ability to control the situation and reminders of their own mortality. Physicians have most often been criticized for limiting themselves to brisk and perfunctory interactions that do not respond to their patients' cognitive and emotional needs. Psychiatrists have been found to have particularly high levels of death anxiety.

The defense against what might be called *secondary death anxiety* has itself become recognized as a source of stress and disordered communication.

4. Institutionalized patterns of evasion. It is not just the individual who often has difficulty interacting in death-related situations. Organizations have also maintained implicit rules against open communication. For example, workplaces have frequently invoked a code of rigid protocol and near silence when a colleague becomes terminally ill, has died, or has lost a loved one. Educational systems from grade school to graduate school tend to look the other way when a death occurs particularly if by suicide. The most elaborate network of techniques for avoiding and minimizing death-related interactions has been documented in health care facilities. In their classic field studies, Glaser and Strauss (1966, 1968) identified many types of institutional evasion that made open communication almost impossible to achieve in hospitals. For example, mutual pretense was a common arrangement: both staff member and patient acting as though the other did not know the grim truth. Unfortunately, recent studies have found that institutional evasion remains standard procedure in some of the nation's major teaching and research hospitals.

5. Uncertainty about the status of the dying person. Family and care providers are experiencing more difficulty in deciding if they are dealing with a dying person, and therefore adjusting their expectations and interactions. People are now more likely to spend a longer period of time in the interval between decline and death. Neither "dying" nor "terminal" quite fit the variety of situations in which people find themselves. Health care professionals have come to recognize the end phase or end stage as a distinct situation: The major physical systems have failed and death is imminent. But many people live with their eventually terminal conditions for months or years, and, as a society, we have not yet learned how to comprehend and address this phenomenon. The fact that *dying* has become an increasingly imprecise term is contributing to ambiguity and hesitations in death-related communications.

Improvements to Death-Related Interactions.

Psychologists and their colleagues in related fields have been discovering effective approaches to improving the quality of communication, and therefore the quality of care, in death-related situations:

- Education and role-playing to improve perspective-taking and empathic skills. Training exercises have proven valuable in helping the various professionals involved in terminal care to respect each other's viewpoints as well as appreciate the situation of patients and their families.
- Developing strategies for preserving a sense of control and efficacy on the part of all people involved in the terminal care situation. This includes a shift from an

authoritarian medical model to shared responsibilities and a more open communication network.

- Encouraging peer support groups for families coping with chronic and terminal illness and the grief of bereavement. Professional guidance is helpful in establishing support groups and assisting them over difficult episodes, although much of the benefit is provided by the members themselves.
- Developing increased resourcefulness in dealing with death-related situations. A growing research base and active death education programs provide the opportunity for people to analyze situations, discover alternative approaches, and offer a wider variety of responses. For example, students of psychology and related fields often develop a quantum leap in their understanding when exposed to family members' reports of responses that were helpful and not helpful.
- Recognizing that a moderate level of death anxiety is not only acceptable, but useful. It has been found that empathy, openness, and the willingness to help vulnerable and suffering people often is associated with a discernible level of death anxiety. Preoccupation with concealing or denying one's death anxiety seems to interfere with responsiveness to other people's needs.
- Improving our understanding of pain and suffering will also improve communication and effective interventions. It is now agreed that pain cannot be comprehended adequately from an objectivistic standpoint alone. The same is true for the general sense of suffering and despair that may be experienced in dying and grieving. Phenomenological and gestalt/holistic traditions in psychology can provide the dimension that was too often neglected in the past.

Additionally, studies suggest that whatever strengthens a person's sense of purpose in life and connection with enduring values also improves one's ability to withstand the stress of terminal illness, grief, and offering services to those so afflicted (Schneider & Kastenbaum, 1993; Viswanathan, 1996). The current revival of interest in the role of emotions and values in human behavior is in keeping with the experiences of those who work with the dying and bereaved.

The Psychologist and Death

There is no turning back from the realization that psychology must address the human encounter with death. The general public, professionals, researchers, educators, lawyers, clergy, and policy makers are all engaged with death-related issues along a broad front. Assisted suicide is the spotlight issue with all its ethical and legal aspects. Nevertheless, it is palliative care for the dying and counseling for the bereaved that affect a larger number of people.

Psychology's constructions of death have taken several forms (Kastenbaum, 2000). Most prevalent was the implicit belief that death is irrelevant, except for occasional use of mortality statistics. This approach has

usually been associated with a disconnect from natural time and situational context. The focus of psychology in the United States has often been on characteristics of individuals taken as individuals, rather than on people moving through their life course in a biosocial context. The first pass at including death within psychological theory has been its construction as a "task" to be completed in the later adult years. Although not without value, this approach imposes a work-achievement ethos, and establishes a kind of protective ghetto by isolating death as a concern primarily of the aged. The popularity of developmental task theory has yet to be earned through confirmatory research or contribution to everyday dealings with dying and death. Pop psychology has created a fantasy meld in which nineteenth-century romancings of death are embodied within the wrappings of modern media images. Depictions of death as an inspiring adventure are greatly removed from the experiences of most people who are coping with the stress of terminal illness or grief.

Psychology has yet to offer a compelling, comprehensive, and realistic framework for understanding our relationship to death. This is a major challenge for the future. When this challenge is adequately met, it will be one of the finest hours in the history of psychology as a natural, as well as a human, science.

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Robert Kastenbaum

DECEPTION is the deliberate misrepresentation of facts through words or actions. Although someone may unintentionally misrepresent the truth, the psychologist is concerned with discriminating between the person who is trying to tell the truth and the one who is deliberately lying. Clinical psychologists must be alert that a client may intentionally misrepresent his or her psychological state. For example, a depressed person may try to deceive a clinician about the depth of his or her depression. Forensic psychologists often provide assessments of individuals for law enforcement (e.g., lie detection tests), the courts (e.g., whether a person is insane or just "acting"), or a parole board (a risk assessment). In each of these contexts the person being assessed may engage in deception. It should be noted that a client or witness may unintentionally misrepresent the truth (e.g., through a mistaken belief), but such factual errors are not included in the definition of deception.

Ekman (1992) noted that deception may occur in emotional, opinion, or factual domains. One can misrepresent, through behavior or dialogue, a true emotional state, a true belief, or factual information. Factual deception can be of two types: (a) denying an experience when it actually occurred (e.g., a defendant falsely denying his guilt); or (b) reporting an experience that did not occur (e.g., a complainant falsely claiming to be a victim of a crime). Despite popular misconceptions, there is no single behavior or indicator that is

diagnostic of either of these types of deception across individuals. Thus, detecting deception is a profoundly difficult task. Psychologists have focused research and practice in three domains to detect deception: (a) behavioral cues, (b) verbal cues, and (c) tests of malingering.

Behavioral Cues to Deception

Research on behavioral cues to deception has included physiological responses, facial expressions, body language, and voice pitch.

Physiological Measures. The most popular, and widely researched, technique to assess deception is the polygraph, or lie detector test. The polygraph records physiological responses that vary with stress, typically heart rate, skin conductance (related to sweating), and respiration (and sometimes blood pressure). These measures are recorded while the individual is asked a series of questions. With the control question test, responses to the critical questions are compared to responses to stressful questions unrelated to the crime. Alternatively, the guilty knowledge test involves assessing the individual's reaction to questions concerning aspects of the case that would be known only to someone connected with the case (e.g., the use of an ice pick as a murder weapon). It is difficult to apply this version of the polygraph when the media have reported critical aspects of the case.

The polygraph depends upon the assumption that a person will have an emotional response when lying, reflecting a fear of detection and/or guilt about lying. Lying is also thought to place demands on cognition that may be another source of physiological change. Although the polygraph is a useful investigative tool, it has the same problem that exists in most detection techniques: There is no lie response, only a stress response. It is assumed that stronger responses to critical questions are due to guilt, but they could be due to fear of false arrest, or some other emotion felt by an anxious but innocent person. Thus, the polygraph test is prone to false-positive errors (wrongly concluding that a person is lying). It is also possible for deceptive individuals to beat the test (false-negative error) by means of countermeasures (e.g., cognitive effort during the control questions). The extent of such errors is a matter of considerable debate among researchers.

There have been recent attempts to identify more reliable physiological indicators of deception. Electrical and blood flow activity in the brain have been examined as possible cues to deception. The necessary research on these cues has yet to be conducted but they offer some intriguing future possibilities.

Demeanor. The demeanor of a liar has often been proposed as a clue to deception and has received some empirical support. Demeanor includes changes in facial expressions, body language, and voice pitch. For ex-

ample, microsecond changes in facial expressions have been recorded in individuals misrepresenting their emotional state. The rate and nature of some hand and arm movements have been found to change when a person is lying. Also, voice pitch may rise when a person is being deceptive. However, most observers cannot reliably detect these behavioral changes. Scores of experiments have found that people, usually undergraduate students, perform only slightly better than chance when asked to discriminate lying from truthfulness on the basis of demeanor. However, much of the research has two weaknesses: (a) there is little at stake for the liars, which may reduce behavioral cues to deception; and (b) the cues are compared between individuals (e.g., it is possible that spending time with a person may reveal personal, idiosyncratic demeanor cues to deception). In any event, although training and experience may enhance detection of deception, no one has yet demonstrated what training or experience is required.

Verbal Cues to Deception

A relatively recent development in deception research has examined whether the content of what a person says can reveal deception. Beginning in the 1950s, German psychologists developed the first systematic approach to analyzing statements. Although originally developed for use with children, the procedure came to be applied to the statements of adults as well, particularly to the statements of adults alleging a sexual assault or sexual abuse as a child. With statement analysis the trained assessor applies a set of 19 criteria to the content of a statement(s). The criteria are based upon an assumption (the Undeutsch hypothesis) that the description of memories for directly experienced events is qualitatively different from the description of invented or coached memories. Research completed with child and adult witnesses indicates that the procedure performs better than chance at discriminating the descriptions of actual experiences from deceptions, although there are some limitations with younger children.

Tests of Malingering

Malingering is the intentional distortion or misrepresentation of psychological symptoms for personal gain or to avoid negative consequences (e.g., incarceration). There have been a number of attempts to detect malingering with validity scales on pencil-and-paper tests, such as the Minnesota Multiphasic Personality Inventory (MMPI). It is recognized that people malingering will often endorse items that exaggerate the seriousness of pathology compared to people with a genuine mental disorder. Another recent approach to identifying a malingering patient is symptom suggestion, in which a psychologist suggests a false symptom to a suspected malingerer. These clinical tools are often described as

useful aids to clinicians in interpreting responses to pencil-and-paper tests. However, to date, there are no reliable, valid tests of malingering.

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John C. Yuille and Stephen Porter

DECISION MAKING. People face a great variety of decisions in their lives. Some are fateful, such as whom to wed, what to study, which causes to defend, and how to handle medical crises. Some have limited scope, such as where to dine or shop, what to read or eat, and how to exercise or continue an unrewarding conversation. Some decisions involve clear-cut choices, while others are shrouded in uncertainty. Sometimes that uncertainty concerns what will happen; sometimes it concerns what one really wants and values. Sometimes there are opportunities to learn from experience; sometimes one must get it right the first time. Some decisions offer time for deliberation; others must be made in an instant.

Given the diversity of decisions, how could one hope to develop systematic general knowledge about decision-making processes? Psychologists have adopted

two converging strategies in order to address this challenge. One strategy relies on the statistical analysis of multiple decisions, involving complex tasks drawn from a single domain. The second relies on the experimental manipulation of simple decisions, looking at elements that recur in many different decisions (e.g., uncertainties, trade-offs).

The former strategy achieves greater ecological validity, in the sense of placing people in circumstances more closely approximating their actual decision making. However, it uses such complex situations that it can be hard to tell which factors are driving people's choices. The latter strategy isolates factors. However, it also creates the inferential challenge of generalizing from the small world of the experiment to the real world of actual decisions. Combining these strategies offers the opportunity for a relatively balanced perspective on what is—and what can be—known about decision-making processes.

A balanced perspective is essential to fulfill a goal shared by both approaches: helping people to make better decisions. That goal is ill-served by exaggerated claims of any sort. Practical concerns have also made evaluating decision-making performance a focus of both research traditions. In some cases, the standard is achieving a real-world objective (e.g., predicting an event, achieving a return on investment). In other cases, the performance standard is demonstrating consistency with a principle of decision theory (e.g., having transitive preferences, ignoring irrelevant features of tasks).

Statistical Models of Decision Making

Psychology won its stripes (as worthy of public funding) by its ability to process large numbers of people in wartime. During World War II, that processing included diagnosing soldiers' mental conditions. After the war, interest grew in how effective those efficient decisions were. The study of such clinical judgment began by examining the performance of psychologists deciding, say, whether clients were psychotic or neurotic. It gradually expanded to consider the judgments of such diverse experts as radiologists sorting images of tumors into benign and malignant, auditors deciding whether loans were "nonperforming," and admission committees choosing graduate school applicants.

When many predictions of a particular type are characterized on a common set of cues, one can create statistical models predicting either the clinicians' own choices or the real-world event, using the information at the clinicians' disposal. Many such studies have consistently found (a) simple statistical models do a good job of predicting judgments that clinicians describe as the result of complex inferential processes; and (b) somewhat different but still simple statistical models do

at least as good a job as clinicians in predicting actual events.

These are challenging results, with provocative implications for how such decisions should be made. Much research (statistical and experimental) has gone into explaining them, leading to some fundamental findings of decision-making research. One result is that people often have limited insight into their own cognitive processes. Particularly when asked to summarize multiple judgments, they may confuse what they did with what they wanted to do or with what people generally do. They may misremember their own judgmental processes, confusing in hindsight what they saw (and said) in foresight. They may underestimate the "treatment effect" created by their own predictions (which can shape subsequent events in their own image). They may remember only an unrepresentative subset of their decisions, leading them to exaggerate their past consistency and success.

A second line of evidence arose from growing recognition of the predictive power of simple (linear) statistical models. If one can identify and measure the cues that individuals consider, then one can often mimic their summary judgments quite well with simple additive models. However, the arithmetic rules for combining those cues need not bear any direct relationship to the underlying cognitive processes. Indeed, one can often predict well with a model that assumes that people simply count the number of factors favoring and opposing each option and then choose the alternative with the best overall tally. And one can also do quite well with a model using variables correlated with those that directly occupy decision makers.

Although the power of linear models is good news for those hoping to predict people's choices, it is bad news for those hoping to explain them. There may be many models that predict equally well, even though they incorporate different variables—and hence represent different theories of the choice process. As a result, it may be hard, and even impossible, to determine which of a set of competing models really captures how people make their choices. Without that knowledge, one may lack the insight needed to help people improve those processes. How researchers have attempted to circumvent these fundamental limits is an interesting and important story. So is the reluctance of decision-making institutions to replace clinical judgment with demonstrably superior statistical procedures.

Experimental Studies of Decision Making

The complementary approach asks whether people have the basic cognitive skills needed to make effective decisions. Those skills include assessing the probability that different actions will lead to different outcomes, and evaluating those outcomes in terms of their rela-

tive attractiveness (or aversiveness). Successful probability assessment is evaluated in terms of (a) accuracy, how well people's beliefs agree with statistical estimates; (b) coherence, how well the relationships among beliefs follow the axioms of probability theory; and (c) calibration, how well people understand the limits to their own knowledge. Successful outcome evaluation requires (a) accuracy, people's predicted (dis)pleasure should correspond to their actual experience, (b) consistency, people should evaluate different representations of the same problem similarly, and (c) articulation, people should be able to translate their general values into preferences for specific choices.

In both respects, experimental work has found a mixture of strengths and weaknesses. Overall performance is, perhaps, about as good as could be expected, considering how little training people receive in decision-making processes and what poor conditions the world offers for learning on their own (e.g., unclear and delayed feedback). A widely accepted account holds that people respond to complex, uncertain decision-making tasks (and their limited information-processing capacity) by using heuristics. These are rules of thumb that are generally helpful, but can lead one astray when used outside their domain of validity.

For example, people may judge the probability of an event by the availability (in memory) of examples of its occurrence. Generally speaking, commonly observed events should be more frequent than rarely observed ones. Moreover, people are good at keeping a rough count of the frequency of the events that they observe, even when they do not expect to be asked. However, there are cases when an event is disproportionately available for reasons that people do not realize or whose effects they cannot undo (e.g., the crime rate as revealed by local TV news). If so, then its probability will be overestimated.

The most widely accepted normative standard for combining probabilities and values into a choice is utility theory. The pillar of modern economics, utility theory evaluates options in terms of their expected utility, defined as the sum of the utilities associated with the different outcomes (e.g., how much money will the person have, how much respect, how much prestige), weighted by their probabilities. Psychological research has found that people are sensitive to features missing from utility theory and insensitive to ones in it. Some of the most dramatic demonstrations have shown framing effects, in which formally equivalent descriptions of a decision elicit different choices (e.g., describing a civil defense program in terms of the lives it will save or the lives that will still be lost; describing the payment for an insurance policy as a "premium" or a "sure loss."

The central role of performance standards in decision-making research has been a source of often productive controversy. It has encouraged thinking

hard about the fairness of tasks, sharpening their formulation. It has created an obligation to develop interventions designed to overcome apparently robust judgmental limitations. It has prompted the creation of alternative normative accounts, sometimes involving economists, philosophers, management scientists, and others. Finally it has involved psychologists in public policy debates focused on people's competence, such as adolescents' control of their reproductive choices and citizens' involvement in environmental policy.

[See also Illusory Correlation; Political Decision Making; Thinking, *article on* Problem Solving.]

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Baruch Fischhoff

DEFENSE MECHANISMS are patterns of feelings, thoughts, or behaviors that are relatively involuntary. They arise in response to perceptions of psychic danger or conflict, to unexpected change in the internal or external environment, or in response to cognitive dissonance (American Psychological Association, 1994). They obscure or diminish stressful mental representations that if unmitigated would give rise to depression or anxiety. They can alter our perception of any or all of the following: subject (self), object (other), idea, or feeling. There is increasing evidence that choice of defensive styles makes a major contribution to individual differences in response to stressful environments (Vailant, 1992). As in the case of physiological homeostasis, but in contrast to so-called coping strategies, defense mechanisms usually are deployed outside of awareness. The use of mechanisms of defense usually alters perception of both internal and external reality. Often, as with hypnosis, the use of such mechanisms compromises other facets of cognition.

Adaptation to psychological stress can be divided into three broad classes of coping mechanisms. One class consists of voluntary cognitive or coping strategies, which can be taught and rehearsed; such strategies are analogous to consciously using a tourniquet to stop one's own bleeding. The second class of coping mechanisms is seeking social support or help from others; such support seeking is analogous to calling 911 in response to one's own bleeding. The third class of coping mechanisms are the involuntary defense mechanisms. Such coping mechanisms are analogous to depending on one's own involuntary clotting mechanisms in order to stop bleeding.

Nineteenth-century medical phenomenologists viewed pus, fever, pain, and coughing as pathological; twentieth-century pathophysiologists have learned to regard these same processes as evidence of the body's healthy, if involuntary, efforts to cope with physical or infectious insult. In analogous fashion, many of the mental symptoms that phenomenologists classify as mental disorders can be reclassified by those with a more psychodynamic viewpoint as manifestations of the brain's involuntary adaptive efforts to cope with mental stress. In recognition of the close association between psychological homeostasis and psychopathology, the latest edition of the *Diagnostic and Statistical*

Manual of Mental Disorders (DSM-IV; APA, 1994), has included a Defensive Functioning Scale as a proposed diagnostic axis for further study.

Defenses operate in four major arenas. First, they can provide individuals with a period of respite (denial) to master changes in self-image that cannot be immediately integrated; such changes in reality might result from leg amputation (e.g., "But I still have both my legs."). Second, defenses can deflect or deny sudden increases in affective states (e.g., "I'm not angry—just perturbed."). Awareness of forbidden or conflicting "wishes" is usually diminished; alternatively, antithetical wishes may be passionately adhered to. Third, defenses can keep anxiety, shame, and guilt within bearable limits during sudden conflicts with conscience and culture. Finally, defenses enable individuals to mitigate and alter internal representations and unresolved conflicts with important people, living or dead (e.g., "My mother gave me a perfect childhood.").

Choice of mental defensive mechanisms is a major consideration in understanding differential responses to environmental stress. Defenses are mental mechanisms that alter the relationship between self and object, and between idea and affect, in rather specific and differentiated ways. For example, the defense of projection enables someone conflicted over expressing anger to change "I hate him" to "He hates me." In addition, defenses dampen awareness of and response to sudden changes in reality, emotions and drives, conscience, and relationships with people. For example, some people respond to danger or loss in a surprisingly stoic or altruistic fashion, whereas others become phobic or get the giggles or project responsibility. These responses can be differentiated by assigning different labels to the mechanisms underlying the responses. While cross-cultural studies are still sorely needed, socioeconomic status, intelligence, and education do not seem to be causal predictors of maturity of adult defensive style (Vaillant, 1992).

Freud's Discovery of the Concept of Defense

That emotions were significant to humans had been known since ancient times, but our understanding of their modulation through unconscious mechanisms of defense originated with Sigmund Freud, who was trained in both neurology and physiology. In delineating the nature of defenses, Freud not only emphasized that upsetting affects, as well as ideas, underlay psychopathology; he also suggested that no experience "could have a pathogenic effect unless it appeared intolerable to the patient's ego and gave rise to efforts at defense" (Freud, 1906/1964, p. 276).

Over a period of 40 years, Freud described most of the defense mechanisms of which we speak today and identified five of their important properties:

1. Defenses were a major means of managing impulse and affect.
2. Defenses were unconscious.
3. Defenses were discrete from one another.
4. Although often the hallmarks of major psychiatric syndromes, defenses were dynamic and reversible; they were states, not traits.
5. Finally, defenses could be adaptive as well as pathological. Freud conceived of a special class of defense mechanisms—sublimations—that could transmute conflicting affect not into a source of pathology but into culture and virtue. (1905/1964, pp. 238–239)

Freud also introduced the concept of an ontogeny of defenses. Like projection, repression, and sublimation, defenses not only lay along a continuum of relative psychopathology but along a continuum of personality development. With the passage of decades, the defense acting out (e.g., impulsive self-detrimental sexuality) could become the parent of reaction formation (sex is bad, celibacy is good) and a potential grandparent of altruism (teenage mothers are troubled and deserve help).

Modern Conceptualizations of Defense in DSM-IV

From the beginning, defenses have posed a problem for experimental psychology. First, there is no clear line between character (enduring traits) and defenses (shorter-lived responses to environment), behavior and mental mechanisms, symptoms (psychopathology) and unconscious coping processes. Conflict-driven adaptive aberrations of a normal brain (defenses) cannot always be distinguished from the symptoms of neuropathology. Second, defense mechanisms can serve other purposes; conversely, any of the mind's functions, not just standard defenses, can be employed in the service of defense. Third, in any effort to produce a comprehensive list of defenses there will be enormous semantic disagreement.

Differentiated mechanisms of defense are clearest when one can study the psychopathology of healthy everyday life in detail. Our appreciation of the defensive nature of mature behavior awaited studies of normal populations, such as those by Ernst Kris, Robert White, Heinz Hartmann, David Hamburg, and Anna Freud (1936). Every one of these investigators, however, presented a different nomenclature; no one supplied mutually exclusive definitions; few sought rater reliability or provided empirical evidence beyond clinical anecdote. Over the last 30 years, several empirical studies (e.g., Haan, 1977; Vaillant, 1977; Perry, 1994) that are well reviewed by Cramer (1991), Skodol and Perry (1993), and Conte and Plutchick (1995) have clarified our understanding of defenses with experimental and reliability studies. By offering a tentative hierarchy and glossary of consensually validated definitions, *DSM-IV* sets the stage for further progress.

DEFENSE MECHANISMS. Table 1. Defense levels and individual defense mechanisms (adapted from *DSM-IV*)

<p>I. Level of Defensive Deregulation. This level is characterized by failure of defensive regulation to contain the individual's reaction to stressors, leading to a pronounced break with objective reality. Examples are</p> <ul style="list-style-type: none"> • delusional projection (e.g., psychotic delusions) • psychotic denial of external reality • psychotic distortion (e.g., hallucinations) 	
<p>II. Action Level. This level is characterized by defensive functioning that deals with internal or external stressors by action or withdrawal. Examples are</p> <ul style="list-style-type: none"> • acting out • apathetic withdrawal • passive aggression • help-rejecting complaining 	
<p>III. Major Image-Distorting Level. This level is characterized by gross distortion or misattribution of the image of self or others. Examples are</p> <ul style="list-style-type: none"> • autistic fantasy (e.g., imaginary relationships) • splitting of self-image or image of others (e.g., making people all good or all bad) 	
<p>IV. Disavowal Level. This level is characterized by keeping unpleasant or unacceptable stressors, impulses, ideas, affects, or responsibility out of awareness with or without a misattribution of these to external causes. Examples are</p> <ul style="list-style-type: none"> • denial • projection • rationalization 	
<p>V. Minor Image-Distorting Level. This level is characterized by distortions in the image of the self, body, or others that may be employed to regulate self-esteem. Examples are</p> <ul style="list-style-type: none"> • devaluation • idealization • omnipotence 	
<p>VI. Mental Inhibitions (Compromise Formation) Level. Defensive functioning at this level keeps potentially threatening ideas, feelings, memories, wishes, or fears out of awareness. Examples are</p> <ul style="list-style-type: none"> • displacement • dissociation • intellectualization • isolation of affect • reaction formation • repression • undoing 	
<p>VII. High-Adaptive Level. This level of defensive functioning results in optimal adaptation in the handling of stressors. These defenses usually maximize gratification and allow the conscious awareness of feelings, ideas, and their consequences. They also promote an optimum balance among conflicting motives. Examples of defenses at this level are</p> <ul style="list-style-type: none"> • anticipation • affiliation • altruism • humor • self-assertion • self-observation • sublimation • suppression 	

All classes of defenses in Table 1 are effective in “denying” or defusing conflict and in “repressing” or minimizing stress, but they differ greatly in the psychiatric diagnoses assigned to their users and in their consequences for long-term biopsychosocial adaptation. At level 1, the most pathological category, are found denial and distortion of external reality. These mechanisms are common in young children, our dreams, and psychosis. Such a definition of denial is a far more narrow but specific use of the term than making the term *denial* synonymous with all defense mechanisms. Level 1 defenses rarely respond to simple psychological intervention. To breach them requires altering the brain by neuroleptics or waking the dreamer.

More common to everyday life are the relatively im-

mature defenses found in levels 2 to 4. They are often associated with what *DSM-IV* calls Axis II disorders. Immature defenses externalize responsibility and allow individuals with personality disorders to appear to refuse help. These categories are associated with adolescents, immature adults, and individuals with personality disorders. It includes the paranoid's projection, the schizoid's autistic fantasy, and mutual passive-aggression (the sadistic drill sergeant and the infuriating recruit). Like cigarette smoking in a crowded elevator, such behavior may seem innocent to the user and deliberately irritating and provocative to the observer. Such defenses are consistently and negatively correlated with global assessment of mental health and profoundly distort the affective component of interpersonal relationships.

Defenses in this category rarely respond to verbal interpretation alone. They can be breached in two ways. First, by confrontation—often by a group of supportive peers—or by highly focused but empathic psychotherapy. Second, immature defenses can be breached by improving intrapsychic competence by rendering the individual less anxious and lonely through empathy, less tired and hungry through rest, less intoxicated through abstinence from alcohol, or less adolescent through maturation.

The third class of defenses, those at level 6, are often associated with what *DSM-IV* calls Axis I anxiety disorders and with the psychopathology of everyday life. These include mechanisms like repression, intellectualization, reaction formation (i.e., turning the other cheek), and displacement (i.e., directing affect at a more neutral object). In contrast to the “immature” defenses, the defenses of neurosis are manifested clinically by phobias, compulsions, obsessions, somatizations, and amnesias. Such users often seek psychological help, and neurotic defenses respond more readily to interpretation. Such defenses cause more suffering to the individual than to those in the environment.

The fourth and theoretically most mature class of defenses includes those at level 7: humor, altruism, sublimation, and suppression. These mechanisms still distort and alter feelings, conscience, relationships, and reality, but they achieve these alterations gracefully and flexibly. These mechanisms allow the individual consciously to experience the affective component of interpersonal relationships, but in a tempered fashion.

While mature defenses are arguably more conscious and certainly more “coping” than immature defenses, to dichotomize defenses as either “coping” or “defending” has proven both arbitrary and not helpful. The defense most highly associated with mental health is suppression, a defense that modulates emotional conflict or internal and external stressors through stoicism, by postponing but not ignoring wishes, and by subjectively minimizing but not ignoring disturbing problems, feelings, and experiences.

Implicit in the concept of defense is the conviction that it is not only genetic vulnerability and life stress but also the patient’s idiosyncratic defensive response to such vulnerability and stress that shapes psychopathology. Thus, despite problems in reliability, the validity of defenses makes them a valuable diagnostic axis for understanding psychopathology. By including defensive style as part of the mental status or diagnostic formulation, clinicians are better able to comprehend what is adaptive as well as maladaptive about their patients’ defensive distortions of inner and outer reality. They may also learn to view qualities that initially seemed most unreasonable and unlikable about their patients as human efforts to cope with conflict.

[See also Coping; Learned Helplessness; Optimism

and Pessimism; Repression; Self-Consciousness; and Stress.]

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George E. Vaillant

DEINDIVIDUATION is a psychological state of reduced self-awareness and a reduced sense of personal identity resulting in behavior that is influenced by current situational or group norms, rather than by personal or societal norms. Deindividuation is most likely to occur when individuals are submerged in a group, but may also occur outside a group when situational cues draw attention away from the self. Deindividuation

may help explain many forms of collective antisocial behavior. For example, rioters may feel faceless and unaccountable in the midst of a lynch mob, and sports fans may yell obscenities at a referee when submerged in a crowd of similar others. However, deindividuation does not necessarily produce antisocial behavior, and can lead to positive consequences if the group or situation creates positive standards for behavior. Indeed, people sometimes deliberately seek out potentially deindividuating experiences such as parties, dances, and religious gatherings in the hope of enhancing positive emotions and feelings of closeness.

Historical Background

In 1895, French theoretician Gustave Le Bon (*The Crowd*, London) proposed that a crowd of people can become a unified entity that operates as though guided by a collective mind, with emotions and behaviors that are easily transmitted from one person to the next. Festinger, Pepitone, and Newcomb (1952) first coined the term *deindividuation* and described it as a phenomenon in which individuals become so submerged in a group that they engage in disinhibited, deviant behaviors. These ideas were expanded and refined in later years by a variety of American and European social psychologists. A variety of theories have been developed, and more than 60 laboratory and field experiments have identified important factors that can lead to deindividuation. Although deindividuation research has provided much insight into collective behavior, it has also produced some inconsistencies and unanswered questions. Future research is needed to determine more precisely the conditions under which deindividuation is likely to occur and to produce positive and negative consequences, as well as the specific mechanisms through which deindividuation alters the behavior of individuals.

Key Factors Contributing to Deindividuation

Research has identified a number of factors that influence the occurrence and magnitude of deindividuation.

Group Size. As the size of the group or crowd increases, so does the potential for deindividuation. Mullen (1986) illustrated the importance of group size in a content analysis of newspaper accounts of 60 lynchings committed in the United States between 1899 and 1946. Mobs were more likely to engage in savagery and commit atrocities when the size of the mob increased relative to the number of victims.

Anonymity. A number of studies suggest that anonymity plays an important role in deindividuation. For example, Zimbardo (1969) found that women who were clothed in oversized lab coats and hoods were more willing to administer supposed electric shocks to another person than were women who wore normal

clothes and name tags. Similarly, in an anthropological study of 27 cultures, Watson (1973) found that warriors who hid their identities during battle by using face and body paint or masks were significantly more likely to torture or kill enemy prisoners than were warriors who could be readily identified. However, anonymity does not always result in negative behaviors. For example, in a conceptual extension of Zimbardo's experiment, Johnson and Downing (1979) found that anonymity only enhanced aggression when the costumes bore a resemblance to Ku Klux Klan outfits, but actually reduced aggression when the costumes resembled nurse uniforms.

A clever study by Diener and colleagues (1976) of Halloween trick-or-treaters in Seattle further illustrates the importance of anonymity. A greeter asked the children to take just one piece of candy, then left the room. Half of the children were asked to provide their names and say where they lived. Hidden observers noted that the anonymous children were more than twice as likely to take extra candy than were the identified children.

Reduced Self-Awareness. Experiences that diminish self-awareness can also contribute to deindividuation. A number of studies have found that, compared with self-aware people, deindividuated people behave in a manner that is less self-regulated, less consistent with their own attitudes and values, and more easily influenced by situational cues. Thus, factors that can reduce self-awareness, such as alcohol, arousal, and distraction, can enhance one's responsiveness to situational norms. However, factors that increase self-awareness, such as mirrors, cameras, name tags, and bright lights, increase self-regulation, enhance the consistency between personal attitudes and behaviors, and serve as potential remedies to deindividuation.

Group Identification. Reicher, Spears, and Postmes (1995) suggested that deindividuation occurs when individuals shift their attention from their personal identity to a more social or collective identity, and therefore attend more to group norms and social norms in the immediate social context than to personal norms. Consistent with this logic, a recent meta-analysis by Postmes and Spears (1998) found that individuals' behavior in deindividuation experiments appears to be influenced more by situation-specific norms than by general social norms. Whether changes in self-identity rather than other potential sources of deindividuation produce these patterns is currently unclear.

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Steven J. Karau

DEINSTITUTIONALIZATION was intended as a process in which institutional psychiatric care would be reduced but improved where necessary or replaced by comprehensive, community-based services encompassing treatment, rehabilitation, and support (Government Accounting Office, 1977). In common understanding, however, deinstitutionalization has simply meant reductions in the census of public mental hospitals.

The magnitude of deinstitutionalization can only be appreciated through statistics. Increasing steadily since the early 1900s, the resident population of state/county mental hospitals peaked in 1955 at 558,922 patients. By 1980, this figure was one-quarter of its previous high. Interestingly, the number of hospitals stayed constant during this time period; admissions rose through 1970 and then declined. The major effect of deinstitutionalization was on the number of beds per hospital and length of stay.

The process of deinstitutionalization was driven by a confluence of social forces—conservative and liberal. Operation of public mental hospitals was an economic burden borne mainly by state governments. By 1955, costs were consuming politically indefensible state revenues, for example, 38% of New York State's budget (R. J. Isaac and V. C. Armat, *Madness in the Streets*, New York, 1990). Exposés of deplorable conditions in state hospitals combined with this economic burden to heighten state concerns.

The "discovery" of antipsychotic medications is frequently cited as the major cause of deinstitutionalization. Anne Johnson in *Out of Bedlam* (New York, 1990) points out, though, that adoption of neuroleptic drugs resulted primarily from promotions by entrepreneurial pharmaceutical companies, invested heavily in marketing strategies targeted at state legislatures to increase hospital drug budgets. Medication-based treatments were attractive to fiscal conservatives as they promised to reduce institutional costs.

Deinstitutionalization was also driven by humanitarian concerns. Rights protections, initiated through civil rights cases, were extended to other disadvantaged groups, including psychiatric patients. Gerald Grob in *The Mad Among Us* (New York, 1994) notes that mental health systems were also a focus for academic sociologists, positing deviance as a social construction enhancing group cohesion in times of social change. The function of psychiatric diagnosis was to reify and legitimate the existing social order. In this antipsychiatry movement, mental illness, if it existed at all, was created by the social institutions designed to cure it. Eliminating mental hospitals would therefore eliminate mental illness.

Psychological theories recognizing the influence of parenting practices on child development and later adult outcomes contributed to rejection of illness and hospital treatment models. Effective interventions needed to be in vivo, social and educational in nature. The mental hygiene movement espoused the potential of early interventions with families, schools, and communities to prevent mental illness; in the future, hospitals would not be needed.

In response to these social and economic concerns, the U.S. Congress created the Joint Commission on Mental Illness and Health. In its 1961 report, *Action for*

Mental Health, Congress recommended upgrading state hospitals to therapeutic levels, increasing psychiatric treatment in general hospitals, and developing community mental health centers to divert persons with mental illness from hospitals and provide aftercare for those discharged yet incompletely recovered. The Community Mental Health Centers (CMHC) Act (1962) was the legislative response. The act and its associated regulations, however, placed an emphasis on prevention and included no mechanisms or funding to improve conditions in state hospitals—contrary to National Institutes of Mental Health assurances in congressional hearings. The act also ignored the state's role in implementation or monitoring CMHCs. Thus, state authorities were still without legitimate means to address the responsibility of state hospitals.

Deinstitutionalization, representing an economic and political mandate, nevertheless, was already proceeding. Its immediate implementation, however, was seriously flawed in most locations. Community facilities were not adequate to provide appropriate care for discharged and/or diverted patients. CMHCs had no function nor any staff with training or interest in long-term mental illness. Their focus was on prevention and services to less seriously disturbed individuals; therefore, rather than diversion or step-down programs, less appropriate mechanisms were used to reduce state hospital census.

Deinstitutionalization is seen as a failed policy or a failure to implement policy by most. Many unintended, negative results have been attributed to deinstitutionalized patients allegedly discharged before they were ready, transferred or discharged to inappropriate sources, or refused admission in order to decrease hospital utilization. The burden of care for these individuals was consequently borne by other sectors, resulting in the following:

- *Homelessness*: released patients without a home and/or capabilities to care for themselves wind up living on the streets or discharged to shelters;
- *Transinstitutionalization*: older patients transferred directly from state hospitals to nursing homes (through federal Medicaid funding), where care is inadequate for serious psychiatric problems; others sent to board and care homes, funded through Supplemental Security Income;
- *Criminalization*: unable to receive treatment through hospitals when needed, individuals with mental illness engage in bizarre behaviors and/or illegal acts necessary for survival (for example, loitering, stealing food, breaking or entering to obtain shelter, and so forth). Their resulting treatment is jail;
- *Family burden*: families that still have connections to ill relatives have no choice but to care for them or turn them out on the street. This increases the family's own stress and economic vulnerability, since it usually receives no assistance from public authorities.

These processes reflect states' shifting their costs in operating mental hospitals. Transinstitutionalization shifts costs to federal government revenues, homelessness and criminalization to local governments, and family burden to personal or private sources. But, of course, the largest effect is on quality of care. Rather than receiving appropriate attention in a hospital, patients live alone, stigmatized in the community and unable to obtain jobs. Such conditions can exacerbate symptoms, producing the revolving door phenomenon. Ironically, attempts to protect rights instigated by advocacy groups (for example, mental patient liberation advocates including young, public interest attorneys focused on eliminating civil commitments, ending unnecessary detention, and upholding rights to refuse treatment) may have exacerbated these negative outcomes by limiting treatment options even further.

Some statistics have been amassed in support of these allegations. E. Fuller Torrey and colleagues in *Criminalizing the Seriously Mentally Ill* (Washington, D.C., 1992) provide data on the sizeable population of persons with mental illness in local jails. Research on homelessness indicates that about 20 to 30% of homeless populations have experienced long-term serious mental illness. However, as persuasive as the advocates are, none of the documentation on homelessness, family burden, or criminalization can establish that without a deinstitutionalization policy, these individuals with mental illness would have been cared for adequately anyway.

While the short-term failures of deinstitutionalization are readily visible, the long-term positive consequences are not often identified. Deinstitutionalization has at least contributed to the development and expansion of innovative organizational forms (psychiatric rehabilitation, clubhouses, assertive community treatment), more humanistic treatment (rights protection guarantees), and a social movement (former-patient advocacy, self-help groups for persons with serious mental illness, and consumer-run programs). Examples can be found of well-planned state hospital closures, accompanied by exemplary treatment that is completely community-based (Northampton State Hospital in Massachusetts). Long-term data on mental health service utilization (from 1970 to 1986) does resemble more the comprehensive definition of deinstitutionalization. Only 24% of episodes are inpatient (compared to 77% in 1986); the number and size of public mental hospitals and additions to their census have decreased; and the resident population has been reduced by another two-thirds. Finally, despite allegations of poor and/or unsafe community treatment, consumer preferences are almost uniformly in favor of community residence rather than hospitalization (see Davidson et al., *The experiences of long-stay patients returning to the community*, *Psychiatry*, 58, 122–132, 1995).

While deinstitutionalization presents a complicated story of causes and effects, it also contains many lessons to learn. Deinstitutionalization was not a policy; despite its significance, it just happened. Probably because of extreme polemics, planning was totally inadequate, driven by dogma and self-interest rather than patient concerns. Policy implementation did not match policy intent, but there were no checks or balances to monitor this. Local programs needed oversight to assure policy congruence, but federal authorities could not do this; involvement of states or local constituencies was needed. Furthermore, for meaningful change, all components of a system must be prepared to change—which requires adequate funding upfront and a long time frame. Most of all, deinstitutionalization needed an integrated and meaningful federal policy on treatment of mental illness.

Deinstitutionalization is still underway with downsizing and state hospital closures. As of 1995, the number of resident patients in state and county mental hospitals was 69,177: 12.4% of the 1955 peak and 20% of the 1970 census. The need for national policy and social science involvement in deinstitutionalization still exists.

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Carol T. Mowbray and David P. Moxley

DELBOEUF, JOSEPH-RÉMI-LÉOPOLD (1831-1896), Belgian psychologist. Joseph-Rémi-Léopold Delboeuf can be considered as the first significant Belgian psychologist. He earned a doctorate in philosophy in 1855 and in physical and mathematical science in 1857 from the University of Liège. After working in the area of geometry and logic, he was named professor of Philosophy at the University of Ghent (1863-1866). As a philosopher and a mathematician, he naturally took an interest in then current scientific work in psychology and more specifically in perception and psychophysics.

An encounter with the physicist Joseph Plateau apparently oriented Delboeuf toward the question of optical illusions. He advanced the concept of muscular strength in order to put forward a theory applicable to all optical illusions (changes in muscular sensations enable us to judge differences in extent). He tested his theory empirically in 1865 on a new optical illusion known now as "Delboeuf concentric circles," which consists in a change in the perceived size of one circle in the presence of a circle of a different size.

The first experimental researches by Delboeuf in the domain of psychophysics were executed at the University of Ghent between 1865 and 1866 before he was nominated to the University of Liège as a philologist. These studies led him to compile two important memoirs and several articles where, with considerable originality, he defended the famous Fechner's logarithmic law relating sensation strength to stimulus strength. His work in this area is characterized on the one hand by an amendment to Fechner's formula and on the other hand by the utilization of a psychophysical technique based on brightness contrast (bisection method).

Although viewed by Fechner himself as an opponent of his beliefs, Delboeuf was actually one of his least virulent critics and the only psychologist of the era to have adopted a logarithmic law.

In his later career Delboeuf gradually devoted more of his time to research on a variety of subjects including philology, philosophy, biology, and above all at the end of his life, hypnotism, a subject he had been interested in since 1850. It was in the context of a book he published in 1885 on sleep and dreams in connection with memory that he decided to study hypnotism. He visited the famous hypnosis researcher Jean Charcot in 1885 in order to verify a phenomenon widely accepted at the time: the total loss of memory *after* hypnosis for events that took place *during* hypnosis. For Delboeuf, this memory loss was not a characteristic of the hypnotic state and he cleverly showed that memories created under hypnosis can, in fact, be evoked. On his return home he practiced hypnotism and published a book on the Salpêtrière school showing that many of the regularly observed characteristics of hypnosis really were due to influences unconsciously transmitted. Delboeuf's major conclusion about the role of suggestion was also consistent with many of the early observations made at Nancy by investigators such as Liébault, Bernheim, and Liégeois. Delboeuf's ideas are now considered as precursors of modern ideas on both hypnotism and clinical psychology.

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Serge Nicolas

DELGADO, HONORIO (1892-1969), Peruvian psychiatrist and philosopher. Born in Arequipa, the second largest city in Peru, Delgado studied medicine at San Marcos University in Lima where he became a disciple of psychiatric pioneer Hermilio Valdizán (1884-1929). In 1915, while still in medical school,

Delgado published an article in the newspaper *El Comercio* (Lima) entitled "El psicoanálisis," one of the first articles written in Spanish about psychoanalysis. In 1918 Delgado earned his medical degree and wrote a dissertation with the same title. During that same year, Valdizán and Delgado founded the *Revista de Psiquiatría y Disciplinas Conexas* (Review of Psychiatry and Related Disciplines). Until 1930, Delgado dedicated much effort to the dissemination of Freudian theory in Latin America. During a trip to Europe in 1922, Delgado met Freud, as well as Adler. Freud (*History of Psychoanalytic Movement*, 2nd ed.) described Delgado as an important representative of psychoanalysis in the Spanish-speaking world, and the *Revista* as the regional publication of his movement.

After 1930, Delgado gradually grew more and more disassociated from psychoanalysis, finally becoming one of its most bitter critics in Spanish-speaking psychiatry. Instead, he developed a keen interest in German, philosophically oriented psychologies, especially those of Karl Jaspers (1883–1969) and Nicolai Hartmann (1882–1950). Delgado viewed psychology as a *Geisteswissenschaft* (a social or cultural science, as opposed to a natural science), and tried to demonstrate the importance of Hartmann's ideas for psychopathology. His critical attitude toward psychoanalysis grew increasingly apparent when he became chair of psychiatry at San Marcos University after Valdizán's death. Delgado's papers and books diminished the diffusion of psychoanalysis in Peru.

Delgado was active in a number of academic societies, and in 1938 joined J. Oscar Trelles (1904–1990) in founding the *Revista de Neuropsiquiatría* (Review of Neuropsychiatry). He also served as psychiatrist at Víctor Larco Herrera Hospital, an institution devoted to the treatment of psychiatric patients. He was appointed Minister of Education (1948), Dean of the San Marcos University Faculty of Medicine (1961), and was the first rector (1962–1966) of the University of Medical and Biological Sciences (the current name of the university is Cayetano Heredia University), which he helped to found.

Delgado was a prolific author. Among his most important books are *Sigmund Freud* (Lima, 1926), *Psicología* (with M. Iberico; Lima, 1933), *La formación espiritual del individuo* (The spiritual formation of the individual; Lima, 1933), *La personalidad y el carácter* (Personality and character; Lima, 1943), *Curso de psiquiatría* (The textbook of psychiatry; Lima, 1953), *Enjuiciamiento de la medicina psicosomática* (Critical evaluation of psychosomatic medicine; Barcelona, 1960), *De la cultura y sus artífices* (Of culture and its artificers; Madrid, 1961), and *Contribuciones a la psicología y a la psicopatología* (Contributions to psychology and psychopathology; Lima, 1962).

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Ramón León

DELINQUENCY refers to the commission of acts prohibited by the criminal law, such as theft, burglary, robbery, violence, vandalism, and drug use, by persons aged under 18. The minimum age for delinquency varies in different places but is rarely less than seven. There are many problems in using legal definitions of delinquency. The boundary between what is legal and what is illegal may be poorly defined and subjective, as when school bullying gradually escalates into criminal violence. Legal categories may be so wide that they include acts that are behaviorally quite different, as when robbery ranges from armed bank robberies carried out by gangs of masked men to thefts of small amounts of money perpetrated by one school child on another. Legal definitions rely on the concept of intent, which is difficult to measure, rather than the behavioral criteria preferred by psychologists. Also, legal definitions change over time; however, their main advantage is that because they have been adopted by most delinquency researchers, their use makes it possible to compare and summarize results obtained in different projects.

Delinquency is commonly measured using either official records of arrests/convictions or self-reports of offending. The advantages and disadvantages of official records and self-reports are to some extent complementary. In general, official records include the worst offenders and the worst offenses, while self-reports include more of the normal range of delinquent activity. The worst offenders may be missing from samples interviewed in self-report studies. Self-reports have the advantage of including undetected offenses but the disadvantages of concealment and forgetting. By normally accepted psychometric criteria of validity, self-reports of offending are valid. Fortunately, the worst offenders according to self-reports (taking account of frequency

and seriousness) tend also to be the worst offenders according to official records, and the predictors and correlates of official and self-reported delinquency are generally very similar.

Epidemiology

The most useful information about epidemiology and risk factors for delinquency is obtained in prospective longitudinal surveys of delinquency based on large community samples. For example, over 400 South London boys were followed up from age 8 to age 40 in the Cambridge Study in Delinquency Development, and over 1,500 Pittsburgh boys were followed up from ages 7 to 25 in the Pittsburgh Youth Study.

Most research concerns males, because the prevalence of delinquency is greater for males than for females. About three times as many boys as girls are arrested in the United States for the more serious "index" crimes, and about six times as many boys as girls are arrested for violent index crimes (murder, rape, robbery, and aggravated assault). There are also ethnic/racial disproportionalities in arrest rates. Over five times as many African American juveniles as Caucasian juveniles per capita in the United States are arrested for violent index crimes. The gender and ethnic/racial disproportionalities are generally lower in self-reports than in official records.

Even according to official records, the cumulative prevalence of delinquency is high. In a Philadelphia follow-up study of over 27,000 children born in 1958, Paul Tracy reported that the prevalence of juvenile arrests for nontraffic offenses was 42% of African American males, 23% of Caucasian males, 19% of African American females and 9% of Caucasian females. According to self-reports, most juveniles commit delinquent acts. David Huizinga, in a longitudinal study of over 1,500 Denver children, found that 94% of boys and 90% of girls reported that they had committed a delinquent offense before age 18. In the large-scale Denver, Pittsburgh, and Rochester studies, almost half of 17-year-old boys admitted committing at least one "street crime" (such as burglary, serious theft, robbery, and aggravated assault) in the previous year.

While the overall prevalence of delinquency is high, especially in the inner-city samples that are commonly studied, a small fraction of the population (the "chronic offenders") accounts for a large fraction of all serious delinquencies. In the 1958 Philadelphia birth cohort study, 7% of the males accounted for 61% of all the offenses. Terrie Moffitt of London University has suggested that it is important to distinguish between the more committed "life-course-persistent" offenders and the less committed "adolescence-limited" offenders.

Generally, delinquents are versatile rather than specialized in their offending. Most juveniles who commit violent crimes are persistent offenders who appear to

commit different types of crimes almost at random during their criminal careers. As demonstrated in the Cambridge study, delinquents disproportionally tend to commit many other types of deviant acts, including heavy drinking, substance use, drunk driving, heavy smoking, heavy gambling, and promiscuous sexual behavior.

Generally, there is significant continuity between delinquency in one age range and delinquency in another. In the Cambridge study, 73% of those convicted as juveniles were reconvicted as young adults, and there was continuity for self-reported offending and for antisocial behavior in general. An early age of onset of juvenile offending predicts a large number of juvenile offenses and a high probability of persisting into an adult criminal career.

Risk Factors

Literally, thousands of factors differentiate significantly between official delinquents and nondelinquents and correlate significantly with self-reports of delinquency. The major problem is to establish which risk factors have causal effects. There are many biological, individual, family, peer, school, and community risk factors for delinquency, only a few of which can be mentioned here.

Hyperactivity and impulsivity are among the most important personality or individual difference factors that predict later delinquency. Related concepts include poor attention, a poor ability to defer gratification, and a short future-time perspective. The most extensive research on different measures of impulsivity was carried out by Jennifer White in the Pittsburgh Youth Study. This showed that cognitive or verbal impulsivity (for example, acts without thinking, unable to defer gratification) was more strongly related to delinquency than was behavioral impulsivity (for example, clumsiness in psychomotor tests).

Low IQ and low school attainment are important predictors of delinquency. In a prospective longitudinal survey of about 120 Stockholm males, Hakan Stattin found that low IQ measured at age 3 significantly predicted officially recorded offending up to age 30. Frequent offenders (with four or more offenses) had an average IQ of 88 at age 3, whereas nonoffenders had an average IQ of 101. Similarly, Paul Lipsitt reported that low IQ at age 4 predicted court delinquency up to age 17 in the Collaborative Perinatal Project. Delinquents often do better on nonverbal performance IQ tests, such as object assembly and block design, than on verbal IQ tests. This is concordant with other research suggesting that they find it easier to deal with concrete objects than with abstract concepts.

The classic longitudinal studies by Joan McCord in Boston and Lee Robins in St. Louis show that poor parental supervision, harsh discipline, and a rejecting parental attitude are all important predictors of delin-

quency. In the Cambridge study, the presence of any of these family background features at age 8 doubled the risk of a later juvenile conviction. Also, there seems to be significant intergenerational transmission of violent behavior from parents to children, as Cathy Widom found in a follow-up of over 900 abused and about 700 control children in Indianapolis. Children who were physically abused up to age 11 were significantly likely to become violent offenders in the next 15 years.

Many studies show that broken homes or disrupted families predict delinquency. In a follow-up of 1,000 children born in Newcastle-upon-Tyne, England, Israel Kolvin reported that marital disruption (divorce or separation) in a boy's first 5 years predicted his later convictions up to age 32. Similarly, in a follow-up of over 1,000 children born in Dunedin, New Zealand, Bill Henry found that children who were exposed to parental discord and many changes of the primary caretaker tended to become antisocial and delinquent. Generally, boys from homes broken by death are not particularly likely to be delinquent, in contrast to boys from homes broken by divorce or separation due to disharmony. Joan McCord's research showed that boys reared in single-parent families with affectionate mothers were less likely to become delinquent than those reared in two-parent homes characterized by parental conflict, suggesting that the quality of family relationships was more important than the number of parents.

Criminal parents tend to have delinquent children. In the Cambridge study, the concentration of offending in a small number of families was remarkable. Less than 6% of the families were responsible for half of the criminal convictions of all members (fathers, mothers, sons, and daughters) of all 400 families. Having a convicted mother, father, brother, or sister significantly predicted a boy's own convictions. Furthermore, convicted parents and delinquent siblings were related to a boy's self-reported as well as official offending.

Large family size is another important predictor of delinquency. In the British National Survey of over 5,000 children, Michael Wadsworth found that the percentage of boys who were officially delinquent increased from 9% in families containing one child to 24% in families containing four or more children. Large family size, together with hyperactivity, impulsivity, low school attainment, poor parental supervision, parental conflict, an antisocial parent, a young mother, a broken family, and low family income, all proved to be replicable predictors of delinquency in England in the 1960s (in the Cambridge study) and in the United States in the 1990s (in the Pittsburgh Youth Study).

Interventions

The major methods of reducing delinquency involve developmental, community, situational, and criminal justice prevention. The focus here is on developmental pre-

vention, that is, interventions designed to prevent the development of delinquency potential in individuals, targeting risk and protective factors discovered in studies of human development. Developmental prevention can be demonstrated most convincingly in randomized experiments with reasonably large samples. Only the most significant experiments can be mentioned here.

Delinquency can be prevented by intensive home visiting programs. In New York State, David Olds randomly allocated 400 mothers either to receive home visits from nurses during pregnancy, or to receive visits both during pregnancy and during the first two years of life, or to a control group who received no visits. The home visitors gave advice about prenatal and postnatal care of the child, about infant development, and about the importance of proper nutrition and avoiding smoking and drinking during pregnancy. The results showed that, especially among socioeconomically deprived mothers, home visits caused a decrease in child physical abuse, in the mother's offending, and in the child's delinquency.

One of the most successful early prevention programs has been the Perry preschool project carried out in Michigan by Lawrence Schweinhart. This was essentially a "Head Start" program targeted on disadvantaged African American children. The experimental children attended a daily preschool program, backed up by weekly home visits, usually lasting two years (covering ages 3 to 4). The aim of the "plan-do-review" program was to provide intellectual stimulation, to increase thinking and reasoning abilities, and to increase later school achievement. This program led to decreases in school failure, delinquency, and other undesirable outcomes. For every one dollar spent on the program, seven dollars were saved in the long term.

Behavioral parent management training, as developed by Gerald Patterson in Oregon, is also an effective technique. Patterson's careful observations of parent-child interaction showed that parents of antisocial children were deficient in their methods of child rearing. They failed to tell their children how they were expected to behave, failed to monitor their behavior to ensure that it was desirable, and failed to enforce rules promptly and unambiguously with appropriate rewards and penalties. The parents of antisocial children used more punishment (such as scolding, shouting, or threatening) but failed to make it contingent on the child's behavior. Patterson trained these parents in effective child-rearing methods, namely noticing what a child is doing, monitoring behavior over long periods, clearly stating house rules, making rewards and punishments contingent on behavior, and negotiating disagreements so that conflicts and crises did not escalate. His treatment was shown to be effective in reducing child stealing and antisocial behavior over short periods in small-scale studies.

The set of techniques variously termed cognitive-behavioral interpersonal social skills training have also proved to be quite successful. The "Reasoning and Rehabilitation" program developed by Robert Ross in Ottawa, Canada, aimed to modify the impulsive, egocentric thinking of delinquents, to teach them to stop and think before acting, to consider the consequences of their behavior, to conceptualize alternative ways of solving interpersonal problems, and to consider the impact of their behavior on other people, especially their victims. It included social skills training, critical thinking (to teach logical reasoning), values education (to teach values and concern for others), assertiveness training (to teach nonaggressive, socially appropriate ways to obtain desired outcomes), negotiation skills training, interpersonal cognitive problem solving (to teach thinking skills for solving interpersonal problems), social perspective training (to teach how to recognize and understand other people's feelings), role-playing and modeling (demonstration and practice of effective and acceptable interpersonal behavior). This program led to a large decrease in reoffending in a small sample of delinquents.

Multimodal programs including both skills training and parent training are likely to be more effective than either alone. An important multimodal program was implemented by Richard Tremblay in Montreal. He identified about 250 disruptive (aggressive/hyperactive) boys at age 6 for a prevention experiment. Between ages 7 and 9, the experimental group received training to foster social skills and self-control. Coaching, peer modeling, role playing, and reinforcement contingencies were used in small group sessions on such topics as "how to help," "what to do when you are angry," and "how to react to teasing." Also, the parents of the boys were trained using Patterson's techniques. This prevention program was quite successful. By age 12, the experimental boys committed less burglary and theft, were less likely to get drunk, and were less likely to be involved in fights than those in the control group. At every age from 10 to 15, the experimental boys had lower self-reported delinquency scores than the control boys.

An important school-based prevention experiment was carried out in Seattle by David Hawkins. This combined parent training, teacher training, and skills training. About 500 first grade children (aged 6) were randomly assigned to experimental or control classes. The children in the experimental classes received special treatment at home and school, which was designed to increase their attachment to their parent and their bonding to the school, on the assumption that delinquency was inhibited by the strength of social bonds. Their parents were trained to notice and reinforce socially desirable behavior in a program called "Catch

Them Being Good." Their teachers were trained in classroom management, for example, to provide clear instructions and expectations to children, to reward children for participation in desired behavior, and to teach children prosocial (socially desirable) methods of solving problems. This program was effective in reducing violent delinquency and heavy drinking up to age eighteen.

Much has been learned from longitudinal studies about development and risk factors, and much has been learned from randomized experiments about effective interventions. More efforts are needed in future to coordinate longitudinal and experimental studies to advance knowledge about causal influences and to ensure that the interventions are solidly grounded in theory and empirical knowledge.

[See also Gangs.]

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David P. Farrington

DELUSIONAL DISORDER. See Paranoid Disorder and Delusional Disorder.

DELUSIONS have the essential feature of being reality distortions or unrealistic ideas or beliefs. A delusion can be defined as an improbable, often highly personal, idea or belief system, not endorsed by one's culture or subculture. This idea or belief is held with a high degree of conviction despite the availability of more probable or more coherent hypotheses and is often maintained in the face of direct evidence to the contrary (Altman & Jobe, 1992). As can be seen from three clinical cases, delusions can range from the simple and disorganized to the highly complex and precisely reasoned:

- A 24-year-old male salesman, with a diagnosis of delusional disorder, reported that "I am being followed by the C.I.A. and I know they are after me."
- A 26-year-old female patient with bipolar disorder recently admitted for an acute manic episode reported that "my right ear can receive messages from outer space, which helps direct my mission here on earth."
- A 38-year-old male patient with a diagnosis of schizophrenia, reported that "the bison overpower buffalo with tyroean ultraforce for world domination."

Some available data suggest that rather than a patient being exclusively delusional or nondelusional, there are gradations, and the extent of delusional belief may fit on a continuum with normal beliefs. This phenomena, called "double awareness," represents an in-between state (Sachs, Carpenter, & Strauss, 1974).

Classification and Reliability and Validity

There are countless ways to classify pathological beliefs, such as delusions. A large number of pathological beliefs are (1) persecutory/paranoid, (2) delusions of reference, (3) grandiose delusions, (4) nihilistic delusions, (5) delusions of influence, (6) somatic delusions, and (7) delusions of metamorphosis. All of these types usually relate directly to the person having the delusion and are personally relevant to the life history of that

individual. Thus, patients may have delusions that people are following them, or people are trying to influence them, but one rarely finds patients, for example, who have delusions about isolated window shades, or about railroad trains, without any reference to the patient or his concerns.

Kenneth Kendler and colleagues in their article "Dimensions of Delusional Experience" (1983), delineated five different dimensions of delusionality: (1) conviction, (2) the degree of certainty by which the belief is maintained, (3) extension, the degree of the patient's life experience that is absorbed by the belief, (4) bizarreness, the degree of improbability of the belief, (5) disorganization, the degree of coherence of the belief, and (6) pressure, the degree of urgency to action arising from the delusion. Other investigators also have analyzed delusions by studying separate dimensions of delusions (Garety & Hemsley, 1994; Harrow, Rattenbury, & Stoll, 1988).

Prevalence and Incidence

Delusions have come to represent one of the most important defining factors in classification systems of diagnostic categories. Some researchers believe that delusions may be the most important symptom of schizophrenia.

The overall incidence and prevalence of delusions is dependent upon the type of disorder, or the diagnostic group in which the patient belongs. For example, the percent of schizophrenia patients with delusions at the acute phase of hospitalization is approximately 80% while the percent of bipolar manic patients with delusions at the acute phase is over 60%.

The question of the prevalence and incidence of delusions raises the issue concerning whether delusions are a traitlike feature or just a one-time aberration in which the patient has at one period in his life a series of pathological beliefs. Longitudinal evidence suggests that delusions tend to recur for both schizophrenics and for other psychotic disorders as well (Harrow, MacDonald, Sands, & Silverstein, 1995). Thus, for most schizophrenics and many psychotic affectively disordered patients, delusions are not a one-time aberration but recur over time and appear to represent a traitlike feature.

Treatment of Delusions

For schizophrenia and delusional disorder, neuroleptic agents that block dopamine, and specifically the D2 receptor, have been effective, particularly in treating acute delusions. Clozaril and other atypical neuroleptics, which block both dopamine and serotonin 5HT-2 receptors, have also been effective in treating delusions as well as other features known as negative symptoms. In general, treatment with neuroleptics is not diagnosis

specific; rather, treatment with neuroleptics is specific to certain symptom groupings, which include delusions. Thus, the treatment of delusions cuts across diagnosis and is not specific to a single diagnostic group. Persistent or chronic delusions are impacted by medications, but less so than acute delusions.

Theories of Delusions

The study of delusions has prompted more theories than hard data. The theories include psychoanalytic views of repressed impulses in paranoid delusions, alteration of the view of one's self-structure, effects of personality characteristics, existential factors, learning deficits, management of hostility, effects of social humiliation, effects of abnormal reasoning, effects of abnormal perceptions, and effects of cognitive styles. From among these views, many promising theories about the genesis of delusions have arisen (Bentall, Kinderman, & Kaney, 1994; Butler & Braff, 1991; Garety & Hemsley, 1994; Oltmanns & Maher, 1988).

The perceptual deficit theory of delusions proposes that abnormal perception leads to the formation of delusions to explain how these perceptions occurred. Using this scheme, delusions could evolve out of abnormal perceptions that then lead to "reasonable" explanations of how such perceptions came about. This may be the genesis of delusional beliefs for select patients, however, it is rare. Empirical assessments of this view have produced mixed results (Garety & Hemsley, 1994). On the other hand, a more promising lead for understanding delusions is in terms of the misinterpretation of normal perception, which is due to background motives/goals and associated emotions. In other words, the interpretation or perception of the environment is influenced by one's background motives/goals/plans (Lazarus, 1991) and associated concerns and needs (Harrow et al., 1988). The ideas or beliefs that result are generated from these background motives/goals and associated emotions as a guiding force for interpretation.

Data suggest delusions are not primarily logical errors but are derived from emotional material. Under high cognitive arousal, memories from the patient's affective past, and wishes and preoccupations from current affective life, thrust themselves into, or are intermingled with the person's ongoing thinking (Harrow, Lanin-Kettering, Prosen, & Miller, 1983). The intermingling becomes more prominent in a state of high tension and heightened cognitive arousal, when cognitive disruption occurs. Under such circumstances, the guiding motives/goals, wishes, and preoccupations also influence and temporarily bias components of longterm memory that, under normal circumstances, would help to self-monitor one's own ideas and beliefs (Harrow, Lanin-Kettering, & Miller, 1989). The delusions can be-

come "real," vital, and intense to the patient. After an individual becomes delusional, the delusions often become mixed up, and their origin becomes difficult to recognize.

Other unknown factors are also involved in the generation and maintenance of delusions, since both disturbed and normal people have motives/goals that influence their perception. However, only select people are vulnerable to major reality distortions and delusions over a sustained period of time. We still do not understand the biological factors involved in the generation, control, and regulation of aberrant thoughts and beliefs. It may be that amygdaloid influences on frontal-temporal ideas, beliefs, and thinking become stronger, or there may be weakened frontal inhibition, or disinhibition, with poorer cognitive monitoring.

This explanation, however, cannot completely explain why many normal people who regularly jump to conclusions do not become delusional. Research (Harrow et al., 1988, 1989) suggests that faulty self-monitoring is involved in delusion formation. Faulty self-monitoring, that is based on ineffective use of stored knowledge (stored in long-term memory) about what types of ideas are socially appropriate may be an important component of almost all psychotic symptoms, including delusions, although other unknown factors are also involved.

Manfred Spitzer, partly modifying a theory by Ralph Hoffman (1987), emphasizes the importance of self-organizing neural networks. This type of network has a local learning rule that changes the strengths of connections between neural elements without the need for an instructor and provides a more brain-related model of delusions (Spitzer, 1995).

Overall, many aspects of delusions are still poorly understood. More empirical research is needed regarding the formation and persistence of delusions and the relationship between delusions and other forms of psychopathology such as thought disorder and hallucinations (for example, most sustained hallucinations include some delusional beliefs). New techniques such as brain imaging may play a role in helping to provide additional insight.

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Thomas Jobe and Martin Harrow

DEMAND CHARACTERISTICS is the term given for the totality of cues and mutual role expectations that inhere in a social context (for example, a psychological experiment or therapy situation), which serve to influ-ence the behavior and/or self-reported experiences of the research participant or patient. The expression was adapted by the first author in 1959 (*Journal of Abnormal and Social Psychology*, 58, 277-299) from a related con-cept—*Aufforderungscharaktere*, which refers to the “de-mand value” that the psychological environment exerts upon the behavior of an individual—derived from Kurt Lewin’s field-theoretical analysis of personality (*A Dy-namic Theory of Personality: Selected Papers*, New York, 1935). The behavioral impact of the demand charac-teristics of a given situation will vary with the extent to which they are perceived, as well as with the moti-vation and ability of the person to comply.

Scientific experiments seek to explain phenomena

(represented by systematic differences in some depend-ent variable, or DV) by expressly manipulating the hy-pothesized causal variable (that is, independent vari-able, or IV) while holding constant or equating any other potential contributory conditions. If variation in the IV produces corresponding changes in the DV to an extent that is probabilistically greater than the natural, ran-dom variation of the DV in the population, then a causal relation can be inferred. Unfortunately, the ex-perimental method may be compromised when the sub-ject of investigation is a sentient, reasoning organism, capable of perceiving (or misperceiving) the purpose of the research. The usual prescription for identifying cau-sation is inadequate because of the investigator’s ina-bility to control the degree to which the participant’s behavior may be contaminated by expectations and re-sponsiveness to situational cues relevant (or irrelevant) to the experimental hypothesis.

In a research context, a volunteer enters into a so-cial contract with the investigator to assume the role of “subject” for the purpose of advancing scientific knowledge. Under these circumstances, the behavioral scientist is likely to elicit behaviors that are not typical for the participants under investigation. We have ob-served, for example, that research volunteers are will-ing to perform clearly meaningless tasks for several hours—such as completing successive sheets of 224 addition problems, only to follow instructions to tear up each sheet before proceeding to the next. When que-ried by an independent investigator about their percep-tions of the purpose of the study, participants invari-ably impute considerable meaning to their endeavors, viewing their activities as a test of endurance or some-thing similar.

The demand characteristics of an experiment can be subtle—personnel in white laboratory coats, the repu-tation of the senior investigator, the wording of in-formed consent documents, as well as the expectation that one’s participation will contribute toward the un-derstanding of an important scientific problem. Nev-ertheless, they can affect not only the external validity (i.e., generalizability beyond the laboratory) of an in-vestigation but its internal validity as well (that is, how confident one can be that the IV was uniquely respon-sible for the observed changes in the DV). The use of quasi-control procedures, such as a postexperimental inquiry carried out by a second investigator who is un-aware of the assigned experimental condition and cor-responding performance of the participant, is one way of detecting the contribution of demand characteristics in social and behavioral research. [See Artifact, *article on Artifact in Research*.]

Although generally regarded as artifact by the sci-entific community, demand characteristics remain a po-tent, and often unrecognized, source for therapeutic

change in the clinical context. Rather than relegating demand characteristics to the realm of artifact, they should be acknowledged as a pervasive influence upon all human interaction. Both researchers and clinicians can benefit from determining what meaning an individual attributes to the totality of cues in any given situation.

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DEMENTIA. See Alzheimer's Disease.

DEPENDENT VARIABLES. See Research Methods.

DEPRESSANTS, SEDATIVES, AND HYPNOTICS.

These categories of drugs all depress central nervous system (CNS) activity. Some are nonselective, while others are more selective in their actions and effects on the CNS and behavior. Sedatives, more typically termed anxiolytics, are drugs indicated for the treatment of anxiety and hypnotics for insomnia. Depressant is an older term used prior to introduction of the benzodiazepines in the 1960s. Currently, the term is used to refer to older, non-CNS selective drugs including barbiturates, alcohol, and alcohol-aldehyde-based drugs.

These drugs, used as sedatives and hypnotics in the past, are now rarely used as their margin of safety is narrow, tolerance to their effects develops rapidly, and most have a relatively high abuse liability.

The drug class of choice for treatment of insomnia is the benzodiazepine receptor agonist. The class name is derived from the recognized site of action of the drugs. Some have the benzodiazepine chemical structure, while others do not. All share the characteristic of occupying benzodiazepine receptors on the gamma-aminobutyric-acid (GABA) receptor complex, with receptor occupation opening ion channels and thereby facilitating GABA, the predominant inhibitory neurotransmitter. This drug class also remains the mainstay in treatment of anxiety disorders, although some tricyclic antidepressants and specific serotonin reuptake inhibitors have been used with success in panic disorder, mixed anxiety and depression, and generalized anxiety disorder.

Many placebo-controlled studies have shown the efficacy of benzodiazepine receptor agonists for insomnia. All hasten sleep onset, reduce wakefulness after sleep onset, and reduce the amount of light (that is, stage 1 nonrapid-eye-movement) sleep. This has been demonstrated in insomniacs and in individuals experiencing transient sleep problems. The drugs differ in their pharmacokinetic profiles and metabolic pathways. Most have a rapid onset of action (that is, $T_{max} \leq 2$ hrs) and effectively induce sleep. All the short- (that is, $T_{1/2} \leq 5$ hrs) and intermediate-acting (that is, $T_{1/2} = 6-12$ hrs) drugs sufficiently maintain sleep for seven to eight hours. Those that are long-acting or have long-acting metabolites (that is, $T_{1/2} \geq 12$ hrs) have the potential of producing residual sedation the following day. The characteristic pharmacokinetics of oxidated drugs are altered in elderly and in liver disease as seen by an increased area under the plasma concentration curve. With some drugs this occurs by increasing the peak plasma concentration and others by extending the duration of action, or both. Those drugs metabolized by conjugation are potentially safer for aged patients or patients with liver disease as their pharmacokinetics do not change.

The sedative action of the benzodiazepine receptor agonists is the desired effect in anxiety disorders. Anxiolytic effects are achieved at lower doses than doses producing hypnotic effects. Although a given benzodiazepine receptor agonist may have an anxiolytic indication, at higher doses it will have hypnotic effects and vice versa. Again, many placebo-controlled studies have demonstrated the efficacy of these drugs in various anxiety disorders. However, the therapeutic dose differs for the various disorders. Parenthetically, it should be noted that these drugs also have muscle relaxant and anticonvulsive effects. The primary issues in the use of

benzodiazepine receptor agonists as anxiolytics and hypnotics are their side effects and abuse liability.

In some insomnia conditions, residual sedation the following day is an undesired side effect, while in anxiety disorders it is the desired effect. The duration of action, determined by the drug's half-life and dose, predicts the likelihood of residual sedation for that drug. Another side effect related to dose and half-life is rebound insomnia. Upon discontinuation, sleep may be disturbed beyond that of baseline for one to two nights. Rebound insomnia occurs after high doses (that is, above the therapeutic range) and is avoided by dose tapering or long half-life drugs. An oft-mentioned corollary to rebound insomnia is rebound anxiety, but it has not been scientifically demonstrated. Rebound insomnia is not the expression of a withdrawal syndrome or physical dependence. It is a single symptom that can even occur after a single night of a high-dose short-acting drug.

Amnesia is another well documented effect of benzodiazepine receptor agonists. It is desirable when these drugs are used as premedicants for surgery and other invasive medical procedures. Its clinical significance when used for insomnia and anxiety depends on patient characteristics and circumstances. The extent of tolerance to this effect is not known. The amnesia is found after both IV and oral administration, is anterograde in character (that is, events occurring after, but not before, drug administration), and is dose related. In dispute is whether the amnesia is secondary to the sedative effects of these drugs or to their direct effects on hippocampal memory systems or to both.

Finally, of concern is the abuse liability (that is, the likelihood of physical and behavioral dependence) of the benzodiazepine receptor agonists. Both epidemiological and laboratory studies suggest it is relatively low. Survey data indicate a 1 to 3% annual prevalence of non-medical use; it is rare in the general population but more frequent in identified drug abuse populations. Surveys of medical use indicate the majority of patients use sedatives and hypnotics for two weeks or less. However, a percentage of individuals use hypnotics nightly (14%) and anxiolytics daily (25%) on a chronic basis yet with no dose escalation. Whether this pattern of medical use reflects addiction (that is, physical and/or behavioral dependence) is disputed. Although there are reports of physical dependence at therapeutic doses in long-term daytime anxiolytic use, no study of long-term hypnotic use has been done. Daytime studies of the reinforcing effects of these drugs indicate they have a low behavioral dependence liability. Studies of their behavioral dependence liability in the context of their use as hypnotics have come to a similar conclusion. Hypnotic use by patients with insomnia is therapy-seeking behavior, does not lead to dose escalation, and

does not generalize to daytime use (that is, does not occur outside of the therapeutic context).

Clinicians generally agree that pharmacotherapy alone rarely "cures" insomnia or anxiety disorder; it is symptomatic treatment. Cognitive-behavioral therapies are typically used to treat some insomnia and anxiety disorders. The role of adjunct pharmacotherapy is highly debated. One view is that pharmacotherapy, in either insomnia or anxiety, blocks or delays the necessary "unlearning" required in treating the specific disorder. The other view is that the drug can in the short term relieve symptoms and the burden of the disorder and reinforce the behavior therapy. There are few well-conducted outcome studies that resolve this question.

[See also *Drugs; and Drug Abuse.*]

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DEPRESSION has been one of the most intensely studied mental disorders. Theorizing about depression began in ancient times. Early concepts were generally physical in nature, and this emphasis continued into

the nineteenth century. Some early speculations about depression viewed it as a general debility of the excitatory vascular system of the brain (Benjamin Rush) or a disturbance of nutrition to the cerebral cortex (Richard von Krafft-Ebing). With the development of Sigmund Freud's ideas, however, there was a distinct shift toward psychological paradigms of depression.

One of the most important conceptual advances was made in the early twentieth century when Emil Kraepelin noted that depression and mania were closely associated. He viewed these as alternative manifestations of the same disease process, and he brought them together under one diagnosis. Leonhard (1957) later emphasized the importance of distinguishing between unipolar and bipolar depression because of differences in the courses of the disorders, degrees of genetic transmission, and premorbid temperament. He defined bipolar depression as a mood disorder having a course that included episodes of mania during the individual's lifetime.

Epidemiology

Depression and mania affect a significant number of persons in our society, with a point prevalence in the United States of 3% for unipolar major depression and 0.7% for bipolar depression. Based on data from the Epidemiologic Catchment Area Study, 6% of persons in the United States have had unipolar major depression at some point in their lives. The likelihood of having depression is higher for women than for men by a ratio of approximately 2 to 1. The prevalence of depression among individuals presenting to primary care physicians has been demonstrated to be as high as 25%. Despite improved treatments for depression, there is evidence that the incidence of affective disorders is increasing with each generation.

The presence of increased levels of stressful events preceding the onset of depression has received considerable empirical support (e.g., Brown & Harris, 1978); nevertheless, the actual variance accounted for by stressful events in predicting depression is only about 10%. In order to understand the relationship between the two better, investigators have increasingly examined the role of moderating variables, such as coping style, social support, and personality (Cronkite & Moos, 1995). At least 50% of individuals who recover from an episode of depression have a recurrence of symptoms within one year. When there has been more than one episode, the probability of recurrence rises still further. The key to treating depression appears to lie in aggressive treatment. Early intervention has been shown to shorten the duration of new episodes.

Data on the long-term course of bipolar disorder is inconsistent. Emil Kraepelin followed cases at the turn of the nineteenth century and found that 45% of persons with manic depression have only single episodes,

even though his follow-up periods lasted up to 40 years. More recent studies have found a much higher incidence of recurrence. This may reflect that biological or social changes are increasing patients' proneness to relapse, or it may simply reflect methodological inadequacies in early studies.

Mood disorders may coexist with almost any other psychiatric disorder. Some of the most common of these are anxiety disorders, substance abuse, and eating disorders. Depression with psychiatric or physiological comorbidity has a poorer prognosis than depression without accompanying disorders. There is a high level of comorbidity between major depression and panic disorder, and to a lesser degree, between major depression and other anxiety disorders such as social phobia. Mood disorders are also very commonly associated with psychoactive substance use disorder (PSUD). They account for one half of all Axis I disorders accompanying PSUD, and approximately one fourth of PSUD patients are at risk to have a mood disorder.

Psychological Theories of Depression

Modern psychological theorizing about depression may be said to have begun primarily with Freud, who developed a complex formulation comparing depression to mourning. Freud theorized that an early disappointment in the depressed person's life, particularly the loss of a relationship, led to reconstructing and substituting an image of the desired person within, resulting in an ambivalent emotional cathexis of the lost person (i.e., both longing for and anger toward him or her). Since the image of the desired person had been taken into the self as a way of compensating for the disappointment, anger was also turned inward at the self. With the loss of a love object in adulthood, anger again was experienced and directed inward toward a representation of the recently lost love object, thus causing depression.

Modern analytic theory has significantly departed from this conceptualization. One of the most influential neoanalytic theorists regarding depression was Edward Bibring. He viewed depression as resulting not from intrapsychic conflict but from loss of self-esteem caused by environmental loss. Arieti and Bemporad (1980) hypothesized that reactive depression results from an overreliance either on a dominant other or a dominant goal for a sense of meaning and self-worth. When these external supports to self-esteem are lost, a drastic loss of self-esteem ensues. They also theorized that a third type of depression, characterological depression, results when the individual cannot find pleasure, meaning, or self-worth from any source—internal or external. All three types of depression share in common "anxiety over the direct attainment of pleasure . . . fear that spontaneous activity will result in rejection or criticism from others" (p. 1363). In addition, all three types of

depressed persons "overvalue the opinions of others, and . . . overestimate their own effects on the inner lives of others" (p. 1363). This analytic formulation shows some convergence with cognitive theories of emotional disorders.

One theory that has stimulated a great deal of research has been the theory of "learned helplessness," developed by Seligman (1975). Seligman used an animal analog model from the laboratory to study depression. Dogs exposed to inescapable shocks were less able to learn to avoid future aversive events than dogs exposed to similar levels of escapable shock. Hiroto and Seligman (1975) showed that the helplessness effect could occur in humans also, and subsequent research focused on similarities between depressed persons and persons subjected to a learned-helplessness induction in the laboratory. Later, a model was constructed that incorporated human cognition as a moderator of helplessness effects in humans. This revised learned-helplessness model generated considerable research, examining attributions made by persons in uncontrollable, unpleasant situations, and also attributions made by depressed individuals. According to the revised model, once persons perceive their situation as uncontrollable, they begin to make attributions to explain their loss of control (Abramson, Seligman, & Teasdale, 1978). Attributions for helplessness are either internal (believed to be due to characteristics of the person) or external (due to the environment); global (applying to many situations) or specific (applying to a limited range of situations); and stable (persisting over time) or unstable (limited in time). Loss of self-esteem is theorized to occur when persons decide that their helplessness is due to personal deficiencies rather than to reasons that would universally affect almost anyone in that situation. Stable, global, and personal attributions for helplessness and/or failure have generally been found to produce the greatest degree of depressive deficits.

Subtypes of Depression

Depression is now actually known to be a heterogeneous group of disorders that require multiple alternative treatment strategies. Awareness of the characteristics of the subtypes can enhance recognition of depression in general as well as lead to improved decision making in treatment planning.

Some types of depression have been shown to have very strong biological foundations. Bipolar disorder, for example, is closely linked to biological causes. Although there is a wealth of evidence demonstrating this conclusion, one particularly convincing piece of data is the very high monozygotic concordance rate (70%) for bipolar disorder. With unipolar depression, the picture is somewhat more complex. Whereas some unipolar depressions may be almost purely endogenous (i.e., presumably biological) on the one hand, or exogenous (re-

active to the environment) on the other, the overall evidence regarding the nature of unipolar depression suggests that both physical and psychological processes are involved. The causal sequence that brings about an initial episode of unipolar depression remains somewhat obscure, but appears to include psychological, biological, and environmental processes.

The nature of dysthymia (chronic mild depression) is somewhat less well understood than major depression. It is not known if it is primarily a disorder of the personality or a mild variant of clinical depression. The concept of double depression has gained increasing attention. Double depression is defined as a major depression superimposed on dysthymia. Some studies have shown that persons with double depression (as opposed to simple unipolar depression) have greater impairment, more depressive symptoms, greater comorbidity, and more personality disturbance. They are also less likely to recover fully and are more likely to relapse into depression.

Another highly studied subtype has been atypical depression, which includes symptoms such as oversleeping, overeating, marked decrease in energy ("leaden paralysis"), and rejection sensitivity. This type of depression appears to respond preferentially to monoamine oxidase inhibitors over tricyclic antidepressants.

Psychotherapy for Depression

Modern psychological research into depression treatment began in two ways: in studies about behavior therapy in the 1970s conducted by Peter Lewinsohn (e.g., Lewinsohn, Biglan, & Zeiss, 1976) and Lynn Rehm (e.g., Rehm, Fuchs, Roth, Kornblith, & Romano, 1979), and in three studies funded by the National Institute of Mental Health (NIMH). The NIMH studies tested interpersonal therapy (Klerman, DiMascio, Weissman, Prusoff, & Paykel, 1974), group therapy, and marital therapy.

Similar to some other behaviorists, Peter Lewinsohn hypothesized that when persons encountered a lack of response-contingent positive reinforcement, a decrease in adaptive behaviors was likely to result. The reasons for a lack of positive reinforcement might be poor social skills, environmental changes, or failure to engage in activities that would be pleasant and rewarding. Thus, one strategy was to provide feedback to depressed persons on their interpersonal skill deficits. Because evidence had demonstrated a positive covariation between participation in pleasant events and positive mood, and between aversive events and negative mood, both of these were targeted in his behavioral therapy. Participants were coached to increase pleasant events in their lives. Social skills training was also emphasized (e.g., assertiveness training).

One of the most intensely studied of all psycholog-

ical treatments of depression has been cognitive therapy (Beck, Rush, Shaw, and Emery, 1979). It is based on the theory that negative cognitions are critical in the development and maintenance of depressive symptoms. The roots of cognitive therapy for depression can be traced at least as far back as Alfred Adler, who asserted that behavior arises from beliefs. Cognitive techniques were further developed by Albert Ellis (1962), who also emphasized the need for individuals to change their irrational attitudes about life. But it was Aaron Beck who applied cognitive principles most systematically to depression. Beck guided individuals to test negative expectations and specific self-statements as well as to work on their underlying beliefs. He advocated a Socratic method, termed *collaborative empiricism*, of leading the individual to examine negative thinking in a logical manner. According to Beck, the judgment of self-worth and of the meaning of situations is accomplished with the aid of an enduring, implicit cognitive structure termed the *schema*. The schema acts as a template to make sense of incoming information. In depression, the schema is generally a negative view of self, world, and future. Examples of schemas causing vulnerability to depression would be excessive requirements for approval or for achievement in order to deem oneself worthwhile.

Another major psychological therapy of depression is interpersonal psychotherapy (IPT). Klerman, Weissman, Rounsaville, and Chevron (1984) based the treatment on traditional psychotherapy techniques and on the results of epidemiological studies. Paykel et al. (1969) found that undesirable life events and events involving exits or losses in the social field of the individual (marital separation, children growing up and leaving home) were more frequent in the recent histories of depressed than nondepressed persons. Partially for this reason, IPT was focused on recent rather than remote events. In clinical trials for acute depression, it was found to be generally as effective as tricyclic antidepressants and as effective as cognitive-behavioral therapy. IPT theory posited that there were four major areas of interpersonal disruption accompanying depression: role transitions, interpersonal disputes (e.g., marital arguments), unresolved grieving, and interpersonal deficits. In addition to being an effective treatment for the acute phase of many depressions, there is also evidence that it has a delayed beneficial impact on social functioning, which may appear 6 to 12 months following the end of acute treatment. When given as a maintenance treatment, it also appears to extend the time until relapse.

The value of family therapy for depression has been increasingly explored. Family stress, conflict, and loss have been shown to be associated with the onset of, and relapse into, depressive disorders. Depressed per-

sons have difficulty fulfilling their roles as both parents and spouses. The children and spouses of depressed persons are at increased risk for psychological distress and psychiatric problems.

The NIMH Treatment of Depression Collaborative Research Program

With the development of cognitive, behavioral, and interpersonal therapies for depression, the National Institute of Mental Health (NIMH) decided to test psychotherapies of depression through a collaborative investigation involving several treatment sites at the end of the 1970s. This study is highlighted because of the great care taken methodologically and because of its very large sample size. Cognitive-behavioral therapy and interpersonal psychotherapy were chosen to be compared with imipramine plus clinical management, and placebo plus clinical management. Analysis of acute treatment results revealed no significant differences among the three active therapies after 16 weeks of treatment, but there was a statistically significant difference between imipramine plus clinical management and placebo plus clinical management (Elkin et al., 1989). Imipramine was more effective than the psychotherapies at 8 and 12 weeks, but not at the 16-week termination point. (A later analysis using random regression analysis suggested that imipramine plus clinical management had in fact been statistically more effective than either of the two psychotherapies.)

The Problem of Nonsignificant Differences

One of the perplexing issues facing depression researchers is the lack of strong differences in efficacy among various psychological treatments. Only rarely have studies comparing cognitive-behavioral, interpersonal, and short-term analytic therapies found significant differences. A similar perplexing finding has been that combinations of psychological treatments and medications do not consistently lead to better outcome than individual treatments alone. In addition, despite the differing theoretical bases of the psychotherapies, treatments sometimes fail to differ significantly from each other, even in areas of functioning that are directly and differentially targeted.

One explanation for these findings is that most treatments have several elements in common: (a) they are directive in encouraging clients to work on changing their perceptions, their thoughts, their social participation, or some other central aspect of depression; (b) they generally utilize a one-to-one therapist-client relationship; and (c) they emphasize the importance of the client making attempts to change depressive behav-

ior from very early on in therapy. Another possible explanation for the similarity in effectiveness is that for many persons depression may be a relatively unstable homeostasis. Negative cognitions, inefficient coping behaviors (e.g., social withdrawal), altered brain biochemistry, and negative feedback from the social environment may all serve to reinforce each other. For many depressed persons, these are abnormal conditions, and so the positive feedback loops supporting these negative conditions are likely to be somewhat fragile. Given an adequate therapeutic relationship and sustained assistance in altering any one of these conditions, the homeostasis may begin to deteriorate. This would not be true for chronic depressions, however.

Biological Processes in Depression

Numerous biological processes have been found to be altered in major depression. Any final theory will undoubtedly include numerous physiological factors in the distal and/or proximal causality for severe depression. Nevertheless, at the end of the twentieth century it is still very difficult to establish particular biological processes as being essential causes of depression rather than merely being concomitant processes.

Most biological research has focused on the neurotransmitters norepinephrine, and serotonin. These are monoamines, and the hypothesis that dysregulation of one or both of these neurotransmitters causes depression is termed the *monoamine hypothesis*. Most antidepressants have a demonstrable effect on the presynaptic or postsynaptic receptors for one or more of these transmitters. The monoamine hypothesis states that either there is a deficiency in the neurotransmitter at the synapse or that there is some disturbance in the ability of neurons to chemically transmit stimulation received from monoamines in order to lead to further neural firing.

Another major area of biological research has been in the area of sleep. Sleep in depressed persons is often disturbed—not only in the form of insomnia, but also in basic sleep architecture. Depressed persons have a shortened rapid eye movement (REM) latency, and most somatic treatments of depression will suppress REM to some degree.

Positron emission tomography (PET) has been used to study cerebral metabolism in depression. Such studies have generally shown a decrease in frontal activity in persons with severe depression. This generally improves as the depression remits. Another area of biological research in depression has focused on the hypothalamic-pituitary-adrenal (HPA) axis. Approximately one half to three fourths of hospitalized depressed patients have elevated glucocorticoids. Through feedback mechanisms, these high levels may in turn negatively affect HPA axis functioning.

The Role of Pharmacological Treatment

In the 1990s, the primary antidepressants in use have been the selective serotonin reuptake inhibitors (SSRIs; e.g., Paxil, Zoloft, and Prozac). These have a reduced frequency of side effects (e.g., anticholinergic effects, orthostatic hypotension) and a lower incidence of cardiotoxic effects. They may also be safer when patients attempt to overdose compared to the tricyclic antidepressants. On the other hand, many of the newer agents have a few side effects that still pose problems, such as inhibition of sexual functioning.

One of the most interesting, and clinically pressing, issues in treatment research is whether psychotherapy or pharmacotherapy is more efficacious in the acute treatment of major depression. A detailed analysis of this topic would be beyond the scope of this article. However, there is no consistent finding that can easily be summarized here. The same may be said of comparisons between treatments combining psychotherapy and pharmacotherapy versus treatments using psychotherapy or pharmacotherapy alone. The most that can be said with considerable certainty is that there is no evidence that psychotherapy and pharmacotherapy conflict with or undermine each other when used together. The combination of psychotherapy with pharmacotherapy appears to be a generally effective treatment, but there are no consistent data that it is more effective than psychotherapy alone or pharmacotherapy alone. Psychotherapy and pharmacotherapy both tend to be efficacious. Although current research yields some clues about which individuals may respond best to these two general classes of treatment, no firm conclusions can yet be drawn. It is likely that severity of depression and other variables will determine the relative efficacy of these two major types of treatment.

[See also Mood Disorders; and Seasonal Affective Disorder.]

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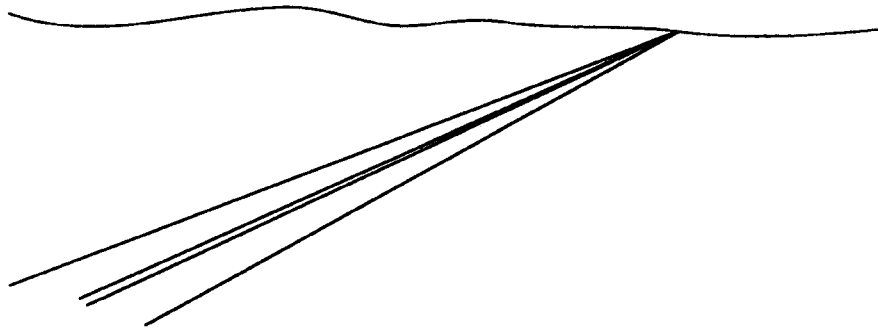
E. Edward Beckham

DEPRIVATION. See Poverty, article on Childhood Poverty.

DEPTH PERCEPTION. One of our most remarkable perceptual capacities is our ability to recover the three-dimensional structure of our environments. All of our actions rely on the ability to recover information about the positions, shapes, and material properties of objects and surfaces as they exist in three-dimensional space. In vision, the term *depth perception* refers to the ability to recover depth from the two-dimensional images projected to our two eyes. The information used to recover depth can be divided into two broad kinds: information from a single view of a scene (so-called pictorial depth cues); and information available when two or more views of a scene can be compared (for example, the slightly different views from the two eyes or the results of motion).

Many pictorial depth cues arise when the three-dimensional world is projected onto the backs of our eyes. As distance from an observer increases, parallel lines on a ground plane appear to converge in the two-dimensional image (linear perspective, Figure 1). Texture becomes increasingly compressed and more dense along the line of sight, creating texture gradients (Figure 2). For example, when a circular disc is tilted away from the observer, it projects the image of an ellipse. The aspect ratio of the ellipse depends on the degree of tilt relative to the observer's line of gaze, and the size of the ellipse depends on both object size and viewing distance. If a series of circles are placed on the ground and viewed from an angle, the circles will project a series of ellipses that become smaller and "flatter" as distance from the observer increases, producing a texture gradient. Contrast decreases from atmospheric haze, commonly referred to as aerial perspective.

Shading and shadows can also provide vivid impressions of depth in images (Figure 3). The amount of light reflected from a surface to a point of observation depends on the surface properties of the reflecting surface, and the angle formed between the light source and the surface. In general, surfaces have complex reflectance properties with varying degrees of scatter and specularity. These properties determine whether sur-



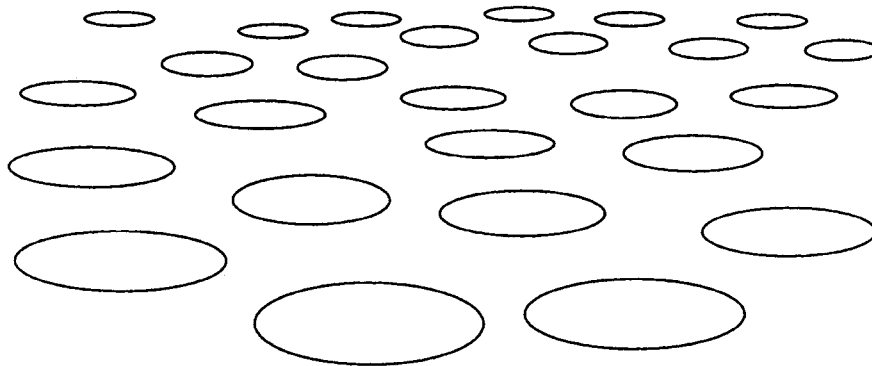
DEPTH PERCEPTION. Figure 1. Linear perspective.

faces look hard, soft, squishy, flaky, smooth, rough, and so forth. For example, if the surface is matte or dull in appearance, the light striking that surface will be scattered and reflected in many different directions. For a purely specular surface (like a mirror), light will essentially bounce off of the surface like a billiard ball, generating the familiar law of optics ("the angle of incidence equals the angle of reflection"). This optical law relating the angle at which light strikes and bounces off of surfaces is also responsible for shading: the amount of light reflected to a point of observation depends on the surface's orientation relative to the direction of the light source. Our visual systems can use patterns of shading to infer the three-dimensional shape of surfaces.

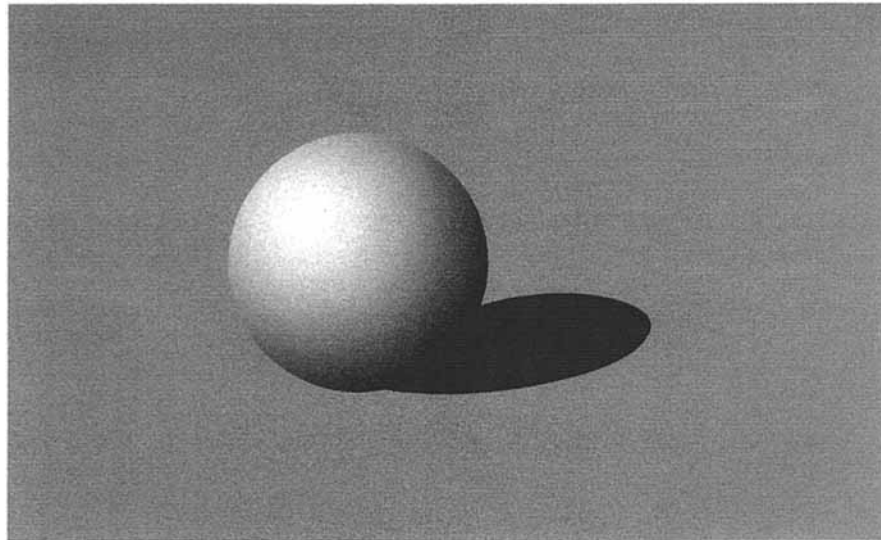
The interruption of more distant surfaces by nearer occluding surfaces also provides information about the depth order of objects in a scene (also known as interposition). However, unlike other sources of monocular depth information, monocular occlusion information does not provide any explicit information about the size of the intervals separating the near and more distant surfaces.

Finally, the size of familiar objects also provides information about depth: if the true size of an object is known, then the angular size of the object on the retina can provide information about the distance to that object.

One of the most powerful sources of information about depth is provided by the parallax generated from multiple views of a scene. Parallax refers to the apparent change in relative position of objects when they are viewed from different positions. The apparent shift in the relative positions of objects in the two views generated by binocular parallax can be experienced by alternately opening and closing your two eyes. The impression of depth generated from binocular parallax is known as stereopsis. The importance of binocular parallax in giving precise information about depth can be seen by the fact that virtually all animals that have stereopsis are predators. This ability comes at a cost, however, since this requires viewing the same region of the world from two perspectives, and hence, a frontal placement of the eyes. In contrast, most prey have laterally placed eyes, which sacrifices the high resolution depth information afforded by stereopsis in favor of a



DEPTH PERCEPTION. Figure 2. Texture gradients.



DEPTH PERCEPTION. Figure 3. Shading and shadows.

larger visual field but has the distinct advantage of being able to spot a predator coming from all directions.

In order to extract depth information from binocular parallax, the visual system must determine how to combine or fuse the two images into a single three-dimensional representation. When binocular fusion occurs, an impression of a single, three-dimensional world is experienced. A failure to fuse images can produce diplopia (or double vision) or binocular rivalry, a perceptual battle between the two monocular images. Fusion requires that the images in the two eyes must be brought into "correspondence." To understand this problem, imagine that the retinal images have been copied onto two transparencies. Your goal is to line up the images as best as possible. Because of the shift of the relative position of the objects caused by binocular parallax, the images can never be perfectly aligned, but the overall difference between the positions of objects in the two images can be made larger or smaller. Binocular fusion and stereopsis only occur when the differences between the two images are less than some value, known as the fusion limit.

The images are brought within the fusion limit by appropriately "crossing" or "uncrossing" the eyes (known as vergence movements). Once appropriate eye movements have been made, there remains the problem of extracting depth from the two views. Some of the regions in the two images will correspond to a common portion of an object's surface seen from two slightly different positions. The relative difference in retinal position of these surface regions is known as binocular disparity, which gives rise to a vivid sense of depth. The region that is binocularly fixated will fall on the fovea in both eyes and has zero disparity. Nonzero disparity has a size and a sign. The size of the disparity is pro-

portional to an object's distance in depth from the fixation point. The sign determines whether a feature appears closer or farther than the fixation point. If the image in the left eye is to the right of the image in the right eye, disparity is crossed and the feature appears closer than fixation. If the image in the left eye is to the left of the image in the right eye, disparity is uncrossed and the feature is more distant than fixation.

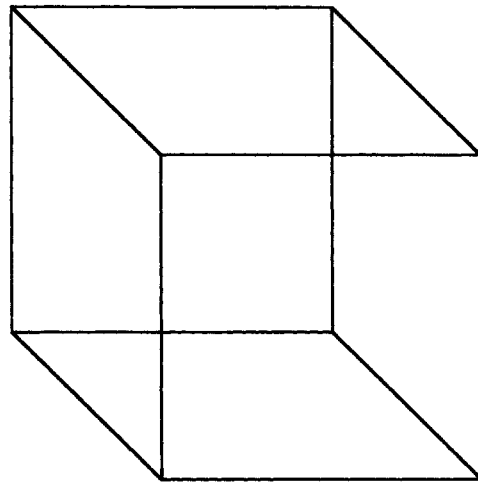
In addition to disparity, the binocular viewing of solid objects provides information about stereoscopic depth by generating features that are visible to only one eye. You can observe this by alternately opening and closing your left and right eyes while attending to the right edge of this book. Notice that your right eye can see a portion of the area behind the edge of the book that is not visible to your left eye. The opposite is true along the left side of the book: the left eye sees more of the background than the right. These monocular (or half-occluded) regions provide information about the presence of occluding contour that the visual system uses to separate objects from backgrounds.

There are strong parallels between the depth from binocular parallax and the depth from motion parallax. When an observer moves, she acquires a continuous stream of new views. In stereopsis, the multiple views are always in a fixed spatial relationship relative to one another, since the eyes are in a fixed relative position in our heads. However, since we are capable of moving in three dimensions, the same is not true for motion parallax. The amount of motion parallax generated by an observer depends on how fast the observer is moving, whereas the maximal amount of binocular parallax is limited by the distance between the eyes. Moreover, a variety of different motion patterns can be generated by motion parallax, and these patterns im-

part different experiences of depth. The parallax field most similar to that generated by binocular vision occurs when an observer moves his head laterally to the left or right. For example, if you fixate any object in a scene and move your head laterally to the right, the objects closer to the point of fixation appear to move the left, whereas those farther than the fixation appear to move to the right. The speed that a surface patch moves relative to the point of fixation will increase as distance from the fixation point increases. The difference in the relative velocities of objects is analogous to the disparity differences generated binocularly. Moreover, just as binocular parallax generates features that are visible in only one eye, motion parallax generates features that appear (or accrete), and features that disappear (or delete) behind occluding surfaces. This accretion and deletion of partially occluded objects provides compelling information about three-dimensional structure. Motion parallax can therefore provide information about relative depth in much the same way as binocular disparity.

However, motion generates more than one kind of parallax field that imparts a sense of depth. When an observer walks through a three-dimensional world and looks straight ahead, a global optic flow pattern is generated: The entire visual field appears to expand and flow out of the point of fixation and around the observer. Under natural conditions, this pattern of optic flow only occurs when an observer moves relative to his environment and therefore provides an unambiguous source of visual information about self-motion. Indeed, when this flow pattern is reproduced in an artificial environment and shown to stationary observers, an extremely compelling sense of self-motion through a three-dimensional world is experienced. Note that this type of parallax field is unique to motion: one eye would have to be placed well in front of the other to generate a similar parallax field in binocular vision.

In addition to the parallax generated by a moving observer, the relative motion of regions within a moving object can also provide information about relative depth, even for stationary observers. The kinetic depth effect (or KDE) refers to the experience of depth generated by the relative motion of surface regions within an object. An example of this effect can be constructed with the aid of a piece of white paper, a bright flashlight (or projector), and wire (such as a paper clip). Bend the wire into a random three-dimensional shape, hold it up behind the sheet of white paper, and use a flashlight to cast a shadow of the paper clip on the paper. If you rotate the paper clip, this will create a two-dimensional image in which the portions of the paper clip move with different velocities. Nonetheless, we are able to use the differential velocities in the image to recover the shape of a three-dimensional object rotating in depth. The shadow stimulus is ambiguous. It



DEPTH PERCEPTION. Figure. 4. Necker cube.

will appear to rotate first one way and then the other even when no changes occur in the physical rotation. The multistability of the KDE occurs because the motion information is consistent with two plausible reconstructions of the three-dimensional world. This is just one of many examples where a depth cue is ambiguous (see, for instance, the Necker cube in Figure 4).

There are two main schools of thought about how a three-dimensional structure is recovered by our visual systems. One perspective assumes that the visual system acts as a kind of detective. Different visual "cues" are independently measured. Each provides some evidence that is used to make an educated guess about the true three-dimensional structure. The need for such detective work arises from the "underconstrained" nature of the two-dimensional image. Returning to the Necker cube (Figure 4), the two-dimensional image is consistent with an infinite number of three-dimensional realities. For instance, the lines that look like a cube could actually represent a flat pattern on a page. To overcome this ambiguity, assumptions must be made about the likely cause of a given image, and the different cues to depth must be combined into a single, three-dimensional representation.

The other school of thought asserts that depth perception does not rely on ambiguous "cues" in images to recover depth. Rather, depth is recovered by directly sensing complex relationships between optical properties that uniquely specify the three-dimensional relationships between surfaces (Gibson, 1979). In this theoretical framework, the starting point of visual processing is not the images formed on the eye, but rather the three-dimensional optical structure formed by the reflections of light from surfaces into the optical media (air). This perspective assumes that our experience of depth arises from the presence of invariants

that have a one-to-one correspondence with the three-dimensional structure of our environments. All that is putatively required is a system capable of sensing these invariant patterns; no visual "detective work" is needed. Instead, the problem is to understand how nature equipped us with "sensors" that respond directly to these complex, invariant patterns.

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Barton L. Anderson

DERMATOLOGICAL DISORDERS. The contribution of psychological factors to dermatological disorders was first discussed by Wilson in his book about diseases of the skin published in 1842. Modern psychosomatic research in dermatology began in the 1930s, when a number of physicians wrote about the relationship between specific skin diseases and unconscious conflictual and personality constellations (Koblenzer, 1987). The psychological aspects of skin disease appear infrequently in the literature but this is slowly changing with the publication of specialty journals such as *Psyche and Cutis*. However, what has been published consists primarily of clinical case examples and theoretical speculation, rather than systematic empirical and experimental observation.

In a prevalence study conducted through the Health and Nutrition Examination Survey of 1971-1974, it was estimated that one third of the U.S. population had one or more significant skin conditions. Among the most common complaints mentioned were psoriasis, atopic dermatitis, acne, and contact dermatitis. One third of the respondents felt that their skin condition posed a social handicap, and one tenth believed it affected their employment or housework. In 1992 there were a total of 29 million visits to dermatologists in the United States; in addition, it was estimated that 18.3% of all visits to primary care physicians were for skin complaints.

Dermatological patients are extremely reluctant to accept a referral to a mental health professional because there is still a stigma associated with mental illness and because such patients, by consulting a dermatologist, have defined themselves as having a medical, rather than an emotional or psychological, illness (Koblenzer, 1987). A variety of studies has found that the incidence of psychological symptoms is higher in dermatological disorders than in a normal population. It appears that depression, anxiety, and obsessive-compulsive disorders are among the most common symptoms. However, the exact type of psychological disorder and the true prevalence of these disorders in dermatological patients are still unknown. Much of the clinical literature suggests that the incidence of psychological difficulties is higher among women, although this is based on clinical treatment studies rather than true epidemiological data. Specific information on ethnic, racial, or age-related differences is rarely reported.

Spitz (1965), in his classic studies of institutionalized infants, found that early impairment in mother-child relationships led to an increase of infantile eczema. His work is an early example of a model postulating an interaction between biological vulnerability and environmental stressors in dermatological disorders. Since this early clinical observation, clinical research has demonstrated that psychological disorders can lead to an increase in dermatological disorders, and psychological disturbances can result from having a dermatological disorder.

Early theories for understanding the etiology and course of psychocutaneous disease relied on psychoanalytic and behavioral models. Contemporary research emphasizes the diathesis-stress model in which genetically vulnerable individuals may develop dermatological diseases under stress due to allergies and/or psychosocial stressors (Gatchel & Blanchard, 1993).

A classification of psychocutaneous disorders (Koblenzer, 1987) for use by clinicians includes three categories: (a) conditions strictly psychological in origin (e.g., delusions as they relate to the skin, delusions of parasitosis); (b) dermatological conditions in which psy-

chological factors are purported to be involved in etiology and maintenance (e.g., urticaria or hives); and (c) those conditions dependent on genetic, environmental, and stress factors (e.g., acne, psoriasis, and eczema).

Case studies have suggested the usefulness of behavioral treatment for a wide range of dermatological disorders. Techniques such as relaxation training, biofeedback, and for child cases, behavioral procedures such as noncontingent attention for scratching, have been utilized. These interventions are based on the speculation that emotional reactions in dermatological conditions may lead to altered autonomic activity resulting in peripheral vascular changes, a lowering of itch thresholds, and the development of a vicious itch-scratch cycle. Behavioral procedures have been developed to combat different aspects of this theory. The clinical literature also has a number of reports on the usefulness of supportive and dynamic psychotherapy for individuals suffering with dermatological disorders.

In summary, there is a relatively large body of literature implicating stressful life situations in precipitating or exacerbating dermatological disorders. The literature is marked by clinical case reports and theoretical speculation with very few well controlled outcome studies. Dermatological disorders of all types can cause an untold amount of suffering for the afflicted. Psychological factors such as stress play an important role for a significant proportion of such individuals. An important new direction is to view dermatological disorders in a truly comprehensive diathesis-stress model. Health psychologists are just beginning to answer some of the fundamental questions that have long existed in the dermatological literature. Psychologists can have a major impact in the lives of countless individuals and, at the same time, contribute to an understanding of the relationship between psyche and soma.

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Steven Friedman

DE SANCTIS, SANTE (1862–1935), Italian psychologist and psychiatrist. De Sanctis studied under Cesare Lombroso and Giuseppe Sergi but departed from their positions by adhering to the ideal of the philosophical impartiality of scientific inquiry. Referring to himself as a “medical psychologist” he maintained in his autobiography that he was “above all and essentially a physician” (de Sanctis, 1936).

In 1899, de Sanctis founded the Asili schools for the assistance and social rehabilitation of mentally handicapped children and adolescents. In 1905, he received the first chair in the history of Italian psychology in experimental psychology. Then, for 25 years (1906–1931), he directed the Psychology Institute of the Faculty of Medicine of the University of Rome, dedicating himself to both teaching and research in various fields of psychology. He introduced clinical and psychopathological methods through his contributions to general and experimental psychology, educational psychology, judicial psychology and criminology, the psychology of religion, and above all, psychotechnics and child psychopathology. He strongly defended the autonomy and the scientific status of experimental psychology, upon which applied psychology and psychopathology should be founded. Yet it was in the field of psychotechnics—grounded in vocational psycho-physiology and concerned with the study of the human “biopsychical personality”—that de Sanctis, recognizing the importance of mental tests, made significant contributions. He devised a number of tests to assess the degree of mental retardation in children and adolescents and promoted the translation and the Italian adaptation of Binet’s and Simon’s well-known test.

With his 1925 volume *La neuropsichiatria infantile*, de Sanctis gave rise to the new discipline of child neuropsychiatry. In this work, he identified the *dementia precocissima* syndrome and suggested a scheme for the identification and classification of abnormal children that Kraepelin acknowledged as a novel and relevant contribution.

In 1929, de Sanctis published a treatise on experimental psychology in two volumes—the first of its kind in the history of Italian psychology. Written for Italian scholars who wished to extend their knowledge of psychology in order to achieve practical results, the treatise attempted “to prove that it is possible to conceive a modern, scientific and generally acknowledged psychology.” De Sanctis thus advocated the necessary separation of scientific psychology—“an autonomous dis-

cipline by intent and method"—from the philosophical disciplines. In its attempt to create "a scientific representation of human psychophysical activity," scientific psychology, de Sanctis further maintained, could not adopt a specificgnoseological perspective.

His unique attitude toward psychoanalysis and the psychoanalytic movement should be emphasized. In 1899 he had, in fact, published his work *I sogni, studi clinici e psicologici di un alienista* (Dreams: Clinical and Psychological Studies of an Alienist), and he had continued extending and refining this theme in the following years, considering the Freudian innovations. Sante de Sanctis had established a correspondence with Freud in 1900, and he supported the growing Italian psychoanalytic movement. He refused, however, to adhere to the movement, seeking to "defend his freedom of thought." Nevertheless, he hoped that psychoanalysis would officially become part of psychology and psychopathology, asserting that "Freudism" should be acknowledged in the history of the two disciplines. Hence, in de Sanctis's view, experimental psychology would, after due consideration, control, test, or confute psychoanalysis by subjecting it to methodological, and therefore comparable, observation, and perhaps even to pure experimentation.

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Nino Dazzi

DESCARTES, RENÉ (1596–1650), French philosopher and mathematician. Descartes attempted a total reform of philosophy, especially metaphysics and natural philosophy (the science of all natural things). Drawing on contemporary theory and his own dissections of animal parts, he advanced a speculative physiology of the whole organism, including major vital, sensory, and motor functions. In metaphysics he proposed that mind and body are distinct substances, a position subsequently known as mind-body dualism.

Life and Works

Descartes was born at La Haye (later renamed Descartes), near Tours in the Poitou region of France. His mother died when he was 13 months old. He lived with his maternal grandmother before entering the newly established Jesuit college at La Flèche, where he studied from 1606 to 1614. The standard curriculum included grammar, rhetoric, literature, logic, mathematics, natural philosophy, ethics, and metaphysics. In 1616, he received a law degree from the University of Poitiers, where he probably also studied medicine. Two years later, while traveling as a gentleman soldier, Descartes met the Dutch natural philosopher Isaac Beeckman, who kindled his interest in mathematical approaches to nature. He dedicated his first written work to Beeckman, the *Compendium musicae* (published posthumously in Holland in 1650), which was translated as *Compendium on Music* (Rome, 1961).

In November 1619, while in Germany, Descartes recorded three powerful dreams that he believed confirmed his quest for a new scientific system. During the 1620s, living in Paris, he discovered the sine law of refraction (also discovered by Willebrord Snel). He started a book on universal mathematics, which contained examples from optics and also a rudimentary theory of cognition and the senses, but abandoned the project in 1628. The incomplete draft was published as *Regulae ad directionem ingenii* (Amsterdam, 1701), or *Rules for the Direction of the Mind*. In 1629, Descartes moved to the Netherlands, where he lived for the next 20 years, with frequent changes of address. That same year his attempts to understand parhelia (appearances of multiple suns) led him to expand his studies to all of natural philosophy, including human physiology and sensory psychology.

From 1629 to 1633, Descartes worked on *Le Monde*, or *The World*, which was to comprise three treatises: on light (covering the physical world), on man (meaning human beings in general), and on the soul. He had nearly completed the first two treatises when, in 1633, he learned of Galileo's condemnation by the Roman Catholic Inquisition. He abandoned these works and they were published posthumously as *Le Monde, ou Le Traité de la lumière* (Paris, 1664), translated as *The World, or Treatise on Light* (New York, 1979), and *L'Homme* (Paris, 1664), translated as the *Treatise of Man* (Cambridge, Mass., 1972). The first work contained the elements of Descartes's physics, including his theory that matter is constituted by small corpuscles of inert, extended stuff, varying only in size, shape, and motion; his three general laws of motion, including an early statement of the principle of rectilinear inertia; and his cosmological theory of the formation of the solar system and the earth. The second work contained a speculative physiology of the human body, including the

role of sensory stimulation in initiating and guiding movements of the whole organism.

In 1637, Descartes published, anonymously, his *Discours de la méthode* (Leiden), or *Discourse on the Method*, which summarized the development of his philosophy and described the need for hypotheses and empirical confirmation in natural science. It served as a preface to his essays, the *Geometry*, which applied algebraic techniques to geometrical problems, the *Meteorology*, which examined atmospheric phenomena, including the rainbow, and the *Dioptrics*, which examined the general properties of light and the physiology and psychology of vision, including size and distance perception. Descartes's most significant metaphysical work was the *Meditationes de prima philosophia* (Paris, 1641), or *Meditations on First Philosophy*. It contained his celebrated inference from "I think" to "I exist," offered as an instance of certain knowledge, and his argument for mind-body dualism.

In 1644, Descartes published *Principia philosophiae* (Amsterdam), or *Principles of Philosophy*, summarizing his metaphysics and physics. During this time he retained interest in physiology and medicine, and worked on *La Description du corps humain* (published posthumously in Paris in 1664), or *Description of the Human Body*. The final work published in his lifetime, *Les Passions de l'ame* (Amsterdam and Paris, 1649), or *Passions of the Soul*, was written in response to queries from Princess Elizabeth of Bohemia. It contained a general theory of the emotions, their physiological causes, functions, and relationships to one another, along with means for their control. In 1649, Descartes moved to Stockholm at the behest of Queen Christina of Sweden, and died of pneumonia the next year. His *Lettres*, published in three volumes (Paris, 1657–1667), contained discussions of his philosophical, mathematical, and scientific works, as well as much pharmaceutical and medical advice for his friends.

Mind and Psychology

As a theorist about mind, Descartes is best known for asserting that mind is wholly distinct from body. This theory contradicted the dominant Aristotelian view of his time, according to which the soul is the animating and organizing principle of the body and all of its functions, from digestion to rational discourse. The Aristotelian theory did not sharply divide physiological from mental processes. Descartes postulated a strict division of mind and body into distinct substances, each capable of existing independently of the other. He was the first to articulate clearly the view that the mental is defined by the contents of consciousness, so that pains, sensations, imaginings, present memories, acts of will, and intellectual thoughts are all part of a single domain, which he called the domain of thought (by contrast with the domain of extension, i.e., of matter). Accord-

ing to his dualistic position, some thoughts, such as acts of will or intellect, can occur without any brain activity. Other thoughts, such as sensations or willings of bodily motion, require that mind and brain interact.

Descartes's metaphysical writings on mind focused largely on the theory of cognition, especially on the means for achieving true cognition. He argued that the most fundamental and secure knowledge is gained independently of the senses. Knowledge of geometry, of one's own mind, and of an infinite deity were his paradigm cases of purely intellectual cognition, devoid of sensory content. He held such knowledge to be innate in the sense that it is available to the intellect independently of sensory experience, and he believed that intellectual cognition can yield the fundamental tenets of metaphysics and physics. But he did not think that all of science can be known independently of sensory observation, nor did he consider sensory cognition to be generally deceptive or faulty. In the sixth of his *Meditations*, and in parts 1 and 4 of the *Principles*, he described the function of the senses as providing guidance for avoiding bodily harm and locating benefits. He also wrote in the *Discourse* (part 4), *Principles* (part 4), and *Letters* (from 1637 and 1638) that sensory perception was essential for testing alternative hypotheses in science.

Descartes was notorious in the seventeenth century for his claim that (nonhuman) animals are soulless machines. He compared the animal body to a complicated hydraulic machine, driven by a rapidly moving, vaporous bodily fluid called the animal spirits. He held that the blood is heated in the heart and passes through the arteries to all parts of the body, while its most subtle parts (material animal spirits) are filtered out in the brain, where they are shunted into various nerves and ultimately cause muscles to inflate, grow taut, and contract in length. He believed all animal behavior could be explained in these terms and applied the same purely mechanical analysis to the human body. Contrary to common doctrine, he maintained that bodily processes such as digestion and growth can be explained mechanistically (in terms of matter in motion), and that most sensory-motor processes can occur without mental intervention. In the *Treatise of Man* he described mechanisms for the reception of sensory stimulation, the storage of sensory patterns in memory, the control of behavior to seek food and avoid danger, and learned changes of behavioral pattern. Consonant with his hydraulic theory, he postulated a clever sensory-motor control device in the brain. Famously, Descartes held that the pineal gland (in the center of the brain) is the seat of mind-body interaction, but he postulated that the gland also serves to mediate between sensory and motor processes in a purely mechanical way. The animal spirits that inflate the muscles spew forth from the pineal and make their way to the muscles through hol-

low neural tubes (nerves were usually conceived as hollow tubes at the time). They enter one nerve or another depending on which nerves are open (Figure 1). This, in turn, depends on activity in the sensory portion of the nerves.

Descartes envisioned sensory functions to be carried out by thin fibrils running in neural tubes from the sense organs to the surface of a cavity surrounding the pineal gland in the center of the brain. A pattern of activity at a sense organ—say, on the retina of the eye—causes motion in the nerve fibrils; this motion causes the nerve tubes lining the central cavity to open in a corresponding pattern; animal spirits then flow down the tubes and cause the muscles to contract in one way or another, leading to a bodily motion, such as pointing (Figure 1). Descartes asserted that purely mechanical changes in the brain can account for the behavioral manifestations of learning and memory in both humans and animals.

Although Descartes described elaborate mechanical processes for the control of behavior, he held that human mental life cannot be explained in a purely mechanical way but requires the postulation of an immaterial mental substance. In his view, mind was necessary to explain three aspects of human psychology: conscious experience, general reasoning ability, and linguistic ability. He accounted for conscious sensory experience through mind-body interaction at the pineal gland, with the mechanical pattern caused at the pineal by sensory stimulation serving as the basis for perceptual experience. In vision, the shape of the pineal pattern leads to a corresponding imaged shape, and the mechanical characteristics of the stimulation cause the experience of various colors.

To explain size and distance perception, Descartes hypothesized purely psychophysical mechanisms, as well as judgmental processes. He called the use of convergence to perceive distance “natural geometry,” since it involves determining the altitude of a triangle (the distance to an object) from two angles and the length of a side (the angles of convergence of the eyes, and interocular distance). He postulated mechanical brain correlates of accommodation and convergence that directly cause the idea of distance in the mind and further theorized that distance can be judged by relating image size to known size, and that size can be judged from image size and perceived distance (yielding size constancy). Descartes later explained that such judgments occur rapidly and habitually, and so go unnoticed (*Meditations*, Sixth Replies). Unnoticed judgments must nonetheless count as conscious for Descartes, given his theoretical stance that all mental events are conscious.

In the *Passions of the Soul*, Descartes examined the physiological causes and mental expression of the emotions. He divided the emotions into six primitive types:

wonder, love, hatred, desire, joy, and sadness. In a 1647 letter to his friend Pierre Chanut he related adult emotions to prenatal and childhood associations between emotions and bodily functions, holding that joy, love, sadness, and hate were the only prenatal emotions. Before birth, they were “only sensations or very confused thoughts, because the soul was so attached to matter that it could not yet do anything else except receive various impressions from it. Some years later it began to have other joys and other loves besides those which depend only on the body’s being in a good condition and suitably nourished, but nevertheless the intellectual element in its joys or loves has always been accompanied by the first sensations which it had of them, and even by the motions or natural functions which then occurred in the body” (Descartes, *Philosophical Writings*, vol. 3, p. 308).

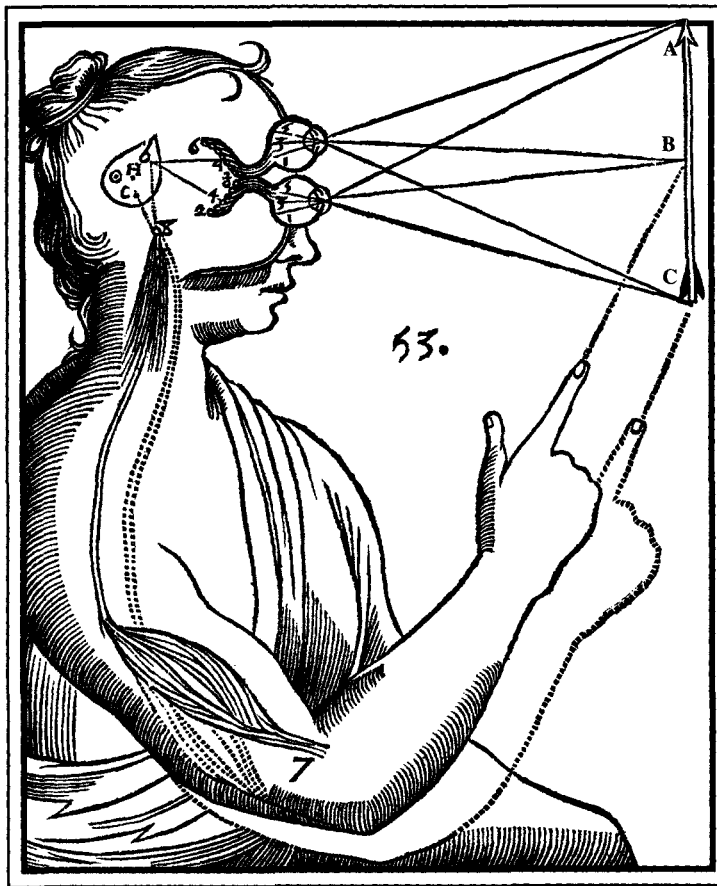
Descartes’s theoretical commitment that all mental phenomena are conscious did not lead him to propose that we explicitly notice all our thoughts and mental processes. As in the case of unnoticed perceptual judgments, habitual or rapidly occurring emotional factors may go unnoticed.

Influence on Subsequent Psychology

Descartes’s work had the immediate influence in psychology of encouraging examination of the neural conditions of sensory experience and other mental phenomena. An example of this influence is the discussion of sensory perception and the moon illusion in Pierre Regis’s *Physique* (Lyon, 1691) or *Physics*. Descartes’s mechanistic physiological approach to behavior helped inspire Julien La Mettrie’s *L’Homme machine* (Leiden, 1748), or *Man a Machine* (Indianapolis, 1994). In *Science and Culture*, the nineteenth-century biologist Thomas Henry Huxley praised Descartes as a physiologist of the first rank.

In the twentieth century, Descartes has been invoked as both a hero and a villain. He was a hero for those committed to the reality of mental phenomena and the need for mental explanations in psychology—even if his admirers did not accept substance dualism. He was portrayed less favorably by those needing a symbolic target for an attack on mentalism and was sometimes as a pure metaphysician who had no interest in natural science and who denied the need for empirical observation. More recently, his contributions to the rise of modern science and his discussions of scientific method have become more widely known.

Descartes’s deepest and most lasting influence on psychology is twofold. First, he proposed that the contents of consciousness reveal a unified domain of mental phenomena, ranging from pains and tickles to abstract thoughts. In effect, he discovered the concept of the mental as a unitary natural kind. Second, he initiated a long tradition of explaining sensory-motor phe-



DESCARTES, RENÉ. Figure 1. Sensory motor processes according to Descartes. External object ABC causes retinal pattern 1-3-5, which is conveyed by the optic nerves to the internal cavity of the brain at 2-4-6. Animal spirits leaving pineal gland H from point b proceed to point 4 and also into tube 8, which leads to muscle 7, which the spirits cause to inflate and contract, causing the arm and finger to point at location B. When animal spirits go from point c to tube 8, the muscle is inflated so that the arm points at C. The pineal flow from points b and c (and intermediate points) causes the soul to experience external objects at B and C (and in between). (From *L'Homme*, 2nd edition. 1677, 104.)

nomena by appealing to physiological mechanisms and processes. Thus he stands behind both the mechanistic and the mentalistic traditions in the history of modern psychology.

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Gary Hatfield

DESENSITIZATION. See Systematic Desensitization.

DESPAIR. See Emotion.

DESSOIR, MAX (1867–1947), German psychologist. Born in Berlin, the son of Ludwig Dessoir, a famous classical actor, Dessoir attained a doctorate in philosophy in 1889 at Berlin, a medical doctorate in 1892 at Würzburg, and an assistant professorship in philosophy at the University of Berlin in 1897, where he remained for over forty years. One of Wilhelmine Germany's elite academicians, he was a colleague of some of the most prominent German intellectuals of his time including Ernst Cassirer, Wilhelm Dilthey, and Georg Simmel. A prolific scholar equally sympathetic to philosophy, psychology, history, and art, Dessoir's primary activities were teaching philosophy and system building in aesthetics. In 1906 he established a journal, the *Zeitschrift für Ästhetik und allgemeine Kunstwissenschaft*, and in 1909 a professional society, the *Gesellschaft für Ästhetik und allgemeine Kunstwissenschaft*, both of which successfully promoted the scholarly study of aesthetics and related psychological issues for many years. Dessoir was an influential member of the intellectual establishment whose students entered all areas of German cultural and academic life, including German psychology as it developed from a philosophical specialty to its autonomous applied-scientific phase in the 1930s (Geuter, 1992). He suffered a complete interdiction of his scholarly activity by the Nazis in 1940, survived the war in Germany, and published his memoirs (1947a).

Dessoir's influence on American psychology was less direct than that of his contemporaries. The relatively few American psychologists who studied at Berlin preferred his more experimentally oriented colleagues. His aesthetics, largely descriptive and based on ideas of classic beauty, receded into the background in an era in which revolutionary art movements succeeded each other almost yearly. Other German psychologists who proposed explicit explanatory mechanisms for aesthetic experience, for example Lipps or the Gestalt psychologists, fared better with functionalist Americans. Dessoir began his career by publishing on then-fashionable topics, a bibliography on hypnosis (1888) followed by a study of dissociation (1890). But he soon turned toward philosophy while, at the same time, American interest in hypnosis began to wane (Hilgard 1987). Probably his most important influence on American psychology was his history of German psychology (*Geschichte der neueren deutsche Psychologie*, Berlin, 1894) whose shorter version in 1911, the *Abriss einer Geschichte der Psychologie* (Heidelberg, 1911) appeared in En-

glish translation the next year as *Outlines of the History of Psychology* (1912). Dessoir's history, concurrent with that of G. S. Brett, offered a comprehensive, erudite account of psychology's philosophical background and reinforced the idea held by many turn-of-the-century psychologists that psychology was an established, respectable field with fundamental connections to classical philosophy. Though many disagreed, most notably E. G. Boring, this is still the standard view of the history of psychology today. [See the biography of Boring.] Beyond this, Dessoir was deeply interested in psychic phenomena and was credited by many—including himself (Stuttgart, 1931, p. vii)—for introducing the term *parapsychology* (Ger. "Parapsychologie") into psychology in 1889 to refer to events outside of ordinary mental experiences that can be studied systematically. He wrote extensively on such subjects throughout his career: his last work, *Das Ich, Der Traum, Der Tod* (Self, dream, and death, Stuttgart, 1947b), is concerned with, among other things, the survival of bodily death. Yet few modern "parapsychologists" cite him, as he was, regarding paranormal phenomena, a fierce though tolerant skeptic.

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David C. Devonis

DETERMINANTS OF INTELLIGENCE. [This entry comprises six articles:

- Heritability of Intelligence
- Socialization of Intelligence
- Culture and Intelligence
- Schooling and Intelligence

Teaching of Intelligence

Nutrition and Intelligence

For discussions related to intelligence, see also Drugs and Intelligence; Intelligence; and Measures of Intelligence.]

Heritability of Intelligence

Heritability (h^2) is the proportion of phenotypic variance in a population attributable to genetic variation. Narrow heritability (h_N^2) is the proportion of phenotypic variance due to additive genetic variance. Narrow heritability indexes genetic variability that breeds true and is of most use to agricultural breeders. Broad heritability (h_B^2) includes all sources of potential genetic variability and is the indicator of greatest interest in the behavioral sciences. Discussion here will be confined to broad heritability.

Figure 1 is a diagram of potential sources of genetic and environmental variance. The phenotype refers to any measurable characteristic like height or intelligence. For many psychological phenotypes, error of measurement can be substantial and will reduce estimates of heritability. Genotypic variation is due to differences in our genes. The 23 pairs of human chromosomes are composed of genes, which can be thought of as individual packets of information that code the genetic portion of our phenotype. Humans are estimated to have 100,000 genes and half of those may be involved in brain function. Genetic variation exists because each gene has alternate codes, called *alleles*, which occur with different frequencies in a population. New alleles can arise through the process of mutation, which is one way of ensuring genetic variation in a species.

Genetic variance can be divided into two main categories: additive and nonadditive. Additive genetic variance is the phenotypic result of all of the simple, additive effects of the alleles. Nonadditive genetic variance is the interactive effects of dominance and epistasis. The two alleles of a gene at homologous sites on paired chromosomes may have an effect beyond what would be predicted from each allele alone. This is known as *dominance*. *Epistasis* is similar to dominance except the alleles that affect each other are at different locations on the chromosome.

One of the most important reasons for understanding the genetic contribution to a trait is to separate it unambiguously from the environmental contribution. For example, a child's vocabulary has been related to the parents' vocabulary (the words a child hears and books in the home are among other variables). Although such studies are useful for descriptive purposes, it is impossible to tell what the cause of vocabulary development is without explicitly separating environmental from genetic causes. What the child hears, how often the child is read to, and other assumed environmental variables could be the only determinants of the

child's vocabulary. On the other hand, parents who have large vocabularies could pass along genes that allow their children to acquire large vocabularies. Unless environmental and genetic sources of variation are explicitly identified, it is not possible to determine which of these alternatives is correct. In the history of psychology, failing to separate genetic and environmental sources of variation is one of the most frequent and serious errors made. This error partly explains why the nature-nurture issue has been such a persistent debate.

When heritability is assessed, it is possible to identify two broad sources of environmental influence. The first type is environmental influences common to a particular family. These influences are the same for all members within a family, but differ across families and are called *between-family* or *common environmental influences*. They make members of a family more alike. The second type of environmental influence is called *unique, specific, or within-family environmental effects*. These influences make family members different and arise from unique experiences specific to a single family member.

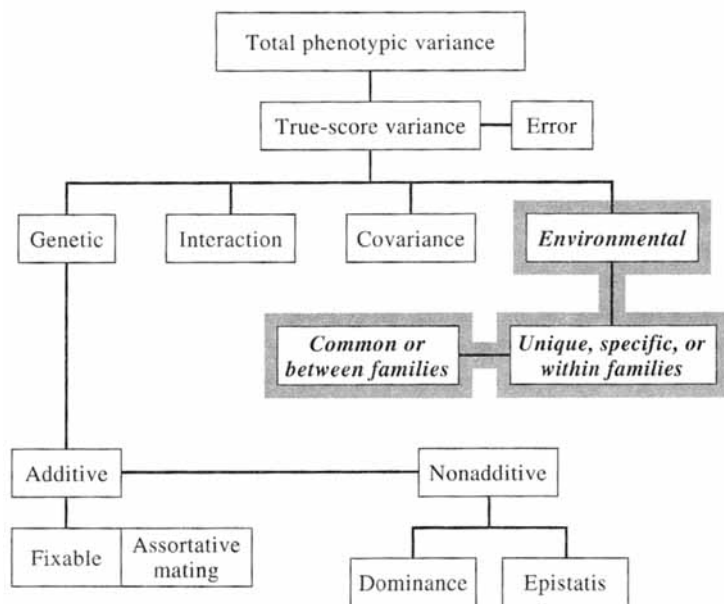
Two other sources of variation can be identified. These are the interaction or correlation of genetic and environmental influences. The first of these is a genotype by environment interaction. Certain environments may be more favorable to specific genotypes. For example, dairy cows bred over many generations for milk production in Wisconsin will not be outstanding milk producers when they are moved to Texas because of differences in grass characteristics in the two places. The second potential source of variation is the covariance or correlation of the genotype and environment. Tall boys in the United States may be more likely to seek out opportunities to play basketball than short boys, thereby providing themselves with better environmental chances to become good at basketball.

How Is Heritability Measured?

One way of estimating heritability would be to know which genes contribute to intelligence, allowing exact specification of an individual's genotype. This is within the realm of possibility but still far from reality. Of the many genes that could potentially affect intelligence, one has been identified (Chorney et al., 1998). The gene, IGF2R on chromosome 6, is for insulin-like growth factor-2 receptor. It was identified by showing that frequencies of the alleles at the location of this gene were different in people of high and average intelligence. Though this result is very encouraging, it will take some time to identify directly all the genes that make major contributions to intelligence.

Current estimates of heritability are less direct than identifying the specific genes involved. Because each offspring receives half of its genes from each parent, the expected genetic relationship of individuals can be estimated. This knowledge of genetic similarity, along

DETERMINANTS OF INTELLIGENCE: Heritability of Intelligence. Figure 1. The puzzle of nongenetic variance. A representation of total phenotypic variance into potential components. These components can be estimated using quantitative genetic technique. (Modified from Jensen, 1997. Copyright 1997 by Cambridge University Press.)



with some special situations like adoption and twins, allows an estimate of heritability. If a trait like intelligence is heritable, the more closely individuals are related, the more similar they should be on the trait. By correlating scores on the trait, it is possible to compare the correlation actually obtained to what would be expected from predictions based on genetic similarity.

Specifically, siblings, who have the same parents, will, on average, have half their genes in common. Since each child gets a random half of the parent's genes, it is only possible to say that siblings will have an average of half their genes in common. They could have anything from all genes in common to no genes in common but, on average, would share half. Similarly, half-siblings would share one quarter of their genes and cousins would share one eighth of their genes, on average.

A very special case is monozygotic or identical twins. Because they result from a single egg and sperm, monozygotic twins are genetically identical. On the other hand, dizygotic or fraternal twins each result from a separate egg and sperm and are no more genetically similar than other siblings. A comparison of the correlations between monozygotic and dizygotic twins on a trait can be used to obtain a rough estimate of heritability. Broad heritability is about twice the difference in the correlation between monozygotic and dizygotic twins.

Obviously, siblings who have been raised in the same home not only share genes in common but share a common environment. An important control for environment is adoption. Children adopted away from their biological parents early in life show what happens

when persons with similar genetic heritage are raised in different environments. Monozygotic twins reared apart are an important example of the adoption method. Since adopted monozygotic twins share all of their genes in common, any similarity between them can only be due to genetic differences (or selective placement, which, at least in more recent studies, is carefully measured). The phenotypic correlation between monozygotic twins provides a direct estimate of heritability. Monozygotic twins reared apart are rare; fewer than 200 cases have been reported in the literature.

Nonadditive sources of variation can be estimated with studies of inbreeding depression and hybrid vigor. When genetically related individuals like cousins mate, they are more likely to have similar genes including deleterious recessive genes. The offspring of related individuals are, therefore, more likely to have two genes that together produce a negative effect on the trait, referred to as *depression*. Outbreeding produces just the opposite effect. If members of two formerly independently breeding groups mate, there is a lowered probability of matching two deleterious genes and there will be a positive effect on the trait in their offspring, called *hybrid vigor*. Both inbreeding depression and hybrid vigor are known to exist for intelligence, providing evidence for nonadditive genetic effects.

Although estimates of heritability can be obtained from monozygotic twins reared apart, a comparison of monozygotic and dizygotic twins, or almost any other genetic relationship, the best way to obtain an estimate is through model fitting. The models used are complex and beyond the scope of this discussion. The advantage

of these mathematical models is that they use all available data and include most, if not all, of the factors that can affect estimates of heritability.

Predictions assume random mating, but people mate nonrandomly for intelligence. Individuals select mates of similar intelligence and this phenomenon is known as *assortative mating*; typically, the correlation between mates is .33. When significant assortative mating occurs and is not controlled for, estimates of heritability will be inflated.

What Is the Evidence Regarding the Heritability of Intelligence?

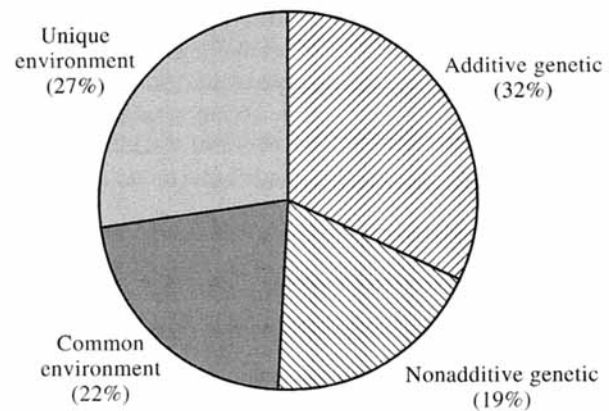
Bouchard and McGue (1981) compiled all the world's literature on the correlation of IQ for genetically related individuals either raised in their family environment or adopted away. There were more than 200 studies including over 50,000 pairs of individuals of various relationships surveyed. Some average correlations were: monozygotic twins raised together (.86), monozygotic twins raised apart (.72), dizygotic twins raised together (.60), siblings raised together (.47), single parent-offspring together (.42), adopted-biological siblings reared together (.29), and adopting parent-adopted sibling (.19). The ordering of these correlations is strongly suggestive that intelligence is a heritable trait. Doubling the difference between the correlation for monozygotic and dizygotic twins [$2(.86 - .60)$] produces a heritability of .52. This is lower than the .72 estimate obtained from monozygotic twins raised apart, but most individuals in that group were adults when tested.

Chipuer, Rovine, and Plomin (1990) used Bouchard and McGue's (1981) compilation of data to fit a multivariate genetic model, simultaneously accounting for assortative mating, nonadditive and additive genetic effects, and common and unique environmental influences. Figure 2 shows the results for the best-fitting model for siblings. Broad heritability (the sum of additive and nonadditive genetic components) is .51. Although this is probably the best single estimate of heritability, nearly all other results can be characterized as finding heritabilities between .40 and .80. Intelligence appears to be the most heritable of all psychological traits.

Is Heritability Different for Different Groups?

Since heritability is a population estimate, the heritability obtained will depend on the population used. Heritability is not necessarily fixed and unchangeable. It is important to remember that heritability reflects the particular conditions that exist in a particular population at a particular time. When conditions change, heritability can change.

Is there any evidence that heritability actually does change for intelligence? The studies summarized by



DETERMINANTS OF INTELLIGENCE: Heritability of Intelligence. Figure 2. The distribution of environmental and genetic sources of variation for siblings obtained by model fitting.

Bouchard and McGue (1981) were heavily weighted with children and adolescents. When examined by age, heritability is found to increase substantially in adulthood, approaching .80. This increase in heritability of intelligence is accompanied by a decrease in common environment to levels approaching zero. This finding makes sense because, when young adults leave home, family environment should have decreasing impact. The increase in heritability with age confirms the old saying that we become more like our parents as we grow older. At the other end of the age range, heritability of IQ for children under six is close to .40, with common environment also being about .40. At all ages, unique environmental influences are constant at about .20.

What Heritability Is and Is Not

Some cautions must be kept in mind when interpreting any estimates of heritability. Heritability does not mean fixed or unchangeable. If conditions change, heritability can change. Furthermore, genes turn on and off during the course of development. Heritability does not apply to a particular individual. It is a population average and, like all averages, there may be no person in the population who exactly represents that average. A heritability of .51 cannot be interpreted as meaning that a particular person's intelligence is 51% due to genetic influences.

Even with these caveats, heritability is an extremely important statistic. It provides a map of the terrain that must be explored to know what causes differences in intelligence. It also provides a methodology for the explicit identification of various sources of variance, both genetic and environmental. In the future, the genetic methods used to estimate heritability may find their

most important application in the identification of environmental variables that affect intelligence. Currently, there are few environmental variables that have been unambiguously identified as affecting intelligence, although it is known that common and unique sources of environmental variance contribute to its development.

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Douglas K. Detterman

Socialization of Intelligence

From the 1960s through the 1980s, the major approaches to understanding intellectual development emphasized basic cognitive processes with little attention to the content or context of cognitive processing. In the late 1980s, however, theories of intellectual development began to consider seriously the influence of context on cognition (e.g., Ceci, 1990; Rogoff, 1990; Sternberg, 1985). Stephen J. Ceci, a prominent cognitive psychologist, suggested that "the basic psychological and biological processes are the 'engines' that drive in-

tellectual development and context provides the fuel and steering wheel to determine how far and in what direction it goes" (1994, p. 404). This article considers the ways in which children's social context (e.g., families, schools, and cultural groups) facilitates and hinders their intellectual development.

Family Influences

Two major approaches have been employed to examine parental influences on children's intellectual development. One approach has been to study specific aspects of parental beliefs and behaviors and their relations to children's performance on cognitive tasks thought to be directly related to those aspects of parenting (e.g., the way parents talk to their children and children's verbal ability). A second tack has been to look at the relations between children's cognitive performance and global assessments of parenting or the home environment. Both types of studies have garnered evidence that what parents do is related to their children's intellectual development.

A landmark longitudinal study (Hart & Risley, 1995) in which specific aspects of parents' behaviors have been linked to children's intellectual development, focused on the ways in which parents in 42 midwestern families interacted with their young children and the relations between parenting and children's language learning, and IQ. The young children were observed for one hour every month from the time they were 6 months old until they were 3 years old. Multiple aspects of parenting were assessed including (a) the diversity of parent language (e.g., number of different words spoken by parent during an hour); (b) the affective quality of the parent-child interactions (e.g., expressions of approval); (c) the emphasis parents placed on telling children about objects and events; (d) the ways in which parents prompted and corrected children's behaviors; and (e) parents' responsiveness to the child. Using very specific, detailed descriptions of parent behaviors with their children over a long period of time, Hart and Risley were able to highlight the cumulative difference in parenting behaviors. For example, there was a vast range in the amount the parents talked to the child from a low of about 50 utterances per hour to a high of approximately 800 utterances per hour when the children were 11 to 18 months of age. In addition, the amount the parent talked to the child when the child was an infant was highly correlated with the amount the parent talked to the child at age 3 ($r = .84$). This consistency in parenting behavior leads to a cumulative difference in children's environments. If a child hears 50 utterances an hour for an average of 14 waking hours per day, that child will be exposed to about 700 utterances each day. On the other hand, if parents address their child 800 times per hour, the child will hear more than 11,000 utterances each

day. Hart and Risley argued that cumulative differences in parenting behaviors can lead to profound differences in children's intellectual development. They found, for example, that (a) greater diversity in parents' language was associated with more rapid growth in children's vocabulary; (b) more positive affect during parent-child interactions was associated with higher IQ scores at age 3; and (c) the ways in which parents guided and corrected their children's behavior were related to children's IQ scores. In a regression analysis, the five aspects of parenting were able to account for 59% of the variance (or individual differences) in children's IQ scores. When the children were in third grade, 29 of the original children were given language development tests. Parents' interactions with their children at ages 1 and 2 were related to children's language development at ages 9 and 10. By third grade, family socioeconomic status (SES) explained 30% of the variance in children's language scores. In contrast, parenting variables accounted for 61% of the variance in language scores. This study demonstrates that the language environment that surrounds the child during the first three years of life can have long-term consequences for the child's verbal ability.

Studies examining the relations between parenting style and children's development take a broader view of the nature of parenting. Parenting style is an analysis of parenting behavior including discipline, responsiveness to child, structure, and warmth with child. Developmental researchers have found that parenting style is related to children's intellectual development. In studies with children and adolescents, researchers have found that authoritative parenting (a parenting style in which parents have high expectations for their children, cultivate warm, nurturing relationships with their children, and help develop children's autonomy) is associated with higher performance on cognitive tasks and school achievement.

The Home Observation for Measurement of the Environment Inventory (HOME) is another widely used global assessment of parenting and the home environment. It measures multiple dimensions of the home environment including maternal responsiveness to child, maternal acceptance of child, provision of appropriate play materials for the child, language stimulation, and encouragement of social maturity. Several researchers have found that scores on the HOME inventory are related to children's current and subsequent cognitive performance. For example, Bradley, Caldwell, and Rock (1988) found that HOME scores taken when children were 2 years old were related to children's school achievement test scores at age 10.

Finally, strong correlations between parenting and children's cognitive performance are *not* necessarily the result of what parents do with and for their children. The correlations may be a function of parents' genetic

contribution to their children's development. Some researchers have used measures of parents' intelligence (e.g., IQ scores) to take parents' genetic contribution into account. Studies examining the relations among children's intelligence, home environment, and maternal intelligence have yielded mixed results. Luster and Dubrow (1992), however, demonstrated that when multiple aspects of the home environment are measured and children are assessed at younger ages (i.e., when the home environment should have a stronger influence on intellectual performance relative to other experiences, such as school), then home environment predicts children's cognitive performance after controlling for mothers' IQ scores. Their work provides evidence that parenting influences children's intellectual development beyond what is explained by genetic inheritance.

Educational Influences

Developmental psychologists have posited that quality and amount of schooling help explain individual differences in intelligence test performance, and that schooling shapes the way individuals reason about information. Both arguments are discussed below. (For excellent reviews of this research, see Ceci, 1990, and Rogoff, 1981.)

Researchers have consistently found strong correlations between IQ scores and years of schooling. Some have interpreted these correlations to mean that people with higher intelligence are better able to complete more years of education; others have argued that more time in school boosts IQ scores. Whereas no single study has definitively resolved this debate, consideration of multiple types of studies provides sufficient evidence to argue that educational context affects intellectual development.

1. Swedish psychologists, for example, have capitalized on mass IQ testing of children in third grade and subsequent IQ testing of young men in military service. When third-grade IQ scores and SES were controlled, men who had more years of schooling had higher IQ scores.
2. Comparisons of children whose birthdays were immediately before and after their school entry cutoff dates have shown that children who have had one year more schooling by a given age (e.g., age 8) have higher IQ scores than their peers who just missed the school entry cutoff date.
3. A consistent finding over several studies is that IQ scores drop after summer vacation, particularly for low-income children. Researchers have hypothesized that the drop occurs primarily for low-income children because their summer activities are least likely to be related to academic tasks.
4. Studies in the mid-1900s documented that when African American families migrated to northern cities, children's IQ scores rose relative to their

southern peers. Researchers attributed the improvement in test scores to differences in quality of schooling.

5. Finally, studies in the early 1900s of children who had little or no schooling (e.g., children of gypsies in Great Britain, children raised in isolated communities in the Blue Ridge Mountains of the United States) have shown that the average IQ scores of younger children (4 to 6 years old) were only a little below normal (e.g., IQs of 90), but the average IQ scores of older children dropped to the retarded range (e.g., IQs of 60). Psychologists have maintained that the lower IQ scores of the older siblings reflect the cumulative effect of the lack of schooling.

Taken together, these data provide evidence that time in school affects children's intellectual development as measured by IQ tests.

Researchers have also argued that formal schooling develops specific types of cognitive abilities. In a critique of research on the impact of education on intellectual development, Rogoff (1981) suggested that among other skills, formal education improves children's abilities to memorize unrelated pieces of information, to organize objects according to taxonomic rules rather than functional rules, to interpret two-dimensional drawings, and to do Piagetian formal operational problems. Schooling provides experience and practice in specific types of problem solving. The importance of these skills depends on their relation to the types of problems children encounter outside school and later on as adults. Much cognitive research today focuses on individuals' ability to transfer skills learned in one setting (e.g., school) to other settings (e.g., work).

Cultural Influences

Cultural context shapes intelligence in a multitude of nontrivial ways. In a review of research on cultural influences on intellectual development, Okagaki and Sternberg (1991) concluded that cultural context functions in four ways to shape intellectual development: (a) provides the content—the objects and ideas—of our thinking; (b) sets the functions or ways in which these ideas and objects are normally used; (c) establishes the social contexts in which we act and shapes our expectations within these settings; and (d) specifies what constitutes an acceptable answer. A classic cross-cultural study conducted by Alexander Luria (1976), a Russian psychologist, demonstrates one of the ways social context shapes intellectual performance. In the 1930s, Luria presented a variety of cognitive tasks to groups of Russian peasants. One task called for the individual to generate spontaneously three questions on any topic. Of the 21 illiterate peasants, 13 politely refused to ask any question: "I can't imagine what to ask about—I only know about spade-work, nothing else . . . to ask

questions you need knowledge" (p. 138). For those Russian peasants, the social context of an experimental interview simply did not permit them or help them to ask questions. Whether or not those adults had a role in their society in which they spontaneously sought information from authority figures was unclear. Whatever the case, in the strange social context of an experimental interview in which the researcher asked them to perform odd tasks for no apparent reason, the social expectations and behaviors the peasants carried with them from their everyday social contexts did not give them the clues to decipher and comply with the experimenter's request.

Finally, a series of cross-national studies by Harold Stevenson, an American developmental psychologist, and his colleagues highlights the impact that differences in cultural values, home environment, and schooling have on children's intellectual performance. Based on their comparisons of students from multiple nations (e.g., Chen, Lee, & Stevenson, 1996; Stevenson et al., 1990), Stevenson and his colleagues posited a cultural-motivational theory of academic achievement. They proposed that a general cultural emphasis on education and a general cultural belief in the importance of effort in intellectual achievement, as opposed to innate ability, create an environment in which children develop a high level of motivation and achievement-related behaviors, which in turn yield better intellectual performance. These cultural beliefs are translated into specific parenting and educational practices that affect intellectual development. For example, in a study of first-grade children in the United States, Japan, and Taiwan, U.S. children did not do as well in math as the East Asian children did. However, there were virtually no overall differences among the three groups on basic cognitive tasks (e.g., spatial reasoning, perceptual speed, and verbal memory), and in reading, the U.S. children did better than Japanese first graders did, but not as well as the Chinese students. Thus, although basic cognitive abilities, such as perceptual speed, did not differ across groups, their performances on math and reading tests did. Aside from providing evidence that the amount and type of school instruction in math and reading contributed to these differences, Stevenson and his colleagues maintained that parents' beliefs affected children's performance. U.S. parents were more satisfied with both their children's schooling and with their children's performance than were other parents. When the children were in eleventh grade, a 10-year follow-up was conducted. In all three countries, children's home environment during first grade (including parental involvement in child's learning and overall home intellectual environment) was positively correlated with eleventh-grade math, reading, and general knowledge test scores. These cross-national studies bring together the multiple influences of parenting, ed-

education, and culture on children's cognitive development.

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Culture and Intelligence

The adaptation of the human species relies on transformation of the natural environment by means of culture accumulated over the course of history. As a result of their different social histories, human groups around the world vary considerably in the particular system of practices, artifacts, and symbols that makes up their culture. Cross-cultural variation is thus related to intelligence in several ways: as a system of meanings, each culture informs the way in which intelligence is conceptualized; as a nurturant environment for personal growth, it places particular demands on the development of an individual's intelligence; and as a forum, each culture frames its own debates about the significance of intelligence in terms of a particular set of topical concerns.

The web of meanings that informs people's lives in a given community defines the cluster of mental characteristics that qualify for the designation *intelligent*. In contemporary, industrialized societies, intelligence is strongly associated with individual excellence on literate, mathematical, or scientific tasks emphasized by academic curricula. However, in a community without schools, those indicators have no indigenous meaning. Several studies in subsistence, agrarian societies of Africa have found that indigenous conceptualization of intelligence focuses on social productivity, and cognitive alacrity is only valued as a mental trait when it is responsibly applied to benefit society.

Even within the United States, members of the general public generally place greater emphasis on social competence in their conceptions of intelligence than do expert researchers, as reflected in published theories, standardized tests, and responses to surveys. Alternative theories responding to this challenge have proposed a distinction between the normative view of academic intelligence and other dimensions such as practical, social, or emotional intelligence. Critics object that this obscures important technical distinctions between cognition and motivation, between ability and disposition, and between general competence and special talents. But the popularity of these texts suggests that they resonate with widely held preoccupations of contemporary Western culture.

According to Piaget, intelligence is a state of equilibrium in which understanding approximates closely to the world as it really is, which the developing individual gradually constructs over time through active exploration and experimentation. This extremely influential theory rests on several philosophical premises that have purchased for Western science a certain clarity at the expense of other types of understanding: a dualistic separation of mind from body, prioritization of detached contemplation over emotional and moral engagement, a mechanistic orientation, and a teleological

theme of progress toward an ideal end state. Given this sociohistorically situated character of Piaget's theory, critics have questioned whether the cognitive stages he described mark a process of substantive discovery and enlightenment about the world as it is, or rather the progressive assimilation of a particular cultural perspective on the interpretation of experience.

Empirical investigations designed to assess the cross-cultural validity of Piaget's theory have generally replicated the basic sequence of stages that he postulated, but the rate at which children progress from one stage to the next is highly variable across cultures. Indeed, even the stage of concrete operations, characteristic of eight-year-olds in Geneva, was not found among a majority of the adults tested in several less industrialized countries. More precisely focused studies have shown that the ecological press for children to develop an understanding of different domains varies across desert, forest, and city cultures with predictable consequences for their rates of cognitive development in each particular domain.

Other cross-cultural studies of perceptual and mathematical skills conclude that decontextualized tests of performance generally afford an invalid estimate of general competence. Different human communities organize the physical and social environment so differently for their children that behavioral adaptation can only be understood and evaluated with reference to the constraints of an ecoculturally particular, developmental niche. The context of human development is not merely a source of external stimulation, but constitutes an incorporating system of social activity, informed by a cultural system of meanings. According to Vygotsky's cultural-historical perspective, Bronfenbrenner's ecological theory and others, the developing child appropriates the system of meanings encoded in language and other shared cultural resources by participating in structured activities. Cognition arises from interactive processes such as intersubjectivity and coconstruction, which support the growth of competence within the child's zone of proximal development.

The study of developmental change in cognition is relevant to an understanding of the nature of intelligence, and as a frame of reference for evaluating individual differences. Yet very little of the theoretical conceptualization of cognitive development is explicitly reflected in the design of the most widely used intelligence tests. Instead, the rationale of these tests is generally phrased in speculative terms, combined with statistical evidence of psychometric reliability and empirical correlations with external criteria, such as scholastic achievement, as evidence of validity.

Intelligence testing is an historically situated cultural practice, whose formal procedures and instruments reflect not only their manifest psychological functions, but also the institutional arrangements

within which those functions were conceptualized. The pioneering design of intelligence tests was constrained by considerations of speed, affordability, simplicity, and reliability. Background assumptions included the age-graded school curriculum of institutionalized public basic schooling, so that intellectual aptitude was indexed in a manner that corresponded closely with scholastic precociousness. Thus, individuals introduced to literacy at a relatively late age, and/or socialized in a cultural tradition that places a lower premium on speed, may appear relatively incompetent on these tests.

In the early 1970s a great debate erupted in the forum of American society about the degree to which an individual's intelligence is open to influence by educational and other cultural experiences, and to what extent it is determined by genetic endowment. The debate has continued over ensuing decades and will probably continue to command public attention, given the volatile nature of race relations in the United States. Although various ideological commitments have contributed to both sides of the debate, one of the central issues at stake remains what is meant by intelligence and the methodology of assessing it. Defenders of a mainstream orthodoxy contend that the technology of psychometrics has established valid and reliable methods for measuring intelligence. Many critical researchers, however, have advanced alternative conceptions of intelligence and how it should be measured, which may generate a quite different cultural consensus in the future. Meanwhile, the general public tends to encounter professional assessments of intelligence with respect to decisions on resource allocation for individuals at the two extremes of a continuum from low to high intelligence.

The condition of severe intellectual disability or *mental retardation* is widely recognized across most of the world's societies, and is attributed by contemporary biomedical science to organic impairment that gives rise (unless secondary preventive measures are taken) to functional disability, which in turn places the individual at risk for handicap. The degree to which a functional disability is handicapping depends on social factors, including cultural beliefs and practices. Thus, individuals with severe mental retardation are stigmatized as incompetent in the cultural context of institutionalized schooling, but may be effortlessly included in the everyday social life of some subsistence agricultural communities, and are even accorded special privileges within the religious institutions of some societies.

Milder degrees of learning difficulty have been the subject of intense controversy. Placement of children in special educational programs designed to support their learning sometimes incurs social stigma, leading some parents to resist assiduously such placement. Ethnic and cultural minority groups in the United Kingdom and the United States are significantly overrepresented

in such special programs. Given the questionable cross-cultural validity of the measures used to classify students, the arbitrariness of the cutoff points between categories, and the rarity with which those labeled with special needs are readmitted to the mainstream, critics and political activists have argued that intelligence testing serves to legitimate oppressive discrimination against culturally different minority groups by restricting their educational opportunities.

The use of intelligence and aptitude tests for educational selection has been equally controversial. One rationale invokes the elitist principle that scarce instructional resources should be invested in those persons with the greatest potential payoff. Empirical validation of measures used to assess potential in this context is hindered by the tendency for selection to match students' intellectual abilities and dispositions with the character of the curriculum, generating a circular pattern of mutual confirmation between selection criteria and curriculum development. The rationale of matching modes of instruction to the learning characteristics of individual minds implies a need for mutual adaptation by both students and educational programs. Since different kinds of intelligence are demanded by the different eco-cultural settings that exist or are planned for the next generation in different societies around the world, educational selection using tests standardized with reference to past experience in Western industrialized societies is liable to restrict in culturally conservative ways the range of intellectual traits in the pool available to the professions. For non-Western societies, the use of such tests implies a commitment to the Western pattern of socioeconomic transformation methods determining placement of children are open to the charge of cultural hegemony.

The concept of cultural bias in intelligence tests has been interpreted in several different ways. From a psychometric perspective, a test shows no *predictive bias* against a given group if its correlation with outcomes on a validation criterion such as educational achievement is similar to that found for relevant comparison groups. Although this is the case for African Americans with respect to several standardized IQ tests, the sociopolitical reality of their massive underrepresentation in the educational programs and professions to which such tests serve as admission criteria constitutes *prima facie* evidence of *outcome bias*. The inconsistency between these two conceptions of bias can perhaps be resolved with reference to the notion of *sampling bias*. The tests that currently dominate psychometric practices in the United States derive their legitimacy from their predictive power within educational and industrial settings, which are overwhelmingly informed by the meaning system of mainstream Western culture. They therefore sample skills, styles, and attitudes valued in that mainstream (and promoted within the develop-

mental niche that it informs) more thoroughly than those valued and promoted in minority cultural groups.

Some practitioners attempt to counter the cultural bias of existing tests by adjusting the standard criteria for individuals from disadvantaged groups. However, the practice of simply adding points or lowering the bar lacks scientific validity. Culturally appropriate tests need to be sensitive both to the task demands of future educational and occupational contexts, and to the learning opportunities of the testees' antecedent learning contexts. Development of such culture-specific tests has been attempted in some third-world countries and U.S. cultural minority groups, with an emphasis on distinctive dimensions of intellect valued in the indigenous meaning systems, on skills widely promoted in indigenous activity settings, and on caution in the use of performance in Western-origin school settings as validation criteria. Such tests should be of particular value to practitioners for identifying individual strengths and supportive resources in the home and community.

Whenever an intelligence test standardized on a culturally different population is used for assessment, great caution is needed in interpreting the scores, including an estimate of the direction and degree of error likely to arise from taking them at face value. It is especially hazardous in such cases to summarize assessment in the form of a single score such as an IQ, which misleadingly implies the availability of a technically valid frame of reference for ranking the individual relative to others. A culturally sensitive report would present each test score, with a suitably moderated interpretation, as part of a multidimensional profile of strengths and needs, together with suggestions for how these can best be responded to by resources available in the context for which assessment is being conducted.

The psychometric practices standardized in the twentieth century are informed by a view of intelligence that reflects three broad themes of contemporary Western culture: decontextualization, quantification, and biologization. Restricting the definition of intelligence in this way has perhaps enabled Western industrialized societies to address some of the pressing needs of their particular historical circumstances, but it has also narrowed the field in ways that need to be unpackaged and reformulated in much broader, less definitive terms for application to the concerns and needs of other social groups in other places and in other times.

[See also Cross-Cultural Psychology; and Culture.]

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Robert Serpell

Schooling and Intelligence

The benefits of staying in school are pervasive. Over their lifetimes, high school graduates will earn \$212,000 more than nongraduates, college graduates will earn \$812,000 more than high school dropouts, and graduate students with professional degrees will earn nearly \$1,600,000 more than college graduates (Bronfenbrenner, McClelland, Wethington, Moen, & Ceci, 1996). School attendance is also associated with lower rates of teen pregnancy, welfare dependency, and criminality (Bronfenbrenner et al., 1996).

Why does schooling increase income or decrease criminality? To some, it is because schooling is a marker for intelligence. High school dropouts tend to score lower on intelligence tests and earn less than those who graduate (Bronfenbrenner et al., 1996). High correlations are found between measures of intelligence and

the amount of schooling one receives, ranging from .6 in Herrnstein and Murray (1994) to .9 in Ceci's (1991) review of 16 studies.

Although positive relationships among schooling, intelligence, and life outcomes are agreed upon by researchers, the causal relationships are not. Historically, the relationship among these three factors has been explained as the influence of innate intelligence as measured by IQ on schooling and earnings, a position in accord with Herrnstein and Murray's (1994) analysis. IQ has been posited to affect earnings directly (i.e., intelligent workers are rewarded for the skills they display), and indirectly through years of schooling (i.e., people who get more schooling are more intelligent before they even enter school, thus are more likely to stay in school, and through the additional schooling they obtain the minimum entry-level educational standards required for getting certain jobs; e.g., Scarr, 1992). According to these researchers, after considering intelligence, very little of the variance in job success is accounted for by schooling (Gottfredson, 1997, p. 86).

We will briefly review seven types of evidence suggesting that staying in school elevates IQ. Because of space constraints, we cannot supply all the methodological details or citations supporting our analysis (see Ceci, 1991, for a review and references).

Historical Evidence for the Effects of Schooling on IQ

The following discussion outlines seven effects of schooling on intelligence.

1. Intermittent School Attendance. Around 1900, the London Board of Education commissioned Hugh Gordon to study children who had very low IQs. Some children were in London classrooms, others attended school only intermittently, either because of physical disabilities or their status as children of gypsies, canal boat residents, and so on. As reported by Freeman (1934):

Intelligence quotients of children within the same family decreased from the youngest to the oldest, the rank correlation between the intelligence quotients and chronological age being $-.75$. Not only that, but the youngest group (4 to 6 years of age) had an average IQ of 90, whereas the oldest children (12 to 22) had an average IQ of only 60, a distinctly subnormal level. . . . The results of the investigation suggest that without the opportunity for mental activity of the kind provided by the school—though not restricted to it—intellectual development will be seriously limited or aborted. (p. 115)

Thus, the longer youngsters stayed out of school, the lower their IQs became.

In 1932, Sherman and Key studied children reared 100 miles west of Washington, D.C., in hollows that rim the Blue Ridge Mountains. Sherman and Key selected

four hollows with differing levels of isolation. Colvin, the most remotely situated hollow, had only three literate adults, no movies or newspapers, and virtually no access roads to the outside. There was a single school, but it had been in session only 16 of 127 months between 1918 and 1930. The other three hollows had intermediate levels of contact with the outside world.

Sherman and Key (1932) observed that the IQ scores of the hollows' children fluctuated systematically with the level of schooling available in their hollow. Advantages of 10 to 30 points were found for the children who received the most schooling. As with the gypsy children, IQ decreased dramatically with age. Six-year-olds' IQs were not much below the national average, but by age 14 the children's IQs had plummeted into the retarded range. Similar cumulative deficits in IQ with age have been reported among African American and British working-class children (Ceci, 1991).

2. Delayed School Start-Up. In South Africa, Ramphal (1962) studied the intellectual functioning of Indian children whose schooling was delayed for up to four years because of the unavailability of teachers. Compared to children from nearby villages who had teachers, these children experienced a decrement of five IQ points for every year of delay.

Schmidt (1967) reported similar results in his analysis of a different South African community of East Indian settlers. Schmidt measured the impact of schooling on both IQ and achievement within children of the same age, socioeconomic status (SES), and parental motivation. When age, SES, and motivation were removed from the picture, the correlation between the number of years of school attended and IQ ranged from .49 to .68 depending on the measure of intelligence used.

Schmidt (1967) also found that years later, those who began school late had substantially lower IQs than those who began school early: another instance of a cumulative deficit. Finally, Schmidt reported that the relationship between the number of years of schooling completed and achievement test scores was no stronger than between schooling and IQ. This suggests that IQ scores are as influenced by schooling as is something explicitly taught in school, namely, academic achievement.

Another instance of delayed school start-up occurred in the Netherlands during World War II. Nazi occupation forced school closures, which resulted in many children entering school several years late. Those children's IQs dropped approximately seven points, probably as a result of their delayed entry into school.

These results strongly suggest that schooling affects IQ independent of parental motivation. Moreover, none of the findings supports the proposition that the IQ-schooling relationship can be attributed to intelligent children beginning school earlier or staying there longer.

3. Remaining in School Longer. What systematic factor could be responsible for men born on, say, 9 July 1951 being more intelligent than men born on, say, 7 July 1951? No ready explanation springs to mind. Consider, though, that toward the end of the Vietnam War, a draft priority score was established with each day of the year being assigned a number, from 1 to 365. If a man's number was low, his chance of being drafted was heightened if he did not have a student deferment or a medical exemption. Thus, staying in school was a sure way to avoid being drafted. It is well established that men born on the first draft date (9 July 1951) stayed in school longer, on average, than their peers born on the last draft date (7 July 1951).

Men born on 9 July 1951 earned approximately a 7% rate of return on their extra years of schooling (Angrist & Krueger, 1991). This figure of 7% rate of return is very close to the estimates derived from studies of being born early or late in a given year (see Neal & Johnson's study as cited in Heckman, 1995). Although these data do not demonstrate a direct causal effect of schooling on IQ, they imply such a link because IQ was presumably the same for both groups prior to their divergence in schooling.

4. Discontinued Schooling. Researchers have demonstrated the detrimental effect of dropping out of school before finishing. In his study of Swedish boys, Harnqvist (1968) randomly selected 10% of the Swedish school population born in 1948 who, at the age of 13, were given IQ tests. In 1966 at the age of 18, 4,616 of these Swedish boys were retested as part of their country's national military registration. Harnqvist compared children who were comparable on IQ, SES, and school grades at age 13, and determined the impact of dropping out of school. He found that for each year of high school (gymnasium) not completed, there was a loss of 1.8 IQ points, up to maximum of nearly 8 IQ points difference between two boys who were similar in IQ, SES, and grades at age 13, but who subsequently differed in the amount of schooling completed by up to four years of high school. (Similar findings have been reported by others using different samples and analytic procedures.)

5. Summer Vacations. Two independent studies have documented, with large samples, the systematic decline in scores that occur in American children over summer. With each passing month away from school, children lose a small but consistent amount of ground from their end-of-year scores on both intellectual and academic tests.

6. Early-Year Birth Dates. Consider the effect on intelligence of being born early versus late in the year. Most states restrict the minimum age of school entry, and mandate compulsory attendance until age 16 or 17. Because of these laws, individuals born in the last 3 months of the year are likely to miss the age cutoff

for school entry and enter school a year later than their birth-year cohort. These individuals reach the end of mandatory attendance (16 or 17) when they have been in school one less year than the rest of their birth-year cohort. Upon coming of age, some individuals decide to leave school. Hence, late-year births are likely to stay in school one year less than early-year births because they reach the age for school-leaving after one less year of school attendance.

Given the random nature of birth dates, we can assume that the genetic potential for intelligence is the same in these groups. However, late-year births, as a group, have lower IQ scores than early-year births. Neal and Johnson's study (cited in Heckman, 1995) showed that, for each completed year of schooling, there is an IQ gain of approximately 3.5 points. Angrist and Krueger (1991) found that those who spent an extra year in school earned between 7 and 10% more than their peers who dropped out a year earlier but at the same chronological age. These lower IQs and lower incomes among late births are entirely a function of being more likely to attend one less year of school than their early-birth peers.

7. Cross-Sequential Trends. Baltes and Reinert (1969) randomly sampled 630 children from 48 elementary schools in Saarbrücken, Germany. Three groups of 8- to 10-year-olds, who were separated in age by 4-month intervals, completed a German version of the Primary Mental Abilities. Because the German school system at that time required entering children to be 6 years of age by 1 April, it is possible to compare same-aged children who had received up to a year of difference in schooling. For example, we can compare a child born on 15 March to a child born on 15 April (after the cutoff) who entered school 1 year later. The former child would have one additional year of schooling by the time he or she was 8 years old despite only a 1-month difference in chronological age. Baltes and Reinert found a substantial correlation between the length of schooling completed and intellectual performance among same-aged, same-SES children. In fact, highly schooled 8-year-olds were actually closer in mental abilities to the least-schooled 10-year-olds than they were to the least-schooled 8-year-olds! Similar findings have been reported by Cahan and Cohen (1989) and Morrison, Griffith, and Frazier (1996).

Conclusion

Due to space constraints, we have not discussed some variables that might complicate our argument. For example, we were not able to delve into the possibility that schooling may not be static. It may be that as IQ changes over the life course, it influences decisions to stay in school. Hence, what looks like a schooling effect on IQ may in actuality be an influence of changes in IQ on the decision to remain in school (e.g., individuals

who experience an elevation in IQ may decide to remain in school longer than individuals who experience a decline). Resolution of these issues must await future research.

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Stephen J. Ceci and Livia L. Gilstrap

Teaching of Intelligence

Can people learn—can they be taught—to be more intelligent? How one answers this question must depend on how one defines intelligence, how one assesses it, what one takes learning or teaching it to mean, and what one is willing to consider as evidence that it has increased. If intelligence is defined as the cognitive po-

tential with which one is born, then, clearly, it cannot be modified by training, but if it is taken to be the capacity to learn at any time throughout the life span, then its mutability is not ruled out as a matter of definition. If one's score on a standardized IQ test is taken to be a reliable measure of the amount of intelligence one has, then the question of whether that amount can be increased by training is easily answered by testing; however, if one considers intelligence to include capabilities, qualities, or characteristics not fully captured by such tests, answering the question is not so easy.

Most theoretical treatments of intelligence stress its multidimensional, or multicomponent, nature, although they do not all identify the same dimensions or components. Even among psychologists who stress the multifaceted nature of intelligence, many recognize a general ability component that is believed to support intellectual performance across a broad variety of contexts, especially those involving complex information processing. Some views distinguish different types of intelligence or different intelligences (Gardner, 1983). One widely accepted distinction is that between crystallized intelligence, which is assumed to relate more directly to intellectual performance on the kinds of formal tasks typically imposed in educational contexts, and fluid intelligence, which is more closely associated with reasoning and problem solving in novel situations that call for flexibility and creativity in response.

A major limitation in our knowledge of intelligence stems from the fact that most of the studies about it have taken place in classrooms and psychological laboratories, and the extent to which the findings generalize to other situations more representative of those encountered outside these contexts is not clear. Problems used to study or measure intelligence in the laboratory typically are well defined, self-contained, and have known solutions, whereas many of those encountered in everyday life are not well defined, lack essential information, and their solutions are unknown. The differences between the kinds of challenges represented by traditional tests of intelligence and those presented by real life have been considered sufficiently great by some investigators to justify a distinction between academic and practical intelligence: the former being what is needed to do well on academic tasks, and the latter what is required to cope effectively outside the classroom (Sternberg & Wagner, 1986).

The relative importance of heredity and environment as determinants of cognitive capability has been explored in many ways, notably through the study of genetically unrelated (e.g., adopted) children raised in the same environment and identical twins reared apart. Interpretation of the results of such studies can be quite complicated; in the aggregate they make it clear that both heredity and environment contribute to adult intelligence, but the relative importance of the two fac-

tors remains an ongoing debate. The pendulum representing the predominant view has swung from a position emphasizing heredity to one emphasizing environment, and back, several times since the 1820s, but the swings have become progressively less extreme and the pendulum now appears to be resting in the middle position (Plomin & Petrill, 1982).

With respect to environmental influences on intelligence, we should distinguish between the question of how intelligence is influenced by environmental factors during the first few years of life, and whether it can be increased later through formal instruction.

The idea that one's intellectual development can be greatly influenced by environmental factors during one's infancy and preschool years has been widely held among developmental psychologists. The fact that average IQ, as represented by scores on standardized tests, has been increasing by about three points per decade over the last half of the twentieth century has been seen as evidence that performance on such tests is subject to environmental factors (e.g., nutrition, schooling, child-rearing practices), inasmuch as changes in genetic effects would not be expected to occur over such a short time (Neisser, 1997).

The question of whether intelligence can be increased by explicit efforts to raise it through instruction has become of interest recently, as it relates to the cognitive demands that people may face in the workplaces of the future. Whether those demands will be greater, on balance, than they are today is an open question. Given the rapidity of technological development, projecting how the cognitive requirements of jobs are likely to change even over a few decades is very difficult and experts do not present a unified view.

Beyond its implications for work, high intelligence is generally considered advantageous, especially in a competitive world. It is assumed that the higher one's intelligence, the greater the range of opportunities one is likely to have, and the greater one's chances of success are. This assumption motivates interest in the possibility of raising intelligence through instruction, but it also suggests a rephrasing of this question: Can people learn whatever is necessary to increase the range of opportunities they will have and their chances of success at whatever they choose to do? This is a different question than whether or not people can learn to improve their scores on IQ tests. There are many books that assure readers that they will be able to raise their scores on such tests if they learn what the authors have to teach about the structure and contents of IQ tests and follow their advice in taking them. There is little reason to doubt that the promise of improved test scores can be realized in many cases; there is considerable evidence that one can learn to improve one's performance on academic tests, conventional tests of intelligence included. Whether what they learn as a

consequence of efforts to improve their test scores transfers as more intelligent behavior in practical situations is less clear. On the other hand, people can learn to behave in ways that would be perceived as more intelligent in practical situations, but whether what is learned in this case will be reflected in higher scores on formal tests of intelligence is also not certain.

The question of greatest interest for present purposes is this: What, if anything, can be done in the context of formal education to increase the ability of people to behave in what are generally considered intelligent ways? The evidence supports several answers to this question.

1. To the extent that intelligent behavior in specific contexts is dependent on domain-specific knowledge and technical skills, it can be increased by increasing such knowledge and skills. Probably no one doubts that this can be done. A person with experience in carpentry, or journalism, or surgery will function more intelligently as a carpenter, or journalist, or surgeon than will one who lacks that experience. Some researchers have argued that the importance of domain-specific knowledge and skills to high-level cognitive performance is generally underestimated, and that the teaching of them deserves more emphasis than many programs to enhance intellectual performance give them (Glaser, 1984).

2. Much of the knowledge and many of the skills on which effective cognitive functioning in modern society depends are layered in the sense that the development of knowledge or skills at one level of complexity depends on the existence of more foundational knowledge or skills. Knowledge of arithmetic is basic to the learning of higher mathematics, for example, and the ability to read is essential to the acquisition of numerous other capabilities. The acquisition of foundational knowledge and skills enables the development of higher level capabilities, and failure to acquire them early puts one at a serious disadvantage.

3. People can improve their learning skills: They can learn to learn. Educational psychologists have identified a variety of learning strategies that can be goals of instruction, and have presented evidence of their effectiveness in facilitating learning (Weinstein & Underwood, 1983).

4. Training in the use of mnemonic methods has a long history and is demonstrably effective in enhancing both short- and long-term memory. Descriptions of a variety of mnemonic techniques can be found in most texts on human memory; self-help books on how to improve one's memory, written for a general audience, abound.

5. The idea that training in logic improves the way in which people deal with cognitively demanding problems in daily life has had few strong supporters among

psychologists since Thorndike contested it over 80 years ago. However, evidence has been obtained in recent years that performance on deductive reasoning tasks can be improved by training in certain "pragmatic reasoning schemas" that people appear to have in their repertory (Cheng, Holyoak, Nisbett, & Oliver, 1986).

6. Much of the reasoning that is required in everyday life is probabilistic in nature, involving the need to deal with uncertainties of various sorts. Many studies have documented ways in which probabilistic thinking goes astray. Studies have also shown that training in statistics and probability can be effective in improving the way in which people approach problems of reasoning under uncertainty (Nisbett, Fong, Lehman, & Cheng, 1987).

7. Teaching heuristic strategies has been prominent in many approaches to the enhancement of problem-solving ability. Strategies include finding effective ways to represent a problem, breaking down a problem into manageable subproblems, finding analogous problems that are familiar or relatively easy to solve, working backward from a goal state to the initial state, and considering extreme examples of a problem type. Brief descriptions and examples of some of these heuristics, which have been shown to work in various contexts, are given in Nickerson, Perkins, and Smith (1985).

8. Teaching self-management and other metacognitive skills and techniques has been stressed by some investigators, and the effectiveness of this approach has been demonstrated in several studies. An increasing emphasis on metacognition has been seen as a distinctive way in which approaches to the teaching of thinking and problem solving have changed over time (Presseisen, 1987).

There are many factors that are not usually considered causally related to intelligence that unquestionably help determine the effectiveness with which people meet challenges, including those that have major cognitive or intellectual components. Motivation is a case in point: it may be a determinant, among others, of course, even of performance on intelligence tests, and is clearly susceptible to change. Social and organizational skills, which are not necessarily associated with high academic intelligence, can be important to success in the workplace and in everyday life, and these too deserve attention as targets for improvement (Organ, 1994).

The importance of beliefs about the malleability of intelligence as determinants of behavior has been demonstrated in many studies. The belief that one's intelligence is unchangeable can demotivate students from making an effort to learn, whereas the contrary belief that one's cognitive capabilities can be enhanced through learning can motivate effort (Dweck & Eliot, 1983). Thus, one's belief regarding the mutability or im-

mutability of intelligence can become a self-fulfilling expectation.

Success in the workplace and in everyday life depends on a variety of competencies, not all of which are cognitive. A high level of general intelligence, as evidenced by performance on IQ tests, is unquestionably an asset, but it appears to be neither a necessary nor a sufficient cause of success. The goal of raising intelligence through education and other environmental means is not an unreasonable one, although it is one that we do not yet know how best to realize, and it should not be pursued at the cost of neglecting to develop other competencies and character traits that are important to a meaningful and productive life.

When intellectual performance has been improved through training, it may not be possible to determine conclusively whether intelligence has been increased, or the individuals involved have become better at tapping the intelligence they have. For practical purposes, this distinction is not very important. What is important is that performance can be enhanced: People can learn to act more intelligently in dealing with the problems and opportunities of everyday life.

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Raymond S. Nickerson

Nutrition and Intelligence

Many studies have shown that children who are well nourished have better cognitive skills than children who are poorly nourished. However, the interpretation of the link between nutrition and intelligence is difficult because many factors, such as family income, illness, and genetic background, are correlated with both the adequacy of nutrition and children's cognitive skills. For this reason, the often-noted small, but significant, association between children's physical size, a marker of nutritional adequacy, and their intelligence could be due to these related factors. In this case, good nutrition would be a correlate, but not the cause, of higher intelligence.

The most powerful research evidence that nutrition contributes directly to cognitive development comes from supplementation studies in which kilocalories, protein, vitamins, and minerals have been provided. The abilities and achievements of children with enriched diets were contrasted with those of children who had nonsupplemented or less fully supplemented diets. The most consistent beneficial effect of supplementation on young infants has been on their motor skills. Supplementation also improved mental abilities in older infants, preschool, and school-age children, although the effects were smaller than the effects on motor abilities, and were more inconsistent both within and across studies. The strongest, long-term results came from a study in Guatemala in which supplementation was carried out for the first seven years of the children's lives, and the effects of supplementation were found many years later in arithmetic skills, vocabulary, reading achievement, and overall knowledge.

Whereas such studies suggest that nutrition is causally related to academic achievement, some of the critical components of good nutrition are not identified for two reasons. First, most of the well-executed studies have been conducted in developing countries where the level of malnutrition is fairly severe. Thus, the effects of more limited forms of malnutrition are less well understood. Second, intakes of calories and protein were not manipulated independently from intakes of vitamins and minerals. For this reason, the separate contribution of calories, protein, and micronutrients could not be assessed.

An extensive body of research shows that iron de-

iciency anemia has serious consequences in child development. Moreover, the effects of early iron deficiency anemia may not be completely reversible because children who were iron deficient in infancy often have lower cognitive abilities than comparison children many years after their anemia has been treated successfully. The other evidence for the importance of vitamins and minerals comes from a study, carried out in Egyptian, Kenyan, and Mexican communities in which caloric and protein intakes were generally adequate. The level of intake of animal products, an important source of vitamins and minerals, was related to cognitive skills in young children even when potentially confounding factors of parental IQ, family income, and child health were statistically controlled. These results suggest that children need to have adequate vitamins and minerals to acquire good cognitive skills.

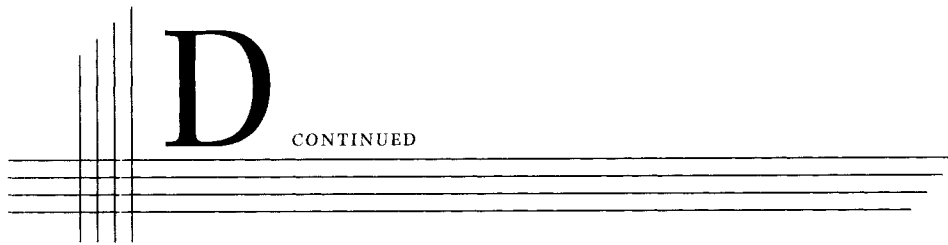
One theory proposed to account for the effects of nutrition on cognitive development is that early inadequate nutrition causes neurological damage that limits children's capacities to learn. This hypothesis does not account for the recovery from short-term malnutrition often shown by children whose diets and quality of life improve, although these children may have mild impairments not evident on many cognitive assessments. A second theory is that the small stature and limited motor skills caused by nutritional insufficiency leads these infants to be treated as less mature, which interferes with their learning experiences and cognitive achievements. Some support for this theory comes from the demonstration that nutritional supplementation and family intervention in combination made a significantly greater contribution to children's cognitive functioning than either experimental manipulation alone. Additional support is derived from the

observation that the quality of schooling interacts with nutrition in influencing cognitive achievements. The results of these studies suggest that the link between nutrition and cognition is functional rather than structural; hence, the effects of malnutrition can be reversed with combined dietary and educational mediation.

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Marian D. Sigman



DEVELOPMENTAL AGENDA. Biological processes set the parameters of the possible for individual developmental tasks over the life course. Sociocultural context, however, provides the developing individual with both opportunities and limitations at all stages of life. The interaction between biology and context create a developmental agenda characterized by both species-specific universals and culturally determined specifics.

The most well-known formulation of a life-course developmental agenda is that of psychologist Erik Erikson, who proposed that there are eight normative crises of development that occur over the life span (1993). Successful development, he suggested, results from the individual's positive resolution of each of these crises as they come up. Although Erikson's formulation has been influential for thinking about development over the life span, most researchers now recognize that it is culturally biased and does not accurately reflect real developmental changes even for individuals in middle-class Western societies (Gardiner, Mutter, & Kosmitski, 1998).

Despite the limitations of Erikson's formulation, however, it does capture some central themes of development in Western societies, and it establishes the idea that the life span can be conceptualized in terms of a series of stages, each with its own challenges for successful development. Cross-cultural evidence suggests that all societies recognize the age-related stages of infancy, early childhood, middle childhood, adolescence, adulthood, and old age. However, there are cultural differences at the ages when the stages (especially after infancy and childhood) are considered to begin and end, and developmental tasks may be further differentiated according to social class and gender. Current theories of life-course development have proposed specific developmental tasks within each of these major age stages.

Infancy

The first two years of life are universally recognized as a period of special vulnerability. Thus, the first developmental task of the infant is to ensure its own survival past this vulnerable period. Bowlby (1969) proposed that the infant's attachment to its mother was shaped through human evolution by the infant's need for reliable care. Subsequent elaboration of attachment theory has established three different styles of attachment, of which only one, "secure attachment," would be considered successful (the other two are variants of "insecure attachment"). However, cross-cultural studies of attachment have demonstrated that population rates of "insecure attachment" vary considerably, and that these variations seem to mirror the cultural norms of child rearing. This finding is of significance to American policy debates about the possibly harmful effects of day care on infants' attachment to their mothers. Most researchers today agree that although continuity of care is important for infants and young children, it is possible for infants to form successful attachment relationships to their mothers and others under a variety of caretaking arrangements.

An important developmental task for both the infant and its caretakers is the establishment of more mature and regular patterns of eating and sleeping. Cross-cultural research has shown that there are wide variations in how soon babies begin to sleep through the night, with much later establishment of mature sleep schedules in cultures where babies can easily wake up and nurse during the night (Harkness & Super, 1995). The location of the infant during sleep also varies cross-culturally and within U.S. society, with cosleeping (in the same bed or same room) more prevalent among African American, Hispanic, and Appalachian families as well as in other traditional societies around the world.

Early Childhood

As anyone who has interacted with toddlers or preschoolers knows, early childhood is an exciting time of life. Margaret Mead's terms *knee child* and *yard child* highlight the rapidly expanding social world of these children as they move from close proximity to caretakers to a world that includes peers as well as siblings and adults (Whiting & Edwards, 1988). Whereas developmentalists usually define the transition from infancy to early childhood in terms of the acquisition of new skills—notably walking and talking—cultural definitions of this transition may be based on other events outside the child. For example, in traditional African societies, the birth of a younger sibling marks the end of the special attentions given to babies, who now spend less time in the company of their mothers and more with older siblings.

Nevertheless, there are some universally recognized developmental tasks of this life stage. Edwards suggests that these include increased autonomy and independence, the emergence of a sense of self, the beginnings of self-control, and the ability to empathize with others, to learn moral rules, and to identify oneself in relation to gender (1995). As this list makes clear, young children, in contrast to infants, are expected everywhere to take their place as contributing members of their families and social groups. Within this general framework, there are significant cultural differences in which aspects of development are considered most important for the child's future success within its culture. For middle-class Western children, the early acquisition of language is a sign of cognitive competence crucial for successful development, and as the child reaches preschool age, the acquisition of communicative competence comes to include preliteracy skills as well. In contrast even to some European societies, however, middle-class U.S. parents tend to underemphasize the development of social skills. A more extreme contrast can be made with young children in sub-Saharan African communities, who are expected to take on responsibilities for child care and household tasks that would be thought beyond the capabilities of Western children even well into the middle childhood years.

Middle Childhood

Around the ages of 5 to 7 years, children go through qualitative shifts in development, recognized for example by Piaget's formulation of the achievement of concrete operational thinking. These changes are also recognized by cultures around the world as ushering in a new stage of development in which children can begin school, take on more responsible tasks at home, or gain new status within their religion. School in particular becomes a primary context for the development of children in today's world. Whiting and Edwards suggest

that school children face four major developmental tasks (1988). First, they must learn to be motivated to work for remote goals promised by doing well in school; second, they must learn to perform individually rather than being identified only with one's family; third, they must learn to manage competition with peers; and finally, they may need to learn to interact with children and adults from different backgrounds. These tasks may not be as new to children who come from highly literate home environments or who may have already encountered cultural differences in preschool or daycare. Nevertheless, children in the middle childhood years are expected to negotiate these new tasks more independently of parents or parent substitutes than are younger children.

For schoolchildren in Western societies, two developmental tasks are particularly important. First, children must establish competence in areas related to their future success in the adult world. Second, children in the middle years must learn how to create and maintain positive relationships with peers, as Collins, Harris, and Susman suggest (1995). Failure at either one of these tasks creates risks for future development, as children enter the later school years lacking necessary competence, self-confidence, and motivation, or find themselves socially isolated in the peer settings that now occupy a large portion of their time. For parents, likewise, the middle childhood years present a new kind of challenge for organizing opportunities for successful development and monitoring their children's progress from a greater distance.

Adolescence

A common view among both psychologists and historians of the family is that adolescence as a recognized stage in the life cycle is relatively new, the product of industrialization, the growth of cities, and the need for schooling past childhood to prepare for adult life. Erikson's conceptualization of the central task of adolescence as establishing a separate identity is consistent with this view, in which development toward adult employment becomes a central concern. Cross-cultural evidence, however, has led anthropologists Schlegel and Barry (1991) to different conclusions. Based on their study of a large worldwide sample of societies, they conclude that social adolescence is a universally recognized developmental stage for both boys and girls, and that its primary purpose is not vocational development but rather preparation for adult reproductive life, generally in the context of marriage. This idea is consistent with the observation that in societies where girls marry too young to experience a prolonged adolescence, such as in India, they tend to marry into the family of their husband and become subject to intimate supervision by their mother-in-law. Even in such societies, however, both boys and girls may be allowed a

period of relative freedom from childhood supervision and adult responsibilities.

If the most basic universal developmental task of adolescence is preparation for adult social rather than vocational life, then the development of mature sexuality takes center stage, along with the training for autonomy and responsibility. From this perspective, vocational training can be seen as a necessary component for the support of mature life in the community, rather than as a primary developmental goal in itself. As young people move toward the successful achievement of this agenda, the boundary between late adolescence and early adulthood becomes blurred.

Adulthood

Probably nowhere during the life span is the idea of developmental tasks so present in the consciousness of the developing individual as when making the transition to early adulthood. Increasingly for American young people, this transition occurs after the completion of college or postsecondary vocational training, generally in the early 20s. Within the span of a few short years, the individual is now expected to make vital life-long decisions and commitments—to a career, a life partner, and perhaps to a community or geographic area of residence—all without the direct supervision of adults that has characterized early developmental niches. In contrast, traditional cultures typically pave the way to adulthood through parental involvement in mate choice and through vocational preparation that begins in childhood. In modern Western European societies, the transition to adulthood is also eased by a gentler expectation of independence and separation of young people from their parents, coupled with a strong state-funded social support system.

Developmental textbooks generally divide adulthood into several stages (early, middle and late adulthood), each with its own developmental agenda. In reality, the increasing diversity in life-course trajectories makes any age-based developmental agenda of adulthood problematic. Not only is the “empty nest” left by young adults “refilled” as they seek respite from failed marriages or employment problems, but the processes of family building and career development may take varied paths. Rather than conceptualize the developmental agenda of adulthood in terms of early, middle, and late age stages, it may be more useful to think in terms of early, middle, and late tasks, as these necessarily follow their own developmental sequences.

As conceptualized by Western social scientists, the major tasks of adulthood center around achieving a sense of fulfillment through intimate relationships, work, and parenting (Berger, 1998). In this agenda, successful engagement may include developmental “crises” as well as periods of stability and satisfaction, as the individual adapts to changing circumstances in the

workplace and at home. From a cross-cultural perspective, however, this developmental agenda seems overly focused on individual achievement, as well as excessively concerned with individual age-related decline (Shweder, 1998). In traditional cultures, development and change during adulthood are more readily conceptualized in terms of changing family and community roles. Anthropologists have suggested that in all cultures, women’s biological changes in mid-life are associated with an increase in status, power, and autonomy (Kerns & Brown, 1992).

Later Adulthood and Old Age

All cultures recognize a period at the end of the life cycle when work and social relationships are modified by the effects of aging. Although Erikson called the life crisis of this stage “integrity versus despair” as the individual comes to terms with the successes and failures of life, it is likely that people in most cultures are not more preoccupied with self-evaluation at this point in their lives than they were earlier. Rather, cultural universals point to a recognition of elders as deserving recipients of increased respect as well as physical care (Keith et al., 1994). From this perspective, the developmental challenge for older adults is to manage a successful transition to greater dependence on others while maintaining their sense of authority and connection with family and community.

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Sara Harkness

DEVELOPMENTAL DISORDERS. The field of developmental disorders experienced a very complicated set of scientific and social changes in the 1990s. Many of those advances involved changes in perceptions about disabilities, and have been referred to as a shift in paradigms (Harper, 1991). As a result, modifications in the definition of developmental disorders and substantial changes in societal responses to children and adults with disabilities emerged. In addition, advances in neuropsychological research have refined our understanding of many developmental and learning disorders. The focus of defining developmental disorders, or the more common terminology, *developmental disability*, has evolved in a sociopolitical context (Wiegerink & Pelosi, 1979) combined with the results of scientific advances.

Definition of Developmental Disability

The implications of the developmental disability (DD) classification and resultant diagnostic labels have a major impact on diagnostic systems, scientific study of developmental disorders, and service-based educational and intervention/treatment programs. Whatever particular classification system is used (or its current emphasis) has effects on federal and state distribution of funds for research and educational service at all levels in the United States. The largest impact on children and youth is related to how such DD definitions become incorporated into administrative rules for the delivery of special education services in public schools and related support services in community-based rehabilitation and treatment settings. Classification systems focused on developmental disorders are very important to the lives of children, adults, and families when such disorders are present.

The earliest definition of developmental disability was crafted in Public Law 91-517 by Congress in 1970 (*Summary of existing legislation affecting people with disabilities*, 1992). This law was an outgrowth of the work of several individuals who assisted on the president's panel on mental retardation at the request of President John F. Kennedy in 1961. A very broad panel effort was generated to report on treatment and prevention efforts in mental retardation worldwide. These details set the stage for subsequent legislation related to developmental disabilities. According to Thompson and O'Quinn

(1979) the president's panel made important contributions that expanded the 1970 DD definition. These emphases included: maintaining children in their normal, local environment; supporting those with physical impairments; encouraging a blended continuum of medical, educational, and social care throughout the life span; recognizing a coordinated, interdisciplinary treatment approach; focusing intervention on local and state levels; and encouraging coordination between university professionals and state provider agencies. This thrust was extremely important in that it set the tone for mental retardation services and developmental disabilities for more than the next 35 years. In 1963, President John F. Kennedy, in his message to Congress on mental illness and mental retardation, actualized these recommendations of the panel in proposing a comprehensive approach to combat mental retardation focusing on prevention, community service, research, and training (Thompson & O'Quinn, 1979). Subsequently, legislation in the 1969-1970 era generated the first definition of developmental disabilities, as follows:

Disabilities attributable to mental retardation, cerebral palsy, epilepsy or another neurological condition of an individual found by the Secretary [Health, Education, and Welfare] to be closely related to mental retardation or to require treatment similar to that required for a mentally retarded individual, which disability originates before such an individual attains age 18, which has continued or can be expected to continue indefinitely, and constitutes a substantial handicap to the individual. (Developmental Disabilities Services and Facilities and Construction Act, 1970)

This initial definition clustered three categorical developmental disorders: mental retardation, cerebral palsy, and epilepsy. These three conditions were contemporarily (circa 1970) viewed as the major causes for substantial handicaps to adults during childhood in the United States. All three of the disorders imply multiple handicap conditions that may require a continuum of highly similar services throughout the life span. The existing services and needs of people were previously classified under disparate and different categorical labels focusing on etiological/medical origins. Furthermore, not all of those who needed services displayed mental retardation, although they did show evidence of multiple handicaps with adaptive delays in life skill functioning. This 1970 DD definition was viewed as "an ecumenical bill since it brought under one umbrella disabled persons with common needs but different diagnostic labels" (Thompson & O'Quinn, 1979, p. 11). A definition of *disability* had now evolved from the early 1960s, reflecting a complicated sociopolitical path, to define and provide services for a wide array of people with diverse and lifelong developmentally based impairments. Concurrently throughout the United States, much additional legislation was being developed relat-

ing to early intervention services: Head Start, poverty and developmental care, and university-based training of professionals working in the field of developmental disabilities (Summary, 1992).

Over the next 27 years (1970–1997), the definition of DD changed in scope and in complexity. In 1975, Public Law 94-103 broadened the DD definition to include autism and a few specific learning disabilities (e.g., dyslexia, if those learning disabilities related to existing and concurrent developmental disorders). Not all specific learning disabilities were included in this classification. Subsequently, Public Law 94-103, Developmentally Disabled Assistance and Bill of Rights Act, was amended as a result of a national task force on the definition of developmental disabilities, and a report was provided (President's Committee on Mental Retardation, 1977). This definition, adapted as part of Public Law 95-605 (1978), follows:

For purposes of the Developmental Disabilities Act, a developmental disability is a severe, chronic disability of a person which:

1. Is attributable to a mental or physical impairment or combination of mental and physical impairments;
2. Is manifest before age 22;
3. Is likely to continue indefinitely;
4. Results in substantial functional limitation in 3 or more of the following areas of major life activity:
 - a. Self-care,
 - b. Receptive and expressive language,
 - c. Learning,
 - d. Mobility,
 - e. Self-direction,
 - f. Capacity for independent living, or
 - g. Economic self-sufficiency; and
5. Reflects the need for a combination and sequence of special, interdisciplinary, or generic care, treatment, or other services which are:
 - a. A lifelong or extended duration and
 - b. Individually planned and coordinated.

Of specific interest is the fact that some of the individuals who generated this definition on the task force were not satisfied with particular terminology, namely, "mental" or "physical" impairments. Consequently, additional clarification was offered to Part 1 of the definition as follows:

Is attributable to mental retardation, cerebral palsy, epilepsy, or autism; or is attributable to any other condition of a person similar to mental retardation, cerebral palsy, epilepsy, or autism because such condition results in similar impairment of general intellectual functioning and adaptive behavior, and requires treatment and services similar to those required for such persons. (Summary, 1992, p. 5)

This new law, signed in 1978 by President Carter, enabled further clarification of the operating definition for developmental disabilities. As is evident, this defi-

nition continued to incorporate broader and more diverse developmental conditions as time went on. The major changes over the prior definitions involved the elimination of specific references to the specific categories of disabling conditions, such as mental retardation and epilepsy, and the more current emphasis on substantial functional limitations. In addition, the term *impairment* was advocated for use because categories or conditions were thought to be confusing and potentially divisive among various groups and organizations involved in the process (Thompson & O'Quinn, 1979).

Contemporary Issues in Defining Developmental Disorders

There has been a move toward using functional perspectives to classify persons with particular developmental disorders or disabilities. This approach focuses on the description of skills, most often adaptive behaviors, that children or young adults need to perform in regard to their daily activities. Again, the relationship between specific diagnostic etiologies and disorders does not capture what most people need with respect to their assistance and functioning on a daily basis. A current trend reflects the importance of support-based paradigms in defining treatments and services for individuals with developmental disorders (Luckasson et al., 1992). A movement away from a deficit (within the person) orientation toward an outcome-based orientation emphasizes the social and community roles for persons with developmental disorders. Fundamental issues underlying this model are that individuals should be maintained and supported in inclusive settings to ensure successful learning, work experiences, and adjustment to the demands of daily community living. An example of this change is in the philosophy evident in the American Association on Mental Retardation (AAMR; Luckasson et al., 1992) definition of mental retardation that emphasizes "level of supports" as a description of the needs of individuals instead of previous levels of disability classification (e.g., mild-moderate-severe-profound mental retardation). Proponents of this support-based orientation of defining disabilities clearly emphasize the opportunity for greater flexibility in diagnosing and classifying such developmental disorders generally. This shift in thinking is not without controversy. For example, others caution that this approach may promote an overemphasis on clinical judgment, rather than empirical sources for decision making, and cite the lack of research and instrumentation to support AAMR's adaptive behavior domains as they are defined in the new system.

The emphasis on these new functionally oriented definitions focuses on chronicity, age-specific onset, multiple areas of functional limitations, and the need for an extended array of long-term services from a multiplicity of providers that are fundamentally unrelated to

specific categories of disability. Medical diagnosis, although relevant, is not useful in designing most treatments for developmental disorders. Interestingly, under the newer definitions of developmental disorder, a person with mental retardation who is competent and functioning in his or her environment would not necessarily be considered developmentally disabled. The seemingly simple idea of providing a general diagnostic label based upon functional differences raises many questions about service provision, inclusion, and who has a developmental disorder.

Conceptual Issues in Developmental Disorders

Defining what is a developmental disorder raises numerous problems from a practical intervention, as well as a scientific, standpoint. One of the key issues in defining DD is the concept of severity and substantiality. Recall that one of the major reasons for the definition of DD and its subsequent legislation is to enable treatment and intervention across an array of congenital disorders with different etiologies, but often with similar functional impacts in adaptive behavior. The goal was inclusive diagnostics for functional needs. The definition of DD focuses on defining a degree of functional limitations (e.g., severity and substantiality). This discrimination of adaptive skills has been viewed as a non-categorical issue that might broaden the DD label, at least in terms of its service inclusion. Furthermore, this delineation of functional status is often a clinical decision despite its evaluation based upon adaptive instruments. These key issues (e.g., severity and pervasiveness of impairment) often are the defining factors in obtaining treatment and interventions. However this aspect of the DD definition lacks operational clarity and is very difficult to place into administrative rules for service delivery. A current dilemma of this DD label is evidenced by the occasional finding of early normative milestones in infants with Down syndrome who are not labeled as developmentally delayed or displaying mental retardation at that time in their development, and subsequently are denied early intervention services at a time when they are likely to receive a high benefit and impact from such treatment. When differences are not present, though highly likely, the DD classification can become an administrative impediment to services. In point of fact, this is a misinterpretation of the DD definition, but testifies to problems of operational clarity.

Finally, when considering the DD category, some clarification is necessary with respect to the issues of delay, dissociation, and deviancy (Capute & Accardo, 1996). These concepts are applied in varying degrees to developmental disorders, particularly mental retardation, during the initial stages of identification. *Delay* often refers to a significant lag in one or more areas of development. The degree of delay has biological impli-

cations (Capute & Accardo, 1996). Delays that are more severe or more global often imply biological etiologies. As noted by Capute and Accardo, "Although the severity of delay does appear to be directly correlated with the ease of identifying a specific etiology, the absence of a specific etiology in cases of milder delay should not be interpreted as supportive of nonorganic etiologies" (p. 3). However, developmental delay is often used to reflect a less definitive state of disability in a young child (up to 5 years old) when the diagnostic data are equivocal generally. Such confusing and sometimes vague diagnostic statements are often applied to young children with milder learning disorders and less pervasive developmental disorders.

Dissociation suggests a difference between the developmental rates of two areas or skills of development, with one area significantly delayed by comparison (Capute & Accardo, 1996). The dissociation phenomenon is relevant to our understanding of children with more specific learning disorders (e.g., dyslexia). Dissociation in this instance reflects a major discrepancy between the general cognitive skills of a child and his or her reading skills, often a characteristic of a specific language or reading disability.

Deviancy is evidenced by nonsequential unevenness in the attainment of particular milestones or skills within one or more areas of development (Capute & Accardo, 1996). The pattern and presentation of developmental progress is significantly and clinically different in rate and context, irrespective of age. Such examples are found in rote expressive language skills, unusual memory and mnemonics found in certain communication disorders (e.g., autism), and hyperverbal language associated with hydrocephalus.

In summary, developmental disorders are classified as developmental disabilities, sharing similar chronic duration, early onset, multiple physical or mental impairments, and are often pervasive in their lifelong functional effects. Developmental differences in rate, level, and pattern are also reflected in the concepts of delay, dissociation, and deviancy in the common developmental disorders (e.g., mental retardation, learning disabilities, autism).

Key Developmental Disorders

A brief chronological history of mental retardation, autism, and learning disabilities follows.

Mental Retardation. The history of mental retardation is well defined by others and represents a complex social and scientific chronology covering several decades (Irwin & Gross, 1990; Madle & Niesworth, 1990). Much debate currently exists in defining primary key aspects in the category of mental retardation as they relate to particular variables, such as IQ score, age, functional disabilities, and sociocultural circumstances. The current definition of mental retardation is:

Mental retardation refers to substantial limitations in present functioning. It is characterized by significantly subaverage intellectual functioning, existing concurrently with related limitations in two or more of the following applicable adaptive skill areas: Communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure and work. Mental retardation manifests before age 18. (Luckasson et al., 1992, p. 15)

This AAMR definition has raised significant discussion among the community of scholars focusing on mental retardation (MacMillan, Gresham, & Siperstein, 1993). Classification of individuals with mental retardation is no longer based primarily on an IQ score, and the categories of mild, moderate, severe, and profound mental retardation are no longer in vogue. This is not true for the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* (American Psychiatric Association, 1994) or *International Classification of Diseases (ICD-10)* (World Health Organization, 1989). Instead, AAMR classification is based on particular types and intensities of supports and services needed by the individual, categorized as intermittent, limited, extensive, and pervasive. This supports-based paradigm represents a shift away from the deficit (within the person) orientation toward an outcome-based orientation that emphasizes the social and community roles of persons with mental retardation. Although controversial, fundamental assertions behind this model are that individuals should be maintained and supported in inclusive settings to ensure successful learning, work experiences, and adjustment to the demands of community living. These issues of inclusion are not inconsistent with earlier models of defining mental retardation or the contemporary definitions of *DSM-IV* or *ICD-10*. However, AAMR's 1992 definition of mental retardation makes the diagnosis and definition contingent upon these issues. Key arguments in the application of this definition center around cautions suggesting that AAMR's (Luckasson et al., 1992) approach may promote an overemphasis on clinical judgment, rather than empirical sources for decision making, and those who question it often cite the lack of research and instrumentation to support the development of this definition, specifically adaptive behavior domains (MacMillan et al., 1993). Such paradigm shifts in the definition of such major categorizations of developmental disorders can have profound implications for millions of citizens, primarily in eligibility for services and long-term educational assistance.

Mental retardation may be the end result of one or more of the following categories of risk: biomedical, social, behavioral, educational, and multiple factors (Capute & Accardo, 1996). Evidence is increasing that biomedical factors have a deleterious impact on the child's developing central nervous system (e.g., genetic

disorders, environmental toxins, infections). Etiologies for mental retardation clearly represent a multifactorial continuum of biological and social factors. Finally, the developmental consequences and life outcomes for individuals with particular levels and degrees of mental retardation are related to their associated disabilities, timing of early interventions, and maintenance of ongoing support systems within their daily environments (Capute & Accardo, 1996).

Autism. Autism is a behavioral syndrome of neurologic dysfunction, characterized by impaired reciprocal social interactions, impaired verbal and nonverbal communication, impoverished or diminished imaginative activity, and a markedly restricted repertoire of activities and interests relative to age (Gillberg & Coleman, 1993). Research in the area of autism has exploded in the 1990s. Numerous studies are focusing on neurobehavioral, neuropsychological, genetic, and behavioral functioning.

Although specific etiologies of autism are generally unknown, often an underlying and associated brain disease can be identified (Gillberg & Coleman, 1993). Such examples include congenital infections, developmental brain abnormalities, metabolic diseases, postnatally acquired destructive disorders, neoplasms, and genetic disorders (e.g., tuberous sclerosis and fragile X syndrome; Gillberg & Coleman, 1993). The relationship of etiology to behavioral functioning and adaptive improvement remains equivocal; historical psychogenic explanations are no longer viewed as etiologically valid.

The life outcomes of individuals with autism remain highly variable. Factors that affect outcome relate to initial cognitive levels, language capability, and associated central nervous system disabilities. Treatment of individuals with autism requires a strong behavioral and special education emphasis with a primary focus on the enhancement of communication skills and adaptive behavioral management. In concert with communication, socialization skills must be given high priority as well.

A major determinant of the prognosis of individuals with autism is the presence or absence of an underlying disorder of the brain and accessibility to treatment for associated disorders and impairments that accompany the disorder. Future outcomes of individuals with autism relate to their initial levels of functioning, language skills, and continuous and available support systems to promote functioning in adaptive behavioral skills within community environments (Gillberg & Coleman, 1993).

Learning Disabilities. Learning disabilities (LDs) represent a very broad group of developmental disorders that have a deficit in a particular area of learning as a common characteristic; individuals with LDs display some type of academic or achievement problem.

To get more specific consensus than this among experts is clearly problematic. Contemporary definitions of learning disabilities tend to stress specific disorders, often independent of general deficits (usually cognitive), and are defined within a neurocognitive or a neuro-behavioral framework (Obrzut & Hynd, 1991).

Defining learning disabilities is an ongoing issue for practice and science. Generally, the identification and conceptualization of learning disabilities evolved from the work of Strauss and Werner in 1955 (Kavale, 1988). This initial definition of learning disabilities was conceptualized within a medical model associated with or caused by neurological dysfunction, related to particular processing disturbances, and often associated with academic failure defined by discrepancy between various skills. Discrepancy here was frequently noted to be between specific functions, for example, achievement levels and general cognitive status. From these initial definitions, learning disabilities have moved to embrace more fundamental neuropsychological theories of brain functioning and central nervous system information processing (Obrzut & Hynd, 1991).

The National Joint Commission on Learning Disabilities (NJCLD; Baltimore, MD) has consistently passed legislation and promoted definitions similar to those associated with the Developmental Disabilities Act (1970) legislation. The most recent definition of *learning disability* constructed by the NJCLD was stated in a 1988 letter to their membership:

Learning disability is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability.

Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance) or with extra influences (such as cultural differences, insufficient or inappropriate instruction) they are not the result of those conditions or influences. (NJCLD, 1988)

For a comprehensive treatment of this history, see Gerber (1993). Findings in this area are moving away from a traditional descriptive medical model and are exploring complex brain-behavior relationships. Research is exploring neurophysiology, brain imaging, event-related cortical potentials, regional cerebral blood flow, and brain electrical activity mapping (Obrzut & Hynd, 1991). Outcomes in relation to learning disability categories and their relationships to particular intervention programs remain an extremely complicated and

active area of educational and neuropsychological research (Gerber, 1993). Specific generalizations about outcomes can only be made with respect to very general statements, since many of the disorders that are included in this category have highly specific impacts on cognitive and neuropsychological functioning.

[See also *Autistic Disorder; Learning Disabilities; and Mental Retardation.*]

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DEVELOPMENTAL PSYCHOLOGY. [This entry comprises three articles: an overview of the broad history of the field from its inception to the present; a survey of the principal theories that have determined the course of development of the field; and a general descriptive review and evaluation of methods and assessments that have been employed in this field.]

History of the Field

Human development is the concern of many disciplines, including biology, sociology, anthropology, education, and medicine. In addition, the topic cuts across nations and cultures, adding to the diversity of subject matter and approaches.

Developmental psychology is concerned with constancy and change in psychological functioning over the life span. As a discipline, it arose shortly after the emergence of scientific psychology in the latter part of the nineteenth century. Its antecedents were different from those that led to the founding of experimental psychology.

In its early years, developmental psychology was primarily concerned with child and adolescent development. Later, adult development and aging began to assume more importance. Developmental psychology began as a correlational science, focusing on observation, not on experimentation, and thus differed from traditional research psychology.

Prescientific Antecedents

Views of development have always reflected the culture in which they emerged. In one of the earliest views of the child, *preformationism*, a homunculus or miniature adult was believed to be contained in the semen or egg at conception. The homunculus was only quantitatively different from the adult. Preformationist views were largely abandoned on the biological level with the development of modern science.

Philosophical Bases

From a philosophical perspective, John Locke (1632–1704) and Jean-Jacques Rousseau (1712–1778) are the usual starting points for Western discussions of development. Locke is considered the father of modern learning theory. For him, the child was a *tabula rasa* or blank slate on which experience writes. The role of Locke and later learning theorists was to emphasize the role of the environment in development.

Rousseau is often identified as the father of classical developmental psychology. In his book *Emile* (1762), he championed a view that emphasized the natural unfolding of the child based on an innate blueprint. He was one of the first to argue that development took place in stages.

Baby Biographies

Early attempts to understand development can be found in "baby biographies," descriptive accounts of children, usually written by a parent, and often biased. The German philosopher, Dietrich Tiedemann (1748–1803), is credited with creating the first baby biography (1787), but there was little follow-up to his work. Almost 100 years later, another German, biologist Wilhelm Preyer (1841–1897), kept a detailed account of the mental development of his son during his first four years. He published the results as *Die Seele des Kindes* (The Mind of the Child) (1882), a work frequently cited as beginning the modern child psychology movement. In America, the best known baby biography was a collection of observations of her niece, by Milicent Shinn (1858–1940), which she began in 1890. A popular version was later published as *The Biography of a Baby* (1900).

The Impact of Darwin

The theory of evolution contained in *The Origin of Species* (1859) by Charles Darwin (1809–1882) was the starting point for many Western developmental psychologists, both European and American. In addition, Darwin's emphasis on individual differences and adaptation became important components of developmental psychology.

The German physiologist, Wilhelm Preyer, was inspired by Darwin and, in turn, was the inspiration for

other European developmentalists including Karl Bühler (1879–1963), Charlotte Bühler (1893–1974), and William Stern (1871–1938). Darwin's approach also led to the ethological school of development, which includes the work of Konrad Lorenz (1903–1989) and Niko Tinbergen (1907–1988). The research and writing of John Bowlby (1907–1990) and Mary Ainsworth (1913–1999) on loss and attachment are later expressions of this school. More recently, a Darwinian-based approach, “evolutionary psychology,” has emerged.

Among the American pioneers deeply affected by Darwin were G. Stanley Hall, one of America's first psychologists, and James Mark Baldwin, also a pioneer psychologist. Hall's main approach to development, recapitulation theory, was derived from Darwin through a German biologist, Ernst Haeckel (1834–1919). Baldwin's approach has been linked to the theories of both Jean Piaget and Lev Vygotsky.

The Child Study Movement and G. Stanley Hall (1844–1924)

Among the many contextual forces which contributed to the rise of developmental psychology in the United States, the child study movement was the most important. This movement, which emerged during the latter part of the nineteenth century, focused on the welfare of children and, among other things, helped to bring about the passage of laws governing child labor and compulsory education. Its leadership was assumed by G. Stanley Hall.

Hall linked the new psychology and the movement. He promised to make an understanding of the child “scientific,” an approach that held appeal for many groups, particularly educators. He published a series of questionnaire studies which, though flawed, attempted to establish norms for children in a variety of areas.

In 1891, Hall published the first journal of developmental psychology, *Pedagogical Seminary*, later renamed the *Journal of Genetic Psychology* (the word *genetic* in these early years was a synonym for *development*). He wrote *Adolescence* (1904), a two-volume book, which revived an archaic word and offered a theory of development broader than the title suggested. He also wrote *Senescence* (1922) which was concerned with the second half of life. For all these efforts and more, he is frequently identified as the “father of American developmental psychology.”

Four Pioneer Developmentalists

James Mark Baldwin (1861–1934) proposed a stage theory of development which initially focused on cognitive development. Later, he extended it to include social development as well. He was largely a theoretician, not an experimentalist, and there is evidence that his work influenced both Vygotsky and Piaget. John Dewey (1859–1952), an American, is probably best known for

his contributions to philosophy and education, but he also wrote on developmental issues. In contrast to many of his American contemporaries, his theory had a contextual emphasis which has sometimes been compared to that of Vygotsky. He focused on education, in part, because he believed it would establish the agenda for development. He established a “laboratory school” at the University of Chicago in order to observe and experiment with children in a more natural setting. Some of the questions he posed are still being asked today. Which aspects of development are universal? Which are expressions of local culture? Alfred Binet (1857–1911), a Frenchman, and the father of modern intelligence testing, conducted research on cognitive functioning, including memory. In addition to being a prolific writer, he was an advocate for educational reform. The experimental laboratory school he founded was probably the first in Europe. Binet's work in intellectual development introduced many concepts which are still in use today. Maria Montessori (1870–1952), an Italian educator, also wrote extensively on child development. Trained as a physician, she first worked with developmentally disabled children. She investigated the writing of Jean-Marc Itard (1774–1838), whose work is often associated with the beginning of special education and his disciple Edouard Seguin (1812–1880). Many of the techniques she learned from them later became part of her Montessori method.

Psychoanalytic Approaches

Psychoanalytic approaches did not enter mainstream academic psychology until the 1930s, but their influence was eventually profound. Moreover, Sigmund Freud (1856–1939), the founder of the movement, had an impact on popular culture unequalled by any other psychologist. While his method of psychotherapy is well known, it is not always appreciated that his theory is a theory of development. His followers were numerous and produced many different approaches.

Two important followers were his daughter Anna Freud (1895–1982), who became a distinguished psychologist in her own right, and Erik Erikson (1902–1994). Both are “ego psychologists,” since they were more concerned with the conscious, rational part of the personality. Erikson is best known for his book *Childhood and Society* (1950), and for his description of the eight stages of man. While accepting S. Freud's notions of psychosexual development, he discussed them within a broader cultural context.

Other psychoanalysts who had an impact on developmental psychology include Karen Horney (1885–1952), particularly for her work on feminine psychology and her emphasis on life-span growth and self-actualization. Carl G. Jung (1875–1961) was a theoretical innovator in adult development and aging. Melanie Klein (1882–1960), who developed *object relations the-*

ory, was a rival of Anna Freud, and emphasized the first 2 years of life, particularly the importance of the mother.

Normative Developmental Psychology

Until the 1940s, much of developmental psychology was descriptive and normative. Arnold Gesell (1880–1961) was important in promoting this approach. Although his mentor, G. Stanley Hall, had tried to develop normative data on children, it was the work of Gesell that proved of lasting value. Gesell collected voluminous data on infants and children, particularly on their physical and motor development. Moreover, he organized the information to make it useful and available to parents.

The effect of his work was to encourage parents to relax and to trust more in nature. In the tradition of Rousseau, the natural unfolding of the child was more important than any interference on the part of parents or educators. Thus, he became a spokesman for the maturation position. Many of Gesell's developmental norms are still in use today.

The Testing Movement

There had been many early attempts to develop measures of intelligence, notably by Francis Galton (1822–1911), but they proved unproductive. However, Alfred Binet, in Paris, tried a new approach and the tests were almost immediately successful. Binet published scales in 1905, 1908, and 1911, the year of his death, each scale more sophisticated than the last.

An American, and former student of G. Stanley Hall, Henry H. Goddard (1866–1957) brought a version of Binet's scale to the United States. After trying it on a number of children, both normal and disabled, he declared the measure a success and immediately began sending copies of his translated version around the country.

Another former student of G. Stanley Hall, Lewis M. Terman (1877–1956), also an American, developed the most widely used version of the Binet–Simon scales, eventually referred to as the Stanford–Binet, which became the standard against which all measures of intelligence were compared. Terman also initiated the first longitudinal study of development, beginning in 1921. His sample, selected for being gifted in intelligence, continues to be followed today. Later longitudinal studies included the Harvard Growth Study (1922), the Berkeley Growth Study (1928), and the Fels Institute Study of Human Development (1929).

Lev Vygotsky (1896–1934) and Contextualism

Although Vygotsky has been dead for more than six decades, he is sometimes referred to as the most important contemporary developmentalist. His ideas are

particularly suited for the contextualist theoretical framework which has become popular in recent years. Born and raised in Russia, Vygotsky was a Marxist who believed in the importance of the social and historical context to development. At the same time, he had an appreciation of the internal features of development. This ability to consolidate these two diverse positions has led some to see his work as forming the basis for an integrative theory of development.

Although he is often compared to Piaget, Vygotsky differed from him in substantial ways. For instance, he placed much more emphasis on the role of the parent and teacher in cognitive development. He emphasized the function of speech, particularly as an aid to the child's development. His "zone of proximal development," a construct describing the ability of children to perform beyond their current level, has been found particularly useful for teachers.

Learning Theory

John Watson (1878–1958), the father of behaviorism, ushered in a movement that differed in important ways from classical developmental psychology. Learning became the central issue for study. Hence, a model based on Locke rather than Rousseau became the standard. In his famous "Little Albert" experiment (1920), Watson attempted to show how a child's emotional development could be understood in terms of learning. Later, Mary Cover Jones (1896–1987), with Watson's guidance, conducted a study of a three-year-old boy to demonstrate how undesirable fears could be eliminated, and by so doing, began the field of behavior modification.

After his departure from academic psychology, Watson continued to write about child development, and his work became popular among parents. He was instrumental in promoting a scientific basis for child care. Eventually, he was replaced as the leader of the child-care movement by less rigid and more child-oriented specialists such as Benjamin Spock.

Influences were still felt from outside of learning theory. Kurt Lewin (1890–1947), for instance, was more interested in motivation and conflict than learning. He conducted some well-designed field studies which had a practical impact on changing developmental psychology. Still, the focus of psychological research at this time was on learning, although some of it strayed from Watson's thinking.

One variation included the research of a group at Yale University under the intellectual leadership of Clark Hull (1884–1952). This group began a program of research that tried to combine learning theory and psychoanalytic theory. A member of the group, Robert Sears (1908–1989), applied learning principles to an understanding of the socialization of children. His work, with others, resulted in the book *Patterns of Child Rearing* (Sears, Maccoby, & Levin, 1957), a frequently

cited assessment of child-rearing practices and outcomes. While the group was ultimately unsuccessful in uniting learning theory and psychoanalysis, they succeeded in moving developmental psychology away from a descriptive science to an empirically testable one. By the 1950s and 1960s in America, developmental psychology was dominated by these learning theory approaches.

Notable among more recent learning theorists was B. F. Skinner (1904–1990), a strict behaviorist, who stressed the role of operant learning. He and his followers performed many experiments demonstrating the role of reinforcement in everyday development. Skinner's work led to widespread use of behavior modification techniques, particularly among autistic children and the developmentally disabled. A highly influential contemporary behaviorist, Albert Bandura (1925–) has focused more on social learning than Skinner. He has emphasized the importance of modeling, and has conducted many experiments demonstrating how socialization takes place, including the development of aggression, altruism, and sex roles. More recently he has focused on issues of health psychology.

The Genetic Epistemology of Jean Piaget (1896–1980)

The impact of Jean Piaget's theory on U.S. developmental psychology can hardly be overestimated. Although he contributed a chapter to the first *Handbook of Child Psychology* (1931), his early work was largely ignored in the United States. By the 1950s, however, a revival of his work began. His stage theory soon became the centerpiece for American developmental psychology, attaining its most important role in the 1970s. His theory was not only essential for most psychologists, it became essential for educators as well.

Piaget saw the child as a scientist, actively constructing increasingly more complex views of the world. At each stage of development, the child is constrained by the cognitive structures available. Piaget was criticized for his methodology and his apparent unwillingness to address the approaches of other prominent developmentalists. Although the era of his greatest prominence has passed, his theory still continues to have an impact on a broad range of developmental issues.

Life-Span Psychology

Initially, most developmental psychology focused on the child and adolescent. However, there were some early attempts to investigate the entire life span. In 1777, Johann Tetens (1736–1807), a German physicist and philosopher, published a book which addressed many life-span issues still of concern today. Friedrich Carus (1770–1808) had a view of development that was similar to that of Tetens. He wrote that aging was not

simply about loss and decline, but was an occasion for growth and perfectibility. Adolphe Quetelet (1796–1874) was probably the first to collect data on physical and psychological variables across the life span. Francis Galton (1822–1911), inspired by Quetelet, established an "anthropometric laboratory" in London in 1884, where he collected measurements on more than 9,000 people. His data constituted an early cross-sectional view of selected physical and psychological characteristics across the life span.

The work of these pioneers in life-span development was largely ignored. It was not until the 1920s and 1930s, with the publication of several textbooks on development, that life-span approaches became prominent again. There was additional interest in later developmental periods when several longitudinal studies began to come of age. Robert Havighurst (1900–1991) and Bernice Neugarten (1916–), at the University of Chicago, were active researchers on development in the middle and later years. Later, the University of West Virginia became an important site for research in life-span development.

Centers of Research

The Iowa Child Welfare Research Station was founded after World War I through the efforts of an Iowa housewife, Cora Bussey Hillis. She argued that if useful research could be conducted in order to understand animals, equally effective research should be directed to an understanding of the child. The Iowa Station was the first of many child development research centers to be established in the United States. Beginning in the 1920s, a number of institutes were established through the efforts of Lawrence K. Frank, initially with money provided by the Laura Spelman Rockefeller Memorial Fund.

Organizations and Journals

There are literally hundreds of organizations which are concerned with issues of human development. Many developmental psychologists belong to the American Psychological Association (APA), which includes divisions devoted to Developmental Psychology; Adult Development and Aging; and Child, Youth and Family Services. The APA publishes several relevant journals, including *Developmental Psychology* and *Psychology and Aging*. The American Psychological Society is also the organizational home for many American developmental psychologists. Increasingly, however, developmentalists are found in specialty organizations. One prominent developmental organization is the Society for Research in Child Development, begun in 1933, with its own journal, *Child Development*, and a monograph series.

The Future

Theorists no longer seem to be working on a "grand theory" of development; they are content with offering

miniature theories. Greater attention has been paid to all ages of development so that the phrase "life-span development" more accurately reflects the science. As developmental psychologists have become more aware of the importance of context in development, they have become more vocal advocates for improving that context, particularly arguing for changes in government policy. There is increased awareness that values matter in development, and that science cannot provide those values. Although developmental psychology has traditionally emphasized research, a new subspecialty called applied developmental psychology, has emerged.

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John D. Hogan

Theories

Human beings, and their families, communities, and societies develop; they show systematic and successive changes over time. These changes are interdependent. Changes within one level of organization, for example, developmental changes in personality or cognition within the individual, are reciprocally related to developmental changes within other levels, for example, changes in caregiving patterns or spousal relationships within the familial level of organization (Lewis & Rosenblum, 1974).

Moreover, the reciprocal changes among levels of organization are both products and producers of the reciprocal changes within levels. For example, over time, parents' manner of behavior and of rearing influence children's personality and cognitive functioning and development; in turn, the interactions between personality and cognition constitute an emergent characteristic of human individuality that affects parental behaviors and the quality of family life.

These interrelations illustrate the integration of changes within and among the multiple levels of organization comprising the ecology of human life. Human development within this ecology involves organized and successive changes—that is, systematic changes—in the structure and function of interlevel relations over time. In other words, the human development system involves the integration, or "fusion" (Tobach & Greenberg, 1984), of changing relations among the multiple levels of organization that comprise the ecology of human behavior and development. These levels include biology, culture, and history.

Given that human development is the outcome of changes in this developmental system, then, for individual ontogeny, the essential process of development involves changing relations between the developing person and his or her changing context. Similarly, for any unit of analysis with the system (for example, for the family, studied over its life cycle, or the classroom, studied over the course of a school year), the same developmental process exists. In other words, development involves changing relations between that unit and variables from the other levels of organization within the human development system. Accordingly, the concept of development is a relational one. Development is a concept denoting systemic changes—that is, organized,

successive, multilevel, and integrated changes—across the course of life of an individual (or other unit of analysis).

A focus on process, and particularly on the process involved in the changing relations between individuals and their contexts, is the predominant conceptual frame for research in the study of human development in the early twenty-first century. Previously, theories about human development often involved causal splits between nature and nurture (Gottlieb, 1997; Overton, 1998). These theories emphasized either predetermined organismic bases of development, for instance, as in attachment theory (Bowlby, 1969), ethological theory (Lorenz, 1965), behavioral genetics (Plomin, 1986), psychoanalytic theory (Freud, 1949), and neopsychanalytic theory (A. Freud, 1969; Erikson, 1959), or environmental, reductionistic, and mechanistic bases of behavior and behavior change (Bijou & Baer, 1961).

Other theories stressed more of an interaction between organismic and environmental sources of development (Piaget, 1970). Nevertheless, there remained in the discipline a presupposition that there were two distinct sources of development, that is, that there was a split between organism and environment. As such, it was the role of theory to explain the contributions of these two separate domains of reality to human development (Overton, 1998).

The stress in contemporary theories, however, is on a “healing” of the nature/nurture split (Gottlieb, 1997), and on accounting for how the integrated developmental system functions, that is, for understanding probabilistic epigenesis. Gottlieb defined this process as being

characterized by an increase of complexity or organization—that is, the emergence of new structural and functional properties and competencies—at all levels of analysis (molecular, subcellular, cellular, organismic) as a consequence of horizontal and vertical coactions among its parts, including organism-environment coactions. (1997, p. 90)

As such, the forefront of contemporary developmental theory and research is represented by theories of process, of how structures function and how functions are structured over time. For example, most contemporary research about human development is associated with theoretical ideas stressing that the dynamics of individual-context relations provide the bases of behavior and developmental change. Indeed, even models that try to separate biological or, more particularly, genetic, influences on an individual’s development from contextual ones are at pains to (retro)fit their approach into a more dynamic systems perspective (Ford & Lerner, 1992; Thelen & Smith, 1994).

Four Dimensions

Thus, in emphasizing that systematic and successive change (that is, development) is associated with alter-

ations in the dynamic relations among structures from multiple levels of organization, the scope of contemporary developmental theory and research is not limited by a unidimensional portrayal of the developing person (for example, the person seen from the vantage point of only cognitions, or emotions, or stimulus-response connections, or genetic imperatives). Contemporary developmental theory consists of four interrelated dimensions.

Change and Relative Plasticity. Contemporary theories stress that the focus of developmental understanding must be on systematic change (Ford & Lerner, 1992). This focus is required because of the belief that the potential for change exists across the life span (Baltes, 1987). Although it is also assumed that systematic change is not limitless (for example, it is constrained by both past developments and by contemporary contextual conditions), contemporary theories stress that “relative plasticity” exists across life—although the magnitude of this plasticity may vary across ontogeny.

There are important implications of relative plasticity for the application of developmental science. For instance, the presence of relative plasticity legitimates a proactive search across the life span for characteristics of people and of their contexts that, together, can influence the design of policies and programs promoting positive development (Fisher & Lerner, 1994).

Relationism and the Integration of Levels of Organization. Contemporary theories stress that the bases for change, and for both plasticity and constraints in development, lie in the relations that exist among the multiple levels of organization that comprise the substance of human life (Ford & Lerner, 1992; Schneirla, 1957; Tobach, 1981). These levels range from the inner biological level, through the individual psychological level and the proximal social relational level (involving dyads, peer groups, and nuclear families), to the sociocultural level (including key macro-institutions such as educational, governmental, and economic systems) and the natural and designed physical ecologies of human development (Bronfenbrenner, 1979; Riegel, 1975). These levels are structurally and functionally integrated, thus requiring a systems view of the levels involved in human development (Ford & Lerner, 1992; Sameroff, 1983; Thelen & Smith, 1994).

Developmental contextualism is one instance of such a developmental systems perspective. Developmental contextualism promotes a relational unit of analysis as a requisite for developmental analysis: Variables associated with any level of organization exist (are structured) in relation to variables from other levels; the qualitative and quantitative dimensions of the function of any variable are shaped as well by the relations that variable has with variables from other levels. Unilevel units of analysis (or the components of, or

elements in, a relation) are not an adequate target of developmental analysis; rather, the relation itself—the interlevel linkage—should be the focus of such analysis (Riegel, 1975).

Relationism and integration have a clear implication for unilevel theories of development. At best, such theories are severely limited, and inevitably provide a non-veridical depiction of development, because of their focus on what are essentially main effects embedded in higher-order interactions (Walsten, 1990); at worst, such theories are neither valid nor useful. Accordingly neither biogenic theories, for example, genetic reductionistic conceptions such as behavioral genetics or sociobiology (Freedman, 1979; Plomin, 1986); psychogenic theories, for example, behavioristic or functional analysis models (Bijou & Baer, 1961); nor sociogenic theories, for example, “social mold” conceptions of socialization (Homans, 1961; Hartup, 1978) provide adequate theoretical frames for understanding human development. Simply, neither nature nor nurture theories provide adequate conceptualizations of human development (Gottlieb, 1997). For instance, theories that stress critical periods of development (Bowlby, 1969; Erikson, 1959; Lorenz, 1965), that is, periods of ontogeny constrained by biology (for example, by genetics or by maturation) are seen from the perspective of theories that stress relationism and integration as conceptually flawed (and empirically counterfactual).

Moreover, many nature/nurture interaction theories also fall short in this regard; theories of this type often treat nature and nurture variables as separable entities and view their connection in manners analogous to the interaction term in an analysis of variance (Bijou & Baer, 1961; Erikson, 1959; Plomin, 1986; Walsten, 1990). The cutting edge of contemporary theory moves beyond the simplistic division of sources of development into nature-related and nurture-related variables or processes; instead the multiple levels of organization that exist within the ecology of human development are seen as part of an inextricably fused developmental system.

Historical Embeddedness and Temporality. The relational units of analysis of concern in contemporary theories are understood as change units. The change component of these units derives from the ideas that all of the above-noted levels of organization involved in human development are embedded in history, that is, they are integrated with historical change (Elder, Modell, & Parke, 1993). Relationism and integration mean that no level of organization functions as a consequence of its own, isolated activity (Tobach, 1981). Each level functions as a consequence of its fusion (its structural integration) with other levels. History is a level of organization that is fused with all other levels. This linkage means that change is a necessary, an inevitable, feature of variables from all levels of organi-

zation (Baltes, 1987); in addition, it means that the structure, as well as the function, of variables changes over time.

Indeed, at the biological level of organization, one prime set of structural changes across history is subsumed under the theory of evolution; evolution can be applied also to functional changes (Darwin, 1872; Gottlieb, 1997). In turn, at more macro levels of organization many of the historically linked changes in social and cultural institutions or products are evaluated in the context of discussions of the concept of progress (Nisbet, 1980). The continuity of change that constitutes history can lead to both intra-individual (or, more generally, intralevel) continuity or discontinuity in development—depending on the rate, scope, and particular substantive component of the developmental system at which change is measured (Brim & Kagan, 1980). Thus, continuity at one level of analysis may be coupled with discontinuity at another level; quantitative continuity or discontinuity may be coupled with qualitative continuity or discontinuity within and across levels; and continuity or discontinuity can exist in regard to both the processes involved in (or the “explanations” of) developmental change and in the features, depictions, or outcomes (that is, the “descriptions”) of these processes.

These patterns of within-person change pertinent to continuity and discontinuity can result in either constancy or variation in the rates at which different individuals develop in regard to a particular substantive domain of development. Thus, any pattern of intra-individual change can be combined with any instance of inter-individual differences in within-person change, that is, with any pattern of stability or instability. In other words, continuity-discontinuity is a dimension of intra-individual change and is distinct from, and independent of, stability-instability—which involves between-person change and is, therefore, a group, and not an individual, concept (Baltes, 1987; Lerner, 1986).

In sum, since historical change is continuous, temporality is infused in all levels of organization. This infusion may be associated with different patterns of continuity and discontinuity across people. The potential array of such patterns has implications for understanding the importance of human diversity.

The Limits of Generalizability, Diversity, and Individual Differences. The temporality of the changing relations among levels of organization means that changes that are seen within one historical period (or time of measurement), and/or with one set of instances of variables from the multiple levels of the ecology of human development, may not be seen at other points in time (Baltes, 1987; Bronfenbrenner, 1979). What is seen in one data set is only an instance of what does or what could exist. Accordingly, contemporary

theories focus on diversity—of people, of relations, of settings, and of times of measurement.

Individual differences within and across all levels of organization are seen as having core, substantive significance in the understanding of human development (Baltes, 1987; Lerner, 1998). Diversity is the exemplary illustration of the presence of relative plasticity in human development. Diversity is also the best evidence that exists of the potential for change in the states and conditions of human life (Brim & Kagan, 1980).

Moreover, the individual structural and functional characteristics of a person constitute an important source of his or her development. The individuality of each person promotes variation in the fusions he or she has with the levels of organization within which the person is embedded. For instance, the distinct actions or physical features of a person promote differential actions (or reactions) in others toward him or her. These differential actions, which constitute feedback to the person, shape at least in part further change in the person's characteristics of individuality (Lerner, 1986; Schneirla, 1957). For example, the changing match, congruence, or goodness-of-fit between the developmental characteristics of the person and of his or her context provide a basis for consonance or dissonance in the ecological milieu of the person; the dynamic nature of this interaction constitutes a source of variation in positive and negative outcomes of developmental change (Thomas & Chess, 1977).

Methodological Implications

The temporality involved in contemporary theories of human development necessitates change-sensitive measures of structure and function and change-sensitive (that is, longitudinal) designs (Baltes, 1987; Brim & Kagan, 1980). The key question vis-à-vis temporality in such research is not whether change occurs; rather, the question is whether the changes that do occur make a difference for a given developmental outcome.

Moreover, given that the study of these changes will involve appraisal of both quantitative and qualitative features of change, which may occur at multiple levels of organization, there is a need to use both quantitative and qualitative data collection and analysis methods. In essence, then, the concepts of historical embeddedness and temporality indicate that a program of developmental research adequate to address the relational, integrated, embedded, and temporal changes involved in human life must involve multiple occasions, methods, levels, variables, and cohorts (Schaie, 1965).

Empirical appraisals of cross-time variation and co-variation are more veridical with the character of change phenomena. Moreover, such analyses would afford examination of whether changes are consistent with theoretical propositions about developmental pro-

cesses. In other words, to study any process and, more basically, to study any change phenomenon, cross-temporal (multi-occasion) data must be gathered, and it would be both theoretically interesting and important and empirically useful to recast many extant cross-sectional data as longitudinal investigations.

Indeed, change-sensitive (that is, longitudinal) designs must be used in research that is intended to appraise adequately the alterations over time that are associated with individual behavior across the life span. As noted, these designs must involve the use of measures that are developed to be able to detect change; however, it is typically the case that measures of traits are not developed to be sensitive to developmental change. Furthermore, multivariate measurement models must be used to appraise the several individual and contextual levels integrated within and across developmental periods.

However, a dynamic, systems theory, such as developmental contextualism, would move the study of human development beyond just the point of promoting multivariate-longitudinal designs involving change-sensitive measures. In addition, developmental contextualism would lead scholars to design research studies that involve

1. dynamic (fused) relations among levels of organization (Ford & Lerner, 1992; Tobach & Greenberg, 1984) involved in the ecology of human development;
2. the appraisal of levels ranging from the inner-biological, and individual-psychological, to the physical ecological, the sociocultural, and the historical, and concepts that stress the ways in which levels interrelate, or are fused—such as the “goodness of fit” notion (Thomas & Chess, 1977)—may be particularly helpful;
3. the individual differences (the diversity) that derive from variation (for example, in the timing) of the interactions among levels; and
4. as necessary, a “co-learning” model for the design of research (and intervention) programs, which would rely on the contributions of individuals themselves to further knowledge about the issues, assets, and risks affecting their lives.

Such research thus diminishes problems of “alienation” between researchers and participants (Riegel, 1975) and suggests that any quantitative appraisal of human development rests on a qualitative understanding of their life spaces and meaning systems. Since such understanding is shaped at least in part by the participants' input, research, and especially programs derived from such information, is more likely to be efficacious for the participants.

Thus, developmental contextualism underscores the need for policies and programs that are derived from

research to be diversity sensitive and to take a change-oriented, multilevel, integrated, and developmental systems approach (Ford & Lerner, 1992). The integrated nature of this system means that change can be effected by entering the system at any one of several levels or at several levels simultaneously—depending on the precise circumstances within which one is working and on the availability of multidisciplinary and multi-professional resources.

Conclusions

Theoretical views such as developmental contextualism not only provide an agenda for a developmental, dynamic, and systems approach to research about human development but also allow for the promotion of positive developmental trajectories in people. When actualized, developmental systems, along with policies and programs, can ensure a continuous social support system across the life course. Such a system would be a network encompassing the familial, community, institutional, and cultural components of the ecology that impacts a person's behavior and development across his or her life (Bronfenbrenner, 1979).

There is growing recognition that traditional and artificial distinctions between science and service and between knowledge generation and knowledge application and practice need to be reconceptualized. Scholars, practitioners, and policy makers are increasingly recognizing the important role that developmental science can play in stemming the tide of insults to the quality of life caused by poverty, premature births, school failure, child abuse, crime, adolescent pregnancy, substance abuse, unemployment, welfare dependency, discrimination, ethnic conflict, and inadequate health and social resources.

Research designs that examine topics of immediate social concern, that consider both normative and atypical developmental pathways as means of promoting and enhancing human welfare, that take into account the contextual nature of development and employ ecologically valid means of assessing functioning, and that are sensitive to the ethical dimensions of action research are required if science is to make a difference in the life of the community. Without such research, the knowledge produced by developmental scientists risks being ignored or misused by practitioners, educators, policy makers, and the public itself.

[See also Behavioral Genetics; and Psychoanalysis.]

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Research Methods

The topic of research methods in developmental psychology encompasses an array of methodological and statistical issues that arise when attempting to study development, or change in behavior as a function of time. To organize ideas about research methods, it is useful to distinguish among three domains—the design of developmental research, measurement issues that are of particular relevance in developmental work, and the statistical models and methods that characterize research efforts in the field.

Developmental Research Designs

The topic of developmental research designs has been broached many times during the past 75 years. As Wohlwill (1973) argued, the most basic aim of developmental science is to study change in behavior (B) as a function of time (T), or $B = f(T)$. Hence, developmental research designs should promote the modeling of change in behavior across time. Time can, however, be measured in many ways (Schroots & Birren, 1990), and different ways of indexing time have important implications for representing and understanding behavioral change. Because researchers are typically interested in the ontogenetic development of behaviors, the most common index of time is chronological age, or time since birth. Under this approach, the goal of developmental psychology is the determination of the relationship between a behavior of interest and the chronological age of participants, often symbolized as $B = f(A)$, reflecting the assumption that behavior (B) is a specifiable function of age (A). But, Schroots and Birren offered many other indicators of psychological age or time that are related to chronological age but that may govern, or at least better track, developmental change, so chronological age should be considered only an approximation of the optimal time dimension along which behavioral development should be charted.

One option that must be faced when designing a developmental study is whether the same individuals or different individuals will be measured at the multiple ages. Most researchers recognize the benefits of assessing the same individuals at the several times of measurement, as this allows the direct determination of age changes, or the age-related change in a given behavior by each individual (Baltes & Nesselroade, 1979). Of course, this approach can slow the progress of research if the aim of the investigation is to portray behavioral change across a considerable age span. To tackle this issue, Bell (1953) presented a method of approximating long-term age changes by means of shorter term study of several samples. This could be accomplished by assessing multiple groups of subjects belonging to different birth cohorts across more restricted age spans and then organizing the partially overlapping trends as a function of chronological age. This notion was formalized by Schaie (1965) as a general developmental model that recognized the potential influences on behavior of the chronological age (A) and birth cohort (C) of the individual as well as the historical moment or period (P) at which measurements are taken. The resulting conception was organized around the potential effects on behavior of age, period, and cohort, signified as $B = f(A, P, C)$, and the interpretation of these effects on behavior, as will be discussed below.

Clear distinctions among three simple developmental

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Clear distinctions among three simple developmental

designs are possible, based on considerations of age, period, and cohort effects. The most commonly used simple developmental design is the cross-sectional design, in which all measurements are obtained at a single time or period of measurement. Two or more samples of participants who differ in chronological age are obtained, and empirical results are arrayed as a function of the chronological age of the samples of participants. But, year of birth, or birth cohort, is perfectly correlated with, and therefore perfectly confounded with, chronological age in a cross-sectional design, so cohort effects are viable alternative explanations for any age-related trends in data.

Furthermore, because the performance of different samples is compared, cross-sectional designs can provide, at best, information on age-related differences, or age differences, as opposed to assessing directly changes with age. Several assumptions must be met in order to have confidence that age differences from a cross-sectional design represent trends that would likely result from individuals changing or developing across the age span of the study. Chief among these is the assumption that comparable sampling of participants was conducted for each of the samples. Even unintended differences in sampling may distort trends, yielding mean aging trends that no individual person would exhibit. For example, consider drawing random samples of students in school in grades 6, 8, 10, and 12. Students who drop out of school tend to perform at lower levels on many variables (for example, school achievement) than do students who remain in school through the completion of high school. Thus, a random sample of sixth graders would likely be more representative of all 11-year-olds than would a random sample of twelfth graders selected to be representative of all 17-year-olds, given the progressive dropout of students during junior and senior high schools.

Even if one could verify equal representativeness of sampling at each age level, a cross-sectional design cannot yield information about the stability of individual differences from age to age, because different individuals are assessed at each time of measurement. Given the importance of understanding both the general developmental trend for any behavior of interest as well as individual differences around this trend, the inability to study individual differences in change is an important shortcoming of the cross-sectional design.

A second common design is the longitudinal design, in which all measurements are obtained from a single sample of participants, persons who are usually of a single birth cohort. This single sample is then observed at two or more times of measurement. Results from longitudinal studies are often arrayed as a function of the chronological age of the sample at the several times of measurement. But, historical time or period is perfectly correlated with, and hence completely con-

founded with, chronological age of participants at the different times of measurement, so historical period effects are alternative explanations of any purported age-related trends in data.

The longitudinal design has one major advantage over the cross-sectional design: the longitudinal design allows the researcher to study age changes, as changes in behavior by individuals are assessed directly by tracking the same subjects at two or more ages. This allows the modeling of individual differences about the developmental trend in addition to charting the mean developmental trend. Unfortunately, the typical longitudinal design also must confront at least two important methodological problems. The first of these involves retesting effects. Simply testing subjects a second time on a particular test often leads to some change in scores. In most longitudinal studies, participants are assessed at three or more times of measurement, increasing the likelihood that retesting will confound results of age changes. For example, Nesselroade and Baltes (1974) presented evidence that retesting effects explained approximately one half of the mean age changes on several dimensions of mental ability. The second problem concerns sample representativeness and the presence of the differential dropout of participants across time. Often, participants willing to commit to participation in a longitudinal design are not representative of the population at large, and later dropping out of a longitudinal study is usually nonrandom. Both of these problems limit the generalizations that may be made from longitudinal studies.

The time-lag design is a third simple developmental design, although it is rarely used. In the time-lag design, measurements are obtained from participants all of whom are the same age, but who are tested at different points in historical time. That is, one could study 10-year-olds in 2010, 2020, and so on. In a time-lag design, cohort and period are perfectly confounded. Further, because age is held constant, the time-lag design is most useful for tracking secular trends. Because developmental psychology has a primary goal of studying age-related trends and because age is held constant in this design, the time-lag design has less direct relevance for the field than do the other two simple designs, but timely applications of the time-lag design should not be overlooked.

Returning to the general developmental model proposed by Schaie (1965), three more complex developmental designs are possible within this framework. These are (a) the cohort-sequential design, obtained by the factorial crossing of cohort and age; (b) the time-sequential design, arising from the factorial crossing of period (or time of measurement) and age; and the cross-sequential design, defined by the factorial crossing of cohort and period (or time). Although Schaie initially contended that the effects of age, cohort, and pe-

riod could be identified separately, subsequent commentators (for example, Mason & Fienberg, 1985) have concluded that the influences of age, cohort, and period cannot be disentangled in a simple mathematical way. The lack of separate identification of these effects is portended by the dependence among age, period, and cohort in any of the three designs discussed by Schaie. For example, consider the cohort-sequential design, in which cohort and age are crossed factorially. In this design, the time of measurement (or period) is fixed by the need to assess a given cohort at a particular chronological age (for example, children born in 2000 and assessed at 10 years of age must be assessed in the year 2010). Thus, one cannot vary factorially and independently all three factors of age, period, and cohort in a single design; once levels of two of these factors are fixed, the levels of the third are fixed as well.

Because effects of the three factors of age, period, and cohort cannot be estimated separately, the choice of a design should be dictated by theory regarding which factors will have important influences on change. For example, the effects in a cohort-sequential design, in which cohort and age are crossed, are interpreted most simply under the assumption that period (or historical time) has no influence on the behavior of interest. If this assumption is accurate, the cohort-sequential design yields age trends for each of several cohorts, enabling the researcher to study the form of general age trends and how these are moderated by cohort. Similar conditions hold for the two remaining designs: the time-sequential design offering clear interpretations if cohort effects are negligible, and the cross-sequential design yielding unconfounded interpretations if age effects are assumed to be zero. Given these considerations, the cross-sequential design appears to be the least adequate of the three complex designs, as age effects must be assumed to be zero, and the cohort-sequential design is the most optimal, because both age and cohort are explicitly included in the design. Ironically, the cross-sequential design has been the most widely used of the designs (for example, Nesselroade & Baltes, 1974), and the cohort-sequential design has arguably been the least used of the designs. The reasons for the differential use of designs are clear, as the cohort-sequential design takes a longer number of years to complete and yields developmental functions across a smaller number of age levels. Still, the cohort-sequential design deserves wider use in the future to corroborate and place on firmer empirical footing the findings generated by other designs.

Measurement Issues

Measurement involves the assignment of numbers to observations (for example, persons) to represent the magnitude of a particular characteristic for each observation. Thus, one may use a ruler to assign numbers

on any of a set of numerical units—for example, inches, feet, or centimeters—to represent the height of each of a set of individuals. Here, the measuring device is the ruler, the characteristic of interest is height, and a direct ratio mapping exists between the length on the measuring scale and the numbers to be assigned to observations.

Measurement is a crucial, if undervalued, aspect of all research endeavors in psychology, with profound implications for representing relations among variables and hence for the theories designed to account for these phenomena. Nowhere is the importance of measurement more obvious than in developmental psychology. When attempting to study the relation of behavior to age, as $B = f(A)$, measurement is paramount, for one must ensure that the units of a measurement scale are comparable across the age span and that one is assessing the same characteristic at all ages for the function related behavior and age to have any interpretation. Researchers frequently assume that their measurements embody desiderata such as comparability of units across age levels but rarely are these assumptions tested directly.

Scales of measurement are often discussed in terms of the well-known classification into nominal, ordinal, interval, and ratio scales. Numbers on a nominal scale serve only to identify the class into which a person falls and do not imply an ordering of individuals on any continuum. In contrast, numbers on the remaining three scales provide an ordering of individuals: an ordering with unequal intervals using an ordinal scale, with equal intervals on the interval scale, and with both equal intervals and a nonarbitrary zero point with a ratio scale.

Cross-cutting the preceding classification, at least partially, is the distinction between qualitative and quantitative variables. A nominal scale clearly represents qualitative differences among persons, but the relations between the three remaining scale types and the qualitative-quantitative distinction are less clear. For example, an ordinal scale might represent an ordered categorical or qualitative variable, with numbers representing different, qualitatively distinct, and hierarchically ordered stages. Or, the ordinal scale may represent an initial, unrefined attempt to assess a quantitative continuum. The confusion between scale types and the qualitative-quantitative distinction has been muddled by researchers in certain domains (for example, moral development, ego development) who have argued for the viability of qualitative, hierarchically ordered stages in the particular domain, but these same researchers have provided instruments with scoring options that yield scores that seemingly fall on interval scales, suggesting the presence of a quantitative dimension. Complications of this sort continue to concern the field of developmental psychology.

Early longitudinal studies, such as the Berkeley Growth Study by Bayley (1956; Bayley & Jones, 1937) employed measures from multiple domains, and many of the variables had either ratio or at least interval status. For example, Bayley (1956) displayed charts of growth in height and weight, which are usually assumed to meet the stipulations of a ratio scale. These scales enabled the fitting of informative age functions to data but were of greater utility in portraying physical growth than psychological development. For psychological development, Bayley developed an interesting approach to constructing derived scales for psychological variables (for example, her 16-D scale was normed to the mean and standard deviation exhibited by a sample of 16-year-olds) that would allow one to study changes in both mean and variance across age levels. However, the idea never took hold, and measurement concerns have a less central role than in the past. Most contemporary work uses measures designed for use with participants in fairly restricted age ranges, circumventing problems of comparability across extended age ranges and, in the process, hindering the study of developmental changes across these broader age levels. Moreover, the only measures that tend to be used across a wide range of ages during the developmental period from infancy through adolescence are measures of intelligence. These measures typically provide an IQ, which is normed in a nondevelopmental fashion—to yield a mean of 100 and standard deviation of 15 in the population at each age level. Hence, modeling the mean developmental trend is hazardous or impossible given the measurement properties of most measures used in current research.

One dependent variable that may provide a common metric across age levels and is widely used in studies of cognitive processes is reaction time, a variable that appears clearly to have ratio scale properties. In aging work, several meta-analyses have been performed on the general slowing hypothesis. Under general slowing, the rate of mental processes may slow (Birren, 1965) or information may be lost in a consistent fashion (Myerson, Hale, Wagstaff, Poon, & Smith, 1990) during the aging period. Regardless of the basis for the effect, various mathematical and statistical models have been fit to reaction time data to represent the extent and consistency of the slowing. Some work has been done to model the speeding up of processing, represented by reductions in reaction time, during childhood and adolescence. The basis of the speeding up of processing during the developmental period, however, is treated as a quantitative improvement in performance, and this is clearly a problematic assumption, as it may be for slowing during aging.

For example, in the domain of numerical processing (for example, addition, subtraction), children appear to proceed through a series of qualitatively distinct stages,

representing different strategies for solving problems of a given type. Regardless of whether strategy choice continues unabated throughout life or a person finally adopts his or her optimal strategy and uses this strategy consistently, the qualitative advances in strategies may underlie the quantitative improvements in reaction time (Widaman, 1991). Thus, researchers may misconstrue the research problem as the understanding of the form of the function relating the quantitative reaction time variable to age, whereas the important developmental finding is the qualitative changes producing the quantitative improvements in performance. This is but one example of the measurement problems arising in developmental contexts. Future advances in both substantive theory and measurement theory may lead the way to clearer thinking about such problems—studying the measures of behavior that matter the most, rather than studying measures of behavior that are easiest to amass.

Statistical Models and Procedures

During the 1950s and 1960s, Wohlwill (1973) detected a clear “invasion of the experimentalists” into developmental psychology. This invasion took the form of researchers trained in experimental studies of mature persons, usually college students, opting to design studies that included multiple age groups, to test whether similar results would be found at all points on the age continuum. This invasion had both strengths and weaknesses. For example, the rigor of developmental research was perhaps improved, and research topics certainly were expanded in interesting directions, but, the results generated often had less relevance to traditional issues that defined the field than did typical research results.

Experimentalism has become firmly ensconced as one approach to developmental science. Statistical methodologists, however, have brought to the field the most modern analytic techniques available. Nevertheless, the standard methods of statistics—including correlation, regression, and the analysis of variance (ANOVA)—continue to be the most commonly used in developmental studies and will likely be the standard for some time to come.

Before discussing the newer methods of representing and analyzing developmental data, some comments should be made about the kinds of questions traditionally framed within developmental theories. The standard techniques of ANOVA and correlation and regression analysis are frequently used in developmental research and are often used as intended, but these techniques are subject to misuse and may fail to capture certain important aspects of developmental data. For example, ANOVA, designed to analyze mean differences across levels of qualitative independent variables, is used to test developmental changes as a function of age

in many contexts. However, when used with longitudinal, repeated measures data, researchers cannot model the pattern of individual differences over time, as these are relegated to the within-group covariance matrices, which are frequently ignored and almost always unreported in research publications.

With correlation/regression methods, crucial tests of differences across groups often are not conducted, leaving the research literature in disarray. For example, when investigating gender differences in development, researchers commonly test whether correlations or regression weights differ significantly from zero, and they do this separately for samples of males and females. If a correlation or regression weight is significant for one group and not for the other, this is construed as evidence of a difference in the development of the genders. The crucial tests of the difference between the correlations (or regression weights) for the two groups, however, might reveal nonsignificance, suggesting a lack of difference across genders in developmental processes. Tests of the significance of the difference between independent correlations are often viewed as unpowerful, however, failure to utilize the proper tests results in a research literature that is open to many, conflicting interpretations.

Regardless of their inadequacies and potential misuse, ANOVA and correlation and regression analysis have helped frame statistically the important questions asked in developmental research. ANOVA emphasizes the understanding of the mean developmental trend, and correlation and regression analysis are used to study individual differences about the mean trend. Indeed, correlational measures were the mainstay for investigations of the differentiation of abilities and other processes during childhood and adolescence. The invasion of the statistical methodologists may be seen as an attempt to introduce new methods of analysis that correct problems in both ANOVA and correlation/regression analysis and that represent more adequately developmental processes and developmental change.

In a special issue of *Child Development* published in early 1987, several researchers promoted the utility of structural equation modeling (SEM) for developmental psychology, although others offered rational concerns about how the techniques would be used and interpretations would be drawn. Despite misgivings, the manner in which SEM can structure ideas and results cannot be discounted. Indeed, ways of addressing many key problems—including the distinctions between state and trait constructs as well as the proper causal lag in longitudinal studies—are uniquely applied with SEM. These benefits have been so clearly realized that applications of SEM in developmental research are becoming quite common.

One way of using SEM informatively in developmen-

tal research is multiple-group confirmatory factor analysis (CFA) to study the factorial invariance of a set of measures (Widaman & Reise, 1997). Using this multiple-group CFA approach, the investigator can test whether a consistent relation holds between the underlying factors and their observed indicators across age levels. Factorial invariance of this type is evidence that the same theoretical constructs are assessed at the different age levels. Moreover, researchers may then investigate differences in mean level and variance on the latent variables identified, as well as the structural relations among the latent variables. In the future, applications of item response theory methods, which are related to CFA models (Reise, Widaman, & Pugh, 1993), offer hope of establishing the comparability of the metric of measured variables across age levels, a problem that continues to plague the field.

Another application of SEM that has special relevance to developmental research is the specification of growth curve models. Under this approach, data from multiple times of measurement are the primary measured variables, and the latent variables that are specified represent both initial level at the first time of measurement and growth since the first time of measurement. Because individual differences in both level and growth are identified in this manner, variance on these latent variables may be predicted from other variables in the model. In this way, the investigator may find the key explanatory variables that account for individual differences in initial level and subsequent growth in a particular behavior of interest. Contributions in this vein continue to mount, and fruitful approaches for dealing with planned or unplanned missing data, a common woe in longitudinal studies, are being developed.

Yet another approach to the identification of level and growth factors within longitudinal data is a generic approach often identified as hierarchical linear modeling (HLM) (Bryk & Raudenbush, 1987, 1992). HLM recognizes the hierarchical structure of data. For example, children are nested within families, families are nested within socioeconomic strata, and so forth. In a longitudinal study, measurements at different ages are nested within individuals, so initial level and growth can be represented in HLM models, along with predictors of both initial level and subsequent growth. Whether SEM or HLM models are able to fit easily or well growth data in which individuals may have different intercepts, growth rates, and asymptotes is a topic for future research.

Another statistical model that will be of increasing importance for developmental psychology goes by the name of survival analysis (Willett & Singer, 1997). Here, an important transition or event—such as dying or dropping out of school—is the outcome variable.

The survival model represents the likelihood or probability of the event as a function of age, and covariates may be added that affect the likelihood of occurrence. Although survival modeling is rare in developmental research, applications of the method are almost certain to increase in the future.

Advances have been made in representing qualitative developmental advances as well. For example, Collins and Cliff (1990) discussed a longitudinal extension to the Guttman scale for representing unitary, cumulative development. In 1997, Collins and colleagues (Collins, Graham, Rousculp, & Hansen, 1997) developed computer programs and analytic procedures for latent class analysis and latent transition analysis (LTA). LTA is useful for representing the unidirectional changes that characterize certain domains of behavior, such as stages of drug use or stages of arithmetic competence. LTA yields probabilities of making the transition from one level or stage to another more advanced stage and can test assumptions of lack of regressions to earlier levels or stages. Moreover, covariates can be included that explain individual differences in probabilities of stage transition.

One common requirement of all of the preceding new methods of analysis is the need for large sample sizes. This is perhaps the single largest stumbling block to widespread, confident use of these methods, as the standards in the field—given the temporal and monetary expenses associated with longitudinal studies—are for sample sizes that are not optimal for the application of sophisticated methods of analysis. With the elegant methods of analysis that have been and are being developed, the field of developmental psychology will be well equipped to understand growth, stability, and decline across the life span in unprecedented ways if a solid commitment is made to collection of adequate measurements on samples of adequate size.

Summary

The research methods used in developmental psychology are undergoing tremendous change, abetted by the invasion of the statistical methodologists. Continuing advances in the design of studies, the construction of measures and their proper scoring, and the methods used to analyze data promise exciting advances in the substantive understanding of the growth and development of individuals across the life span.

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Keith F. Widaman

DEVELOPMENTAL SCIENCE. A common characteristic of scientific progress in empirical disciplines is increasing specialization. In natural sciences, when specialization has reached a certain stage, the engaged researchers recognize that the important next step for further understanding of the structures and processes with which they are concerned is in integration with neighboring disciplines. An important step forward for understanding and explaining the function and development of the physical world was taken when specialization in physics and chemistry as distinctly different disciplines was followed by integration in the interface of the two and the establishment of a new field: physical chemistry. During the last decades of the twentieth century, the most important scientific progress has taken place in the interface, first, of chemistry and biology, and later of chemistry, physics, and biology, all highly specialized fields. The characteristic iterative process of specialization and integration can be seen in the contributions to scientific progress that have been awarded Nobel prizes during the postwar period.

A prerequisite for this iterative process has been the fact that subdisciplines in natural sciences function within the same common general model of nature. Since the end of the seventeenth century, the Newtonian model of the physical world served two interrelated general purposes: (a) it offered a common theoretical framework for planning and implementation of empirical research on specific problems; and (b) it offered a common conceptual space for effective communication among researchers concerned with problems at very different levels of the total universe.

An Emerging Scientific Discipline

The way that the total system of mental, biological, behavioral, and social factors functions in a specific situation is the result of a developmental process, starting at conception. From the beginning, constitutional factors form the potentialities and set the restrictions for

nested developmental processes of maturation and experiences. The characteristic features of these processes are determined in a continuous interaction among mental, biological, and behavioral person-bound factors and social, cultural, and physical characteristics of the environment.

The overriding goal for scientific psychology is to contribute to the understanding and explanation of why individuals think, feel, act, and react as they do in real life, and to understanding and explaining the developmental background to the current functioning of individuals at different stages of the life course. For effective research toward this goal, the view of individual functioning and development briefly summarized here has two consequences. First, knowledge from a number of specialized scientific disciplines must be considered. The total space of phenomena involved in the processes of lifelong individual development forms a clearly defined and delimited domain for scientific discovery, which constitutes a scientific discipline of its own: developmental science (Magnusson & Cairns, 1996). Accordingly, developmental science refers to “a fresh synthesis that has been generated to guide research in the social, psychological, and biobehavioral disciplines” (Carolina Consortium on Human Development, 1996, p. 1). This domain is located in the interface of developmental psychology, developmental biology, physiology, neuropsychology, social psychology, sociology, anthropology, and neighboring disciplines. Indications of the relevance of this proposition appear at an increasing pace. Under the auspices of the Royal Swedish Academy of Sciences, which is responsible for most of the Nobel prizes, and funded by the Nobel Foundation, a symposium was held in 1994 that clearly demonstrated the motives for the new discipline (Magnusson, 1996). The establishment of the Center for Developmental Science at the University of North Carolina in Chapel Hill (Cairns, Elder, & Costello, 1996), and the newly established scientific journal, *Applied Developmental Science*, are among other manifestations of this development.

Second, for research in this new field to be effective, it needs a common theoretical framework, serving the same purposes as the common theoretical framework in natural sciences. Such a theoretical perspective has to consider the proposition that the individual functions and develops as an integrated whole, and is part of an integrated person-environment system, that is, it must take on a holistic perspective (Magnusson, 1995).

A Holistic Perspective. A modern holistic view emphasizes an approach to the individual and the person-environment system as organized wholes, functioning as integrated totalities. The individual develops as an integrated, complex, and dynamic organism, and the individual is an active, purposeful part of an integrated, complex, and dynamic person-environment sys-

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tem. At each level, the totality derives its characteristic features and properties from the interaction among the elements involved, not from the effect of each isolated part on the totality. Each aspect of the structures and processes that are operating (perceptions, plans, values, goals, motives, biological factors, conduct, etc.), as well as each aspect of the environment, takes on meaning from the role it plays in the total functioning of the individual.

Two comments are pertinent here. First, the role and functioning of a holistic model is not to offer a specific hypothesis or an explanation for all problems. The Newtonian model did not answer all questions in natural sciences about the structure and functioning of the physical world, but it served the two purposes summarized earlier. The same role would be played by a holistic model of individual functioning and development. Second, the holistic, integrated model for individual functioning and individual development does not imply that the entire system of an individual must be studied in every research endeavor. Acceptance of a common model of nature for research in natural sciences has never implied that the whole universe should be investigated in every study.

The Modern Holistic Model. A holistic view, that is, making the individual the organizing principle for individual functioning and development, is not a new idea in scientific psychology. During the first part of the twentieth century, some of the most distinguished psychologists, among them Gordon Allport, Alfred Binet, Wilhelm Stern, Egon Brunswik, and Kurt Lewin strongly argued, from different perspectives, for a holistic position. However, for a long time, the propositions put forward had little if any impact on empirical psychological research. A main reason for this state of affairs was that the traditional holistic model lacked specific content about the functioning and interplay of basic psychological, biological, and social elements operating in the processes of the integrated organism. What occurred between the stimulus and the response was regarded as unknown and inaccessible for scientific inquiry; it was concealed in the black box.

However, later in the twentieth century, the holistic perspective was enriched in a way that not only emphasized the old claim for the necessity of a holistic approach to psychological inquiry, but also helped turn such an approach into a solid theoretical foundation for planning, implementing, and interpreting empirical research on specific problems.

The new scenery is the result of influences from four main interrelated sources.

1. For a long time, a consequence of the postwar dominance of stimulus-response models was the neglect of mental processes. However, since the 1960s, research on information processing, memory, and decision making has made dramatic progress, and has

contributed essential knowledge to the understanding and explanation of individual development and functioning.

2. During the last decades of the twentieth century in biological and medical sciences developments have helped fill the empty holistic model with new content from three main interrelated directions.

- The first contribution concerns detailed knowledge about the brain, how it develops from conception over the life span in a process of interaction between constitutional factors and context factors, and how it functions at each stage of development, as an active organ, selecting, interpreting, and integrating information from the environment. The rapid development of research on brain functioning and its role for understanding mental processes has helped bridge the gap between biological and psychological models that had obstructed a deeper understanding and explanation of mental and behavioral processes (Barinaga, 1997).
- The second contribution lies in new insights into the role of internal biological structures and processes in the total functioning and development of individuals. Research into the role of biochemicals in the developmental processes of individuals, and in the individual's way of dealing with current situational-environmental conditions is developing at an increasing pace (Susman, 1993).
- Third, research in molecular biology, fostered by the discovery of DNA, has opened up new perspectives for understanding the mechanisms behind genetic factors in developmental processes.

3. The third important source for the application of a holistic perspective in psychological research lies in the general modern models that have been developed in the natural sciences for the study of dynamic, complex processes. In psychology, the most influential of these models has been the general systems theory (Thelen, 1989). The modern models for dynamic complex processes are important for research on developmental phenomena in several interrelated respects.

- The models emphasize the holistic, integrated nature of dynamic, complex processes. At all levels, the systems involved in the total person-environment system are undivided in function.
- The models emphasize the interactive, often nonlinear character of the processes within the organism and in the organism's interaction with the environment.
- The interactive character of dynamic processes means that the models highlight the concept of context. The role of context is important for understanding individual development at all levels of the total system, from the cellular level to the individual's interaction with the environment. In most developmental research, the concept of context has been used to denote the environment in which an individual grows up and functions (Lerner & Kauffman, 1985). The de-

developmental science perspective draws the attention to a broader view of the role of context.

- The models provide a theoretical basis for the development of effective methodological tools for the investigation of the interactive, dynamic processes underlying individual functioning and development. The basis for the claim that the processes of individual development are accessible to systematic, scientific inquiry is that these processes are not random: They occur in a specific way within organized structures and are guided by lawful principles. In natural sciences the formulation of the new models has led to a strong methodological development. It is important for further real progress in psychological research that we create methodological tools appropriate to the nature of the phenomena of primary concern in developmental science.

4. The fourth main source lies in the revival of longitudinal research. Inadequacies of the piecemeal or variable-oriented approach to the study of developmental issues become obvious in well-planned longitudinal studies that track individuals over time and contexts. Such a design is necessary for understanding developmental processes for a number of reasons. One is that operating factors necessarily shift over time, both with respect to which factors operate, their distinct character per se, and their significance and role in the total integrated interactive processes of the individual. It is only the organism that remains distinct and identifiable.

The Holistic Perspective in the Mainstream of Life Sciences Research. The definition of developmental science as a well-defined field for scientific inquiry rests on the holistic view of individual functioning and development. This view is in line with developments in other disciplines concerned with dynamic, complex processes, for example, meteorology, ecology, chemistry, and biology.

The contributions from cognitive research, research in biology and medicine, modern models for dynamic complex processes, and longitudinal research have enriched the old holistic view of individual development in a way that makes it a fruitful theoretical framework for planning, implementing, and interpreting empirical research in the field of developmental science. The modern holistic view offers us a stable platform for further scientific progress in developmental science, enabling us to fall into step with what happens in other scientific disciplines in life sciences.

The Role of Psychology in Developmental Science

The proposition that research on individual development constitutes a field of research with its special demands on theory, methodology, and research strategy, does not mean that psychology loses its identity as a

scientific discipline. Physics, chemistry, and biology did not lose their special merits as a result of new developments in the interfaces among them. Rather, by contributing essential knowledge to the field of developmental science, psychology strengthens its position as an active partner in the mainstream of scientific progress in the life sciences.

[Many of the people mentioned in this article are the subjects of independent biographical entries.]

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David Magnusson

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Hopkins University, where he studied the “new” physiological psychology with G. Stanley Hall (1844–1924) and logic with Charles S. Peirce (1839–1914). Given his interest in Charles Darwin, G. W. F. Hegel, and liberal Congregational theology, however, Dewey gravitated to the third member of the department, George S. Morris (1840–1889), whose “dynamic idealism” was inspired by Hegel. On completion of his doctorate in 1884, Dewey was hired as an instructor at the University of Michigan. Except for a brief appointment at the University of Wisconsin, he remained at the University of Michigan for the next 10 years. In 1886, he married Harriet Alice Chipman (1858–1927). Their daughter Jane would later write that Alice was instrumental in awakening in Dewey a critical attitude toward religious dogma and social injustice. Alice Chipman Dewey died in 1927. In 1946, Dewey married Roberta Lowitz Grant (1904–1970), and in 1948 they adopted two young children. Dewey died on 1 June 1952 at his home in New York City.

Dewey’s earliest articles on psychology attempted to reconcile the idealism of Morris with the new experimental psychology of Hall. The full-frontal attacks on dualism that would be a central feature of his later work were already present during this period. He rejected the theories of the British empiricists on the grounds that they treated the elements of sensation as prior to experience rather than as products of reflection upon it. Psychology must start with experience, he argued, and it is only afterwards that the relations between subject and object can be isolated. The task of the psychologist is to show how these relations arise out of consciousness.

In his *Psychology* (1886), the first textbook for the “new” psychology published by an American, Dewey continued his efforts to reconcile Hegelian idealism with experimental psychology. Both Hall and William James criticized Dewey’s approach, however, because of its attempt to rescue idealism and its reliance on “soul” as a psychological concept. Although Dewey’s text was widely adopted, it was soon supplanted by others, including James’s own *Principles of Psychology* (1890).

Dewey’s revisions of his *Psychology* exhibited his steady movement away from idealism and toward an evolutionary naturalism that emphasized the adjustment of the individual within its environment. This was a part of the growing momentum toward what would later be known as functional psychology.

In 1894, Dewey accepted a position at the new University of Chicago as head of the department of philosophy, which included psychology and pedagogy. His plans for an educational laboratory, which would be to education as a scientific laboratory was to scientific practice, were realized when the “Laboratory School,” also known as the “Dewey School,” opened its doors in

1896. Dewey used his laboratory to refine his functional psychology, his ethical theory, and his concept of democracy, all of which he saw as intimately connected to his educational research.

Dewey later wrote that William James’s *Principles of Psychology* exerted a major influence on his work during this period. Like James, Dewey now rejected the idea of a substantive consciousness or ego. He argued instead that consciousness is a “stream” of overlapping interests, memories, and habits. From the first, Dewey’s psychology had been organic and evolutionary. Now, as ethics supplanted religion in his thought, it became increasingly naturalistic and social. His opposition to mind-body dualism remained, but its basis shifted from idealism to an instrumentalist form of pragmatism. “Mental entities” were now treated as tools, products, and byproducts employed by the organism to effect adjustment.

Although William James’s essays from the 1880s had exhibited functionalist themes, it is Dewey’s essay “The Reflex Arc Concept in Psychology” (1896) that is generally recognized as the official debut of functionalism in psychology. Instead of attempting to describe basic elements of thought, the laws of their combination, and their neurophysiological correlates, as E. B. Titchener (1867–1927) was doing as a part of his structuralist/introspectionist program at Cornell, Dewey focused on the behavior of the organism as a whole as it adapts itself to changing environmental conditions and as it reconstructs those conditions to meet its changing needs. His “Reflex Arc” essay held that stimulus and response are not separate but a coordination, and that a stimulus is not external to the organism but one of its states. It may be fair to say that Dewey was absorbing structuralism rather than rejecting it out of hand. He was prepared to recognize “elements” and “laws” of thought, but only as provisional working tools utilized by the adjusting organism, and not as existing prior to inquiry, as the structuralists claimed.

In 1942, the editors of *The Psychological Review* asked “seventy prominent psychologists” to rank the top five essays published in the journal during its first 49 years. Dewey’s “Reflex Arc” essay was ranked first (H. Langfeld, *Psychological Review*, 1943, 50, 143–155).

“Psychology and Social Practice,” Dewey’s presidential address at the 1899 meeting of the American Psychological Association, and a companion piece, “Psychology and Philosophic Method” (1899), exhibit still further developments in his understanding of psychology and its relation to philosophy. In these essays, Dewey attacked attempts to construct a science of the psyche isolated from its social conditions.

Thirteen years earlier, in 1886, Dewey the idealist had argued that philosophy is the science of absolute self-consciousness, and that psychology is the science

of the manifestation of absolute self-consciousness in the consciousness of individuals. He had consequently characterized psychology as the completed method of philosophy. By 1899, however, as a result of his reading of William James, his collaboration with the Chicago philosopher-sociologist George Herbert Mead (1863–1931), and his educational research, Dewey the pragmatist had jettisoned the notion of absolute self-consciousness. He had come to view psychology as the social science that studies what he called “sociable” (or socializable) individuals and the ways in which conscious value and meaning are and can be introduced into human experience. His interest now centered on the reconstruction of the habits and character of social individuals and the reform of cultural institutions. His psychology now had profound implications for the philosophy of science, education, and democracy.

In 1904, following disagreements with President William R. Harper (1856–1906) concerning support for his laboratory school, Dewey resigned his position at the University of Chicago. He quickly accepted a position at Columbia University, where he taught regularly until his appointment as Professor Emeritus of Philosophy in Residence in 1930. He entered full retirement in 1939. During these years, Dewey traveled and lectured widely. He spent 2 years in Japan and China and visited schools in the Soviet Union, Mexico, and Turkey. In 1937, at the age of 78, he served as chair of the “Trotsky Commission” hearings in Mexico City, which gave the exiled Trotsky a public venue for defending himself against trumped-up charges brought by Stalin in Moscow.

Although all of Dewey’s major works during this period have significant implications for psychology, the only work he devoted specifically to the subject was *Human Nature and Conduct* (1922). Responding to what he regarded as the conservatism of the political left (which assumed an “acquisitive instinct”), the political right (which glorified social Darwinism), and evangelical Christianity (which emphasized original sin), Dewey rejected the term “instinct” because of its implication of something well organized. In its place he proposed the term “impulse,” by which he understood something loose and undirected. When impulses are directed and informed, however, they become the basis of habitual behavior. Conflict of habits releases impulses, and this requires the modification of habits.

Dewey thus emphasized the plasticity of habits and their centrality in learning and the formation of character. He therefore rejected the idea that innate qualities are indicators of a fixed intelligence. He was particularly critical of the tendency of psychoanalysis to transform, as he thought, social results into psychic causes. He continued to stress his rejection of a substantial mind, soul, or psyche that precedes action. He

thought that such a conception tends to isolate humans from nature and individuals from one another.

Dewey’s treatment of instincts and habits was attacked by some, such as William McDougall (1871–1938) who argued that Dewey’s rejection of a fixed taxonomy of instincts had undercut the possibility of systematic psychology and that he had failed to provide adequate criteria for distinguishing active from passive habits.

In “Conduct and Experience” (1930), Dewey recapitulated many of the psychological themes that he had developed during the 34 years since the “Reflex Arc” essay. He attacked both introspectionism and behaviorism, which he regarded as extremes of psychological theory. Introspectionists, such as Wilhelm Wundt (1832–1920), cast their net too widely, he argued, by failing to recognize that classification always involves interpretation. Transaction between organism and environment is the primary fact of experience, and differentiation of the structural features of experience, including differentiation into subject and object, follows selective abstraction. Behaviorists, on the other hand, such as John B. Watson (1878–1958), cast their net too narrowly by claiming that immediate stimulus-response features of behavior exhaust experience. Behavioral acts are always nested within a life career, or what Dewey termed “conduct.” Avoiding both extremes, he argued that the subject matter of psychology is “the behavior of the organism so far as that is characterized by changes taking place in an activity that is serial and continuous in reference to changes in an environment that persists although changing in detail.” Put another way, “psychology is concerned with the life-career of individualized activities” (Dewey, *The Later Works*, Vol. 5, p. 224).

Remarkably, Dewey took little notice of the work of his contemporary, Sigmund Freud (1856–1939). The stark contrast between their views, nevertheless, helps put Dewey’s work in perspective. Freud argued for fixed psychic structures, emphasized the central role of sexual drives in the formation of personality, held that liberation is possible only through analysis of the past, and set out an authoritarian social psychology. Dewey, on the other hand, argued for the plasticity of the organism, rejected the notion of fixed instincts and drives, emphasized the consequences of conscious habit formation for future growth, and set out a democratic social psychology.

Among Dewey’s most significant contributions to psychology, then, were his devastating arguments against subject-object dualism; his stress on the plasticity of habits, especially those of young children; and his insistence that there can be no psychology of the individual apart from environmental factors, including those that involve education and ethics.

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Larry A. Hickman

DIABETES is a chronic medical condition that affects 16 million people in the United States, half of whom are unaware that they have the disease according to the National Diabetes Data Group (*Diabetes in America*, 1995). Each year more than 169,000 deaths are attributed directly to diabetes and many more deaths occur as a result of its complications (NIDDK, *Diabetes Statistics*, NIH Publication No. 96-3926, 1995). Furthermore, the financial burden of diabetes in terms of health care costs, lost wages, and lost productivity is estimated at 92 billion dollars annually (American Diabetes Association, 1993). While there is no cure for diabetes, it can be treated. The importance of behavioral factors for the effective management of diabetes makes it a topic of interest to psychologists.

Description and Classification

Diabetes mellitus is a term that refers to a group of heterogeneous disorders that are characterized by a defect in insulin secretion or action. Insulin is a hormone secreted by the pancreas that is necessary in order for

most cells of the body to be able to take up and utilize glucose as energy. The absence of adequate insulin action results in a chronically elevated level of glucose in the bloodstream known as hyperglycemia, the major diagnostic criterion for diabetes. Early signs of diabetes include frequent urination (a result of hyperglycemia), constant thirst due to water loss, and glycosuria or sugar in the urine. In fact, the word diabetes means "passing through" and mellitus means "sweet" so the name of the disease actually refers to one of its common symptoms, sweet urine. Other symptoms of diabetes include weight loss and fatigue, which can result from the body's need to break down protein, fat, and glycogen (a form of carbohydrate stored in muscle) for energy. There are two major types of diabetes mellitus: Type 1 and Type 2 diabetes.

Type 1 or insulin-dependent diabetes mellitus (IDDM), has an estimated prevalence of 500,000 to 1 million and an annual incidence of 30,000 in the United States. IDDM is nearly twice as prevalent in Whites as compared to Blacks or Hispanic Americans and is rare among Asian Americans (National Diabetes Data Group, *Diabetes in America*, 1995). The onset of IDDM usually occurs during childhood or early adolescence, which is why it is sometimes called "juvenile diabetes." However, the distinguishing feature of Type 1 diabetes is the complete or near complete absence of endogenous insulin secretion, necessitating that persons with IDDM take daily insulin injections to survive. Without insulin, the body is forced to break down protein and fat for energy, producing byproducts called ketones, which are weak acids. Left untreated, the eventual outcome of this process, known as ketoacidosis, is coma and finally death. The mechanism by which insulin is depleted in IDDM is now widely understood to be the gradual destruction of the insulin-secreting pancreatic beta cells by the body's own immune system. The etiology of the disease is not entirely clear, although it appears that as yet unidentified environmental factors may be at least as important as genetic variables.

The most common form of diabetes is Type 2 or non-insulin-dependent diabetes mellitus. Type 2 diabetes accounts for 90 to 95% of all diagnosed cases of diabetes in the United States with approximately 595,000 new cases being diagnosed annually. Compared with Whites, the prevalence of Type 2 diabetes is about two times greater in Blacks and two to three times greater in Hispanic Americans. Asian Americans also show greater rates of Type 2 diabetes as do Native Americans, though rates vary widely by tribe. The Pima Indians have the highest prevalence rate of Type 2 diabetes in the world at 50% (National Diabetes Data Group, 1995). Typically the onset of Type 2 diabetes occurs in adulthood and its prevalence increases with age. So as the average life expectancy continues to rise, Type 2 dia-

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betes will become increasingly common. Unlike Type 1 diabetes, insulin secretion is not absolutely compromised in Type 2 diabetes, which means that insulin taking is not strictly necessary for these patients. The nature of the defect in Type 2 diabetes appears to be heterogeneous, so that for some patients the primary problem is reduced insulin secretion, while for other patients insulin resistance or the body's lack of response to insulin may be primary. The etiology of Type 2 diabetes seems to involve a very strong genetic component, but environment is also important as evidenced by the strong relationship between obesity and Type 2 diabetes.

Diabetes is associated with a variety of potential complications, some of them related to acute changes in blood glucose and others that develop over time. As mentioned previously, a lack of insulin will cause extremely high blood glucose levels and may result in ketoacidosis in Type 1 patients. A blood sugar level that is too low, or hypoglycemia, can also result in an acute crisis. Early signs of hypoglycemia include trembling, sweating, and headache, and if left untreated confusion, seizures, and even a loss of consciousness can occur. Most of the complications of diabetes, however, are long-term ones. Specifically, people with diabetes are 25 times more likely to develop blindness, 17 times more likely to get kidney disease, 30 to 40 times more likely to undergo a major amputation and twice as likely to develop coronary artery disease as compared to people without diabetes. Since complications have been linked to chronic hyperglycemia, the best way to delay or even prevent the long-term complications of diabetes is by maintaining good metabolic control. Therefore, treatments that help control high blood sugar are of vital importance in reducing the morbidity and mortality associated with diabetes.

Treatments

All patients with Type 1 diabetes must take several injections of insulin daily. In order to give themselves the appropriate dose they must repeatedly measure their blood sugar level by pricking their finger and analyzing the blood with a portable glucose meter. Now the option of using an insulin pump, a device that delivers a measured dose of insulin through a catheter, is available. The pump may be more convenient than having to carry around syringes and vials of insulin. Insulin is not required in Type 2 diabetes, but certain patients with Type 2 diabetes may still need to use insulin for adequate glycemic control.

There are several different types of drugs that can be taken orally to help lower blood glucose in Type 2 diabetes. Sulfonylureas are probably the most common group of drugs used to treat diabetes and work primarily by stimulating insulin release from pancreatic beta cells. Metformin belongs to the class of drugs

known as biguanides, and it works by reducing glucose production by the liver and increasing peripheral uptake of glucose. Alpha-glucosidase inhibitors are compounds that reduce the breakdown and therefore absorption of carbohydrate so that the rise in blood glucose after a meal is attenuated. Finally, thiazolidinediones (such as troglitazone) are new groups of drugs that work by reducing insulin resistance. While oral agents can significantly improve glycemic control in people with Type 2 diabetes, they also have some risks, including side effects and an increased chance of having a hypoglycemic episode.

In the past, people with diabetes were instructed to eat a high-fat, low-carbohydrate diet since carbohydrate results in a higher postmeal increase in blood glucose. However, it is now known that a high-fat diet increases the risk for heart disease. Therefore, the current recommendation is to eat a balanced diet rich in complex carbohydrates and fiber with no more than 30% of calories from fat. This type of balanced diet has been shown to maintain or improve metabolic control in Type 2 diabetes patients. Careful attention to the timing and size of meals is also important, particularly for Type 1 diabetes. Skipping meals could lead to hypoglycemia in persons with Type 1 diabetes or in persons with Type 2 diabetes who are on oral agents. Eating too much, on the other hand, can result in hyperglycemia unless the insulin dose is adjusted properly. Overeating is a particular problem for patients with Type 2 diabetes because the majority of this group are overweight. In these patients, a reduced-calorie diet designed to produce weight loss can help improve their glycemic control.

Regular physical activity can be very beneficial in diabetes since it improves insulin sensitivity and therefore reduces insulin requirements. This is of great benefit to people with Type 2 diabetes since insulin resistance is one of the main defects of their illness. Also, regular exercise can promote weight loss, which also significantly reduces insulin resistance. People with Type 1 diabetes must pay attention to any changes in their level of physical activity so that they can adjust their insulin dose accordingly.

Psychological and Behavioral Issues

Noncompliance with diabetes self-care has been identified as a behavior that can interfere with successful treatment. Examples of noncompliance could include not taking medications, improperly administering insulin, or not following the diabetes diet. It appears that some form of noncompliance is present in a large proportion of diabetes patients and that compliance is a multidimensional concept. This means that the level of adherence to the many different behaviors that constitute a diabetes regimen are independent of one another. For example, it has been found that the failure

to take insulin is extremely rare among children with Type 1 diabetes, but that failure to follow the diet is much more common. This may be because not taking insulin can have serious immediate consequences whereas dietary indiscretions may not. In general, it seems that modifications like diet and exercise are harder to maintain than taking pills or insulin.

A good deal of attention has been focused on how to enhance adherence to the diabetes regimen. The developmental stage of the patient must be considered when determining how to maximize compliance. For example, in children the family plays a big role in both administering care and encouraging self-care, so a stable family environment must be fostered. Adolescents often show very high rates of noncompliance due to a desire to fit in with their peers and for them a combination of education and peer social skills training has shown to be helpful. Education about diabetes and about how to manage it properly is important, but alone it will not improve compliance. Combining education with reminders, behavior-cueing, social support, and the use of contingency contracts seems to result in improved compliance. A relatively recent innovation in diabetes care is home glucose monitoring, which allows the patient to get frequent accurate feedback about his or her level of control. Some research has found that increased compliance with glucose monitoring can result in better diabetes control. However, this has not always been found, maybe because some people simply check blood sugar without making adjustments in care in response to the sugar values.

The term *compliance* implies a passive patient who does as he or she is told, and this is unfortunate because the patients with the best outcomes are those who form a partnership with their doctor in determining their care. For this reason, many psychologists prefer to use the term *adherence* rather than compliance. Mutual agreement on the care regimen predicts compliance and better glycemic control, possibly because the patient feels more involved and in charge of his or her health. Also, it is obvious that even perfect compliance with a poorly planned regimen will not be beneficial, therefore, both doctor and patient must work together and exchange information about how well a treatment is working. With this type of cooperation, adherence and therefore glycemic control can be enhanced.

Stress may play a role in both the etiology and the treatment of diabetes. The main way that stress impacts diabetes is by triggering the body's so-called fight or flight response, which mobilizes the body's energy resources. One component of this response is an increase in blood glucose. Normally, the excess glucose is readily taken up into the cells for use as energy, but in diabetes, due to ineffective insulin action, the glucose just accumulates in the bloodstream. Therefore, in people who

are at risk for diabetes, stress may trigger the onset of the disease. In fact, some researchers have found an association between major life changes and the onset of Type 1 diabetes. Similarly, anecdotal reports of a highly stressful event preceding the onset of Type 2 diabetes are common. While these observations suggest that stress may contribute to the development of diabetes, it is important to point out that stress by itself cannot cause diabetes in the absence of a preexisting genetic vulnerability.

In persons who have diabetes, stress has the ability to worsen their condition. It is well known that physical stressors such as illness or surgery result in increases in blood glucose. Research has shown that for many people with diabetes psychological stressors can also be associated with exacerbations of hyperglycemia. The hyperglycemic effect of stress could be due to its physiological effects, but stress may also indirectly cause a worsening of diabetes by reducing compliance. So, while under stress, people may be more likely to skip their daily exercise, go off their diet, or otherwise neglect aspects of their diabetes care regimen.

A few studies have attempted to determine if behavioral interventions such as progressive muscle relaxation can reduce stress and therefore improve glycemic control in people with diabetes. While the results are mixed, it appears that for some people relaxation training does result in improvements in their diabetes. One study found that improvements in glycemic control after relaxation training could be predicted by a high score on a measure of trait anxiety. Therefore, it may be that only diabetes patients with certain personality characteristics benefit from stress management.

People with diabetes have a higher prevalence rate of depression than the general population. The fact that both Type 2 diabetes and depression are more prevalent in older people may in part account for this. Depression may also result from the psychological impact of having diabetes itself, so, people with diabetes may have disabling complications from their disease or feel overwhelmed by the complex task of managing their illness from day to day. Depression is often found to be more common among people with medical illnesses, and it is not yet clear whether the rate of depression in diabetes is actually higher than the rate in other chronically ill populations. Depression, however, may be particularly relevant to diabetes because of certain physiological effects associated with it.

Several stress hormones that oppose the action of insulin are elevated during a period of clinical depression. It has been shown that even in people without diabetes, depression causes insulin resistance. Since people with diabetes already have problems with glucose metabolism, depression may cause a worsening of their diabetes. Depression could also have an impact on diabetes control by reducing self-care behaviors. Some

of the symptoms of depression can include fatigue, inactivity, and changes in appetite. It is conceivable that these depressive symptoms could negatively impact patient adherence to the diabetes regimen. Therefore, the accurate diagnosis and treatment of depression in diabetes could be very important in maintaining good metabolic control.

Conclusion

Diabetes is a serious chronic illness with tremendous personal and social impact. Although it is a medical condition, optimal treatment of diabetes demands the consideration of behavioral and psychological issues. These issues include, but are not limited to, increasing adherence to diabetes self-care behaviors, minimizing the impact of stress, and recognizing and treating depression in diabetes. Psychological research has played an important role in helping to understand diabetes and will undoubtedly continue to contribute toward the greater goal of achieving the best possible quality of life for people with diabetes.

[See also Nutrition.]

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Priti I. Parekh and Richard S. Surwit

DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS. Mental disorders are clinically significant impairments in one or more areas of psychological functioning, including (but not limited to) thinking, feeling, eating, sleeping, and other important components of behavior (Wakefield, 1992). The *Diagnostic and Statistical Manual of Mental Disorders (DSM)* is a nomenclature of mental disorders developed by the American Psychiatric Association (*DSM-IV*, 1994). What is included within and excluded from the *DSM* and how these mental disorders are diagnosed are of substantial importance, as many social, clinical, forensic, and scientific decisions are informed by this text. Persons within society seeking guidance with respect to whether a behavior pattern is or is not a mental disorder, will usually turn to the *DSM*, and there have been many difficult, controversial decisions (e.g., whether or not certain instances of homosexuality, serial rape, or premenstrual syndrome should be considered to be a mental disorder). The substantial impact of the *DSM* on social and clinical decisions is often bemoaned, even by the authors of the manual (Pincus, Frances, Davis, First, & Widiger, 1992). This is because scientific support for many of the *DSM* diagnoses is often less than it might be given the social and clinical importance of the diagnoses. The manual is reasonably consistent with current scientific research, but none of the diagnostic criteria sets are infallible. There continue to be important questions regarding the validity of all the disorders listed in the manual (Pincus et al., 1992).

A common, uniform diagnostic nomenclature is a necessity within clinical practice. Communication among clinicians regarding etiology, pathology, and treatment of psychopathology is exceedingly difficult in the absence of a common language. Prior to the development of a standard nomenclature, hospitals, clinics, and even individual clinicians were using a wide variety of inconsistent diagnoses. Therefore, in 1917 the American Medico-Psychological Association (which in 1921 became the American Psychiatric Association) developed a list of 22 disorders for use within hospital settings (Grob, 1991). The list was adopted by most hospitals until 1935, when a revised and expanded version was included within the second edition of the American Medical Association's (AMA) classification of diseases.

The AMA's classification, however, was not adopted unanimously by all social agencies, in part because it was confined to conditions of importance within inpatient settings. Its limitations became particularly evident during World War II, with the occurrence of many acute disorders that were not recognized within the AMA classification. By the end of World War II, the Army, Navy, and Veterans Administration had all developed their own classification systems (Blashfield, 1984; Grob, 1991).

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There was also a need internationally for a common language of psychopathology. The diversity of nomenclatures within the United States paled in comparison to the diversity around the world. Therefore, in 1948, the World Health Organization (WHO) included a section devoted to the diagnosis of mental disorders in the sixth edition of the *International Classification of Diseases* (ICD-6). The ICD-6, however, also failed to be adequate for clinicians treating the casualties of World War II. Notably absent were many of the personality and adjustment disorders that were frequently being seen in veterans' hospitals. In 1952 the American Psychiatric Association developed a version of the ICD-6, which became the first edition of the *DSM*, for the application of ICD-6 within the United States (Blashfield, 1984; Grob, 1991).

Although the mental disorders section of ICD-7 was essentially identical to ICD-6, the authors of ICD-8 anticipated substantial revisions to ICD-7. The American Psychiatric Association (APA) therefore determined that it would be advisable to revise *DSM-I* in coordination with ICD-8. It was important to revise the *DSM* so it was compatible with the ICD. But it was also important to influence the ICD revision to increase its consistency with the *DSM* (Frances, Pincus, Widiger, Davis, & First, 1990). Coordination with the ICD is essential for international communication and for meaningful membership and participation within the WHO.

The impetus for *DSM-III* was the development of ICD-9. By this time, however, the diagnosis of mental disorders was receiving substantial criticism (Blashfield, 1984). One fundamental concern was the unreliability of clinicians' diagnoses. If a patient's symptomatology received different diagnoses from different clinicians, there was unlikely to be much validity to the diagnoses (e.g., if two clinicians provide different diagnoses, at least one of them is likely to be wrong). *DSM-II* had not been particularly helpful in addressing this problem (Blashfield, 1984; Spitzer, Williams, & Skodol, 1980). The diagnostic criteria provided within the manual consisted of only brief, narrative descriptions of each disorder. There was no indication of which of the descriptors were necessary and which were optional, and there was no guidance as to how to interpret or apply the criteria in clinical practice. Many researchers, therefore, developed their own diagnostic criteria for the disorders included within the *DSM-II*. They indicated empirically that the reliability of mental disorder diagnoses can be obtained if ambiguities within the criteria set are removed and interviewers systematically assessed and adhered to the criteria sets. The most influential of these efforts were the research criteria for 16 mental disorders developed by Feighner et al. (1972).

DSM-III, therefore, included relatively more explicit, specific diagnostic criteria for each disorder (Spitzer et al., 1980). Another innovation of *DSM-III* was the in-

clusion of more systematic and detailed information in the text discussion of each disorder concerning the associated features, course, complications, impairment, prevalence, differential diagnosis, sex ratio, familial pattern, and other information relevant to the diagnosis of the disorder. A third innovation was the inclusion of a multiaxial diagnostic system. Most of the mental disorders were diagnosed on Axis I. Axis II was reserved in *DSM-III* for personality disorders (and for specific developmental disorders), to ensure that clinicians not overlook the possible presence of a personality disorder when their attention is focused primarily upon a more acute, immediate condition. Axis III was for physical disorders, Axis IV for severity of psychosocial stressors, and Axis V for an assessment of the highest level of adaptive functioning during the past year (Spitzer et al., 1980). These additional axes were included to facilitate a recognition that an informative clinical assessment is not confined simply to the determination of which mental disorder is present.

DSM-III proved to be enormously successful, although it was not without substantial controversy. One of the major issues at the time was the proposed removal from the manual of particular psychodynamic concepts (e.g., neurosis) (Blashfield, 1984; Spitzer et al., 1980). Some felt that their removal reflected a political struggle between opposing theoretical perspectives (i.e., neurochemical versus psychodynamic psychiatry). Most of the original (Feighner et al., 1972) researchers were biologically oriented and some were indeed critical of psychodynamic theory and treatment. However, the decreasing impact of the psychodynamic concepts was also simply a valid reflection of the status of the scientific research.

However, the development of specific, explicit criteria also had limitations. It is much easier to provide general descriptions of mental disorders than it is to develop unambiguous diagnostic criteria. There is insufficient knowledge regarding most mental disorders for diagnostic boundaries to be defined so precisely that no diagnostic errors will occur (Clark, Watson, & Reynolds, 1995). Explicit, specific criteria are preferable to vague, general criteria because the source of errors are more readily identified. The authors of *DSM-III*, however, often had to develop specific inclusion and exclusion criteria in the absence of sufficient knowledge regarding the likely effects and even validity of these criteria (Widiger, Frances, Pincus, Davis, & First, 1991). For example, even before *DSM-III* was published in 1980, the authors recognized that the exclusion of the diagnosis of panic disorder in the presence of a major depressive disorder was a mistake (i.e., panic disorder can occur during the course of a major depressive disorder).

The American Psychiatric Association therefore authorized the development of a revision of *DSM-III* to correct the more obvious errors. This revision was not

coordinated with a forthcoming revision of the ICD, and was to be completed by 1985. By the time *DSM-III-R* was published in 1987, however, the WHO had begun work on the development of *ICD-10*. The year after *DSM-III-R* was published (Frances et al., 1990), work began on the development of *DSM-IV*, in collaboration with *ICD-10*. The authors of *DSM-IV* were also given an additional mandate to provide more explicit documentation of the scientific support for any revisions to the nomenclature (Frances et al., 1990). *DSM-III*, and perhaps to an even greater extent *DSM-III-R*, included a number of controversial diagnoses which may have lacked sufficient empirical support. Four diagnoses approved for inclusion by the authors of *DSM-III-R* were overturned by the board of trustees of the American Psychiatric Association, three of the diagnoses being included in an appendix to *DSM-III-R* (i.e., late luteal phase dysphoric disorder, self-defeating personality disorder, and sadistic personality disorder) and one was deleted entirely (i.e., paraphiliac rapism).

The authors of *DSM-IV* therefore developed a more explicit process by which decisions were made, emphasizing a systematic and comprehensive obtainment, review, and documentation of scientific, empirical support. This process included extensive reviews of the published literature, reanalyses of existing data sets, and field trials (Widiger et al., 1991). Only a few new diagnoses were given an official recognition in *DSM-IV* (e.g., acute stress disorder), many controversial proposals were placed within an appendix to the manual for proposals needing further research (e.g., premenstrual dysphoric disorder, factitious disorder by proxy, and dissociative trance disorder), and a few disorders that had been included in *DSM-III-R* that lacked sufficient empirical support were deleted (e.g., idiosyncratic alcohol intoxication).

Some degree of dispute and controversy with respect to the *DSM*, however, is perhaps unavoidable. *DSM-IV* is useful in providing a common language for mental health clinicians, but clinicians can vary widely with respect to their clinical perspectives and theoretical orientations, and it is difficult to develop a scientifically validated classification that is equally suitable for every theoretical perspective (Frances et al., 1990). Theoretical perspectives (Kaslow, 1996), professional organizations (Schacht & Nathan, 1977), and social interest groups (Caplan, 1995) have often felt inadequately represented or considered in the development of the *DSM*.

An additional difficulty is the pressure for the manual to be optimal for use across a wide diversity of settings (e.g., private practice, inpatient, and forensic settings) and needs (e.g., decisions concerning treatment, hospitalization, criminal responsibility, disability claims, insurance reimbursement, and research). No single manual is likely to be optimal for all settings and needs, and the ideal balance among these conflicting demands

is hard to determine (Frances et al., 1990; Pincus et al., 1992). One approach is to develop variations on the manual for different needs, as the *ICD-10* has done for research settings, and the American Psychiatric Association has done for primary care physicians. The *DSM-IV* is in fact itself a variation on the *ICD-10* for application within the United States. The coordination of *DSM-IV* with *ICD-10*, however, also provides a substantial constraint on its flexibility. For example, body dysmorphic disorder and hypochondriasis are recognized within the United States as being quite distinct conditions, but *DSM-IV* must provide the same code number for these two disorders because the *ICD-10* makes no distinction between them. However, viable alternatives to the *DSM-IV* are being developed, including, for example, a dimensional classification of personality disorders (Costa & Widiger, 1994) and a classification of relational pathology (Kaslow, 1996).

[See also International Classification of Diseases.]

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Thomas A. Widiger

DIETING lies at the heart of a controversy that has polarized many health professionals and has put the eating disorders and obesity fields at odds with one another. For example, French, Jeffery, and Murray (1999) conclude that "many specific weight control strategies are effective and produce weight control effects in a dose-response fashion with duration." Conversely, Polivy (1996), in a review of the literature on dieting as a remedy for overweight, concludes that dieting may be more dangerous than the problem it seeks to solve, problems blamed on overweight may be caused by dieting, and the pursuit of ever more rigorous dieting has predictable and quite negative consequences.

Professionals concerned with the epidemic of obesity and its serious health and psychosocial consequences see dieting as a solution. Those concerned with eating disorders see dieting as primary pathology. This debate generates extreme arguments, with passions often prevailing over science. The purpose of this chapter is to discuss the consequences of dieting and to identify in whom, under what conditions, and for what purposes dieting is helpful or harmful.

Prevalence and Distribution in the Population

Estimates on the prevalence of dieting vary depending on how the term is defined, or even whether the word

diet is used. In the paper by French and colleagues mentioned above, the percentage of people who said they were "dieting" ranged from 17 to 28%, while 82% reported engaging in intentional behaviors for the purpose of weight control. It appears that approximately three quarters of women and two thirds of men engage in specific behaviors for the purpose of weight control, and about 50% of women and 33% of men would label what they do as a "diet." It is widely assumed that Black and Hispanic women, while having the highest prevalence of obesity, are less preoccupied with weight than are whites, and therefore diet less. Recent reports suggest that social class differences, rather than race, may explain these results.

To the degree that dieting holds the potential for harm, rates in children are frightening. At the age when proper nutrition is essential for development and when body image is being formed, food restriction and body image discontent are common. Surveys of girls 9 to 18 years of age find as many as 70% restricting food intake. Girls, and to a lesser extent boys, report concern with appearance and dieting as early as the third grade. Reports have now appeared showing cases of failure to thrive in infants of parents who restrict the child's intake in hopes of preventing obesity.

A number of behaviors can be subsumed under the term *dieting*. These range from practices as debilitating as nearly total calorie restriction to those as reasonable as making modest reductions in dietary fat. The field is moving beyond the global concept of dieting to examine specific behaviors and attitudes.

The Social Origins of Dieting

In most industrialized countries, particularly the United States, extreme importance is attached to physical appearance. This, combined with highly unrealistic ideals for what constitutes desirable weight and shape, creates what has been called normative discontent. Most people internalize: (a) the unrealistic standard for a thin and sculpted body; (b) the belief that personal effort, if sufficient, can provide the ideal body; and (c) the notion that an imperfect body reflects an imperfect person. The predictable response is an attempt to control the behaviors that govern weight.

When dieting fails to deliver the perfect body, the appropriate but atypical response is to adjust goals to be more realistic, abandon arbitrary and destructive social norms, and accept the body weight that follows from a sensible eating and exercise plan. The more typical response is self-blame and more rigid dieting. The internal attribution for failure is supported by diet advertisements promising miracle results, promotions for exercise equipment and health clubs, pictures of fashion models, and multiple other messages.

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Theoretical Predictions on the Effects of Dieting

The classic work of Keys and colleagues, described in *The Biology of Human Starvation*, showed the profound biological and psychological effects of severe, prolonged food restriction. Normal-weight males were starved to approximately 75% of their baseline weight. Even after refeeding and restoration of the lost weight, there were reports of the men eating very large amounts, to the point of being ill.

This work has been interpreted to show that caloric restriction, especially when severe, creates a psychological and perhaps biological climate in which compulsive, driven eating is likely. The concept of dietary restraint, developed originally from studies by Nisbett, Herman, Polivy and others, was designed to explain this psychological process. In typical studies on restrained eating, restrained eaters (dieters) are compared to nondieters on food intake after a challenge in the laboratory such as having a high-calorie milkshake, consuming alcohol, or being subjected to stress. Dieters consistently eat more under these circumstances (counterregulation), while nondieters are more likely to regulate and eat less.

When dieters are challenged, they become disinhibited, a "what the heck" phenomenon occurs, and eating increases. In the case of the milkshake experiments, experimenters have manipulated both real and perceived caloric content. What subjects believe they have eaten better predicts disinhibition than does actual caloric content, so there are clearly psychological effects of energy restriction.

From this theoretical perspective, dieting is doomed to fail because it creates a psychological environment in which control over eating is fragile and easily disturbed, and the response to perturbances is overeating. This creates the need for further dieting, which may become more severe as this cycle continues. Some people become chronic dieters, with success at restriction being punctuated by overeating. When the overeating becomes sufficiently serious in magnitude and duration, binge eating disorder can be diagnosed, and when individuals compensate for the binges with some form of purging (vomiting, diuretics, laxatives, or excessive exercise), bulimia nervosa is present.

There is no unifying biological theory in this area. Many have speculated that the body interprets caloric restriction as a threat and responds with protective mechanisms such as decreased satiety, lower metabolic rate, increased lipoprotein lipase activity, and so forth. These and other mechanisms would serve to replenish energy stores.

While this general biological scheme is appealing from a survival perspective, it says little about for whom energy restriction would be threatening. An obese per-

son, for example, might have far more energy stored than is necessary for survival, and vast amounts of weight could be lost before threat occurs. A person with anorexia nervosa could risk death with continued restriction, so the threat is immediate.

In this context, the concept of "set point" may be helpful. It is possible that the body defends a natural biological weight (the set point), much as a thermostat protects a building from temperature variation. Energy restriction would prompt the most aggressive countermeasures in persons most below their set points. This also is an appealing concept, one which is supported by animal studies and, to a lesser extent, studies on humans. Many humans maintain a remarkably stable weight, but others gain and then maintain, keep gaining, show large fluctuations, or lose weight after a period of being overweight. Whether there is a set point has not been established. Currently, there is no means for identifying an individual's set point, and only some of the conditions under which a set point might be altered (e.g., brain lesions) have been identified.

Empirical Examinations of Dieting

It is common lore that 95% of diets fail. In fact, no long-term population study has been done to see what the success rate might be, but the rate is likely to be much higher. *Consumer Reports*, for example, reported that 25% of individuals surveyed had lost weight and kept it off for a year or more. Furthermore, if the question were asked, "What percentage of people who eat differently in order to control weight or improve health achieve some degree of success?" a much more positive picture might emerge. This is speculation, however. From existing data, it is not possible to declare dieting a success or a failure.

As mentioned above, there is an abundant literature on restrained eating showing that individuals who are dieting are likely to overeat, at least for the short term, when initial challenge eating takes place. Studies however, are done primarily in laboratory settings and most have not examined eating beyond a few hours.

Cross-sectional studies of adults dieting in an attempt to control weight show moderate levels of success. Such a study by Williamson, Serdula, Anda, Levy, and Byers (1992), with 21,673 adults found a median length of dieting and reported weight losses to be 4 weeks and 8 pounds in women and 6 weeks and 10 pounds in men. There is growing agreement that weight losses as small as 5 to 10% of initial body weight may have beneficial health consequences, so the average person in this survey might be considered successful. Whether these losses are maintained and whether the long-term effects of such efforts are helpful is not known.

Several recent prospective studies provide a more de-

tailed examination of dieting. Ogden and Wardle (in press) studied 23 dieters and 18 nondieters for a 6-week period of caloric restriction. Rating scales were completed three times per week and interviews were conducted weekly to assess mood, cognitive, and motivational states. The authors found "surprisingly few differential changes over the period of the diet," that the dieters increased in body satisfaction, and that "even a small weight loss seemed to provide encouragement for the dieters."

French, Jeffery, and Murray (1999) did annual assessments over 4 years on 1,120 adults who volunteered for a weight-gain-prevention program. The most common behaviors employed were increased exercise, decreased fat intake, reduced food quantity, and reduced calories. Global reports of dieting did not predict weight change, but there was a dose-dependent relationship between the duration of specific weight-control strategies used over the four years and changes in behavior and weight. Subjects who reported no caloric restriction gained 5 pounds over the 4 years, compared to 0.59 pounds for those engaging in caloric reduction for 49 weeks or more.

Nondieting Approaches to Obesity

Those who claim that diets nearly always fail and that obese individuals subject themselves to inevitable cycles of weight loss and regain have proposed alternatives to traditional approaches. These generally focus on eating a healthy diet (but not restricting calories), body acceptance, self-esteem enhancement, and attitude change to separate weight from self-image. The theory is that the cessation of chaotic eating and the removal of a restriction mentality will leave the person free to do what is natural—eat a healthy diet and lose weight in a reasonable fashion.

The nondieting approach has been discussed in the scientific literature and even written into popular books, but has been evaluated only recently. In studies where overweight people (in some cases binge eaters) have been assigned to traditional weight-loss treatment versus a nondieting approach, the results have been consistent. Both approaches appear to have similar effects on binge eating and psychological measures, although the nondieting approach will sometimes have stronger effects on issues specifically targeted by the program, such as body acceptance. Weight losses are the same or greater using the traditional approach.

The utility of nondieting approaches must be questioned in light of existing findings. While enhancing self-esteem and body acceptance is desirable and would be a worthy goal when there is no possibility of weight loss, obesity is a significant health risk and is left untouched by these approaches. One would not let smokers, for example, assume that because smoking is difficult to stop there is no hope, and then help people

accept their identity as smokers and protect their self-esteem in the face of the antismoking sentiment in society. Of course, it is important to consider more than health risk in obese persons because of the serious psychological and social effects it produces, so some measure of body acceptance and self-esteem enhancement is important. Not treating the obesity is difficult to justify.

Conditions Under Which Dieting Is Likely to Be Harmful or Beneficial

There seems little utility in asking whether dieting is harmful or beneficial because the term can represent many different combinations of behaviors. Some can lead to weight loss or prevention of weight gain while others can lead to eating disorders. Furthermore, the behaviors can be employed in the service of various pursuits, some healthier than others.

Certainly dieting can be pathological. When severe caloric restriction occurs in pursuit of unrealistic beauty ideals, the potential for harm far outweighs the gain, particularly in nonoverweight persons. Damaged self-esteem, body image disturbance, binge eating, weight cycling, bulimia nervosa, and anorexia nervosa are among the outcomes. Excessive exercise, laxatives, diuretics, and untested weight loss remedies (e.g., many herbal products) join severe caloric restriction on the list of practices that can have harmful consequences.

Cross-sectional and prospective studies on weight control efforts in overweight people seeking to lose weight and individuals hoping to prevent weight gain have shown modestly beneficial results. This stands in contrast to the oft-repeated but not tested claim that nearly all diets fail. Experiences from the general population might be more positive than those from clinical samples, in which morbid obesity, binge eating, and psychopathology are overrepresented.

Most weight control practices can be readily grouped into healthy and unhealthy categories. Some behaviors, such as purging, are unhealthy in any amount, whereas behaviors such as caloric restriction and exercise may be healthy or not, depending on the amount. Success at weight control is associated with the use of healthy practices. Reducing fat in the diet, making modest calorie reductions, reducing food quantity if high initially, and increasing physical activity offer the most hope.

There is also a person X behavior interaction that must be considered. Individuals who stand to benefit from weight loss and for whom there is some hope that behaviors such as caloric restriction and exercise will be successful are justified in dieting if safe practices are used. If a body-weight set point exists, and if an individual is at or below this point even though objectively overweight, weight loss may be difficult, but one can only speculate that this is the case.

Some dieting practices are safe and moderately effective, while others are not. Attempts to lose weight are indicated in some individuals and not others. Discovering the specific practices that are safe and effective, identifying those most likely to benefit, and understanding the conditions under which the practices are most likely to succeed will lead down a more productive path than will asking whether dieting is good or bad.

[See also Eating Disorders.]

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Kelly D. Brownell

DIFFERENTIAL AGING is a term in psychological gerontology describing the aging process as multidimensional within individuals (intra-individual change) and across individuals (interindividual differences). This term implies that aging must be studied in a multifaceted manner, examining age differences by comparing age groups, age changes over time by studying the same individuals longitudinally, and variations within age groups by examining individual differences in psychological performance (Baltes, Reese, & Nesselrode, 1977; Thomae, 1979).

The term *differential aging* stands in sharp contrast to the erroneous conceptions of aging as a uniform process of decline. Although it is true that the natural and inevitable outcome of the aging process is death of the organism, this fact does not rule out diverse avenues toward death including the possibility of growth in psychological functions even at the end of life. A corollary of the term *differential aging* is the premise that chronological age is not necessarily a good index of an individual's level of functioning. Gerontologists have long argued for the necessity of distinguishing among the biological, psychological, and social clocks that are assumed to tick at different rates within and across individuals.

Individual differences in the rate of aging have also been established. Rather than people becoming more alike as they get older, there is evidence that people become "more different." Support for this position has emerged from analyses of measures of variability in which it is shown that the majority of studies in gerontology, particularly longitudinal ones, show evidence of increasing variability over time (Nelson & Dannefer, 1992). Theoretical explanations of this diversity among older adults focus on the effects of varying experiences that individuals accumulate over their lives and relate to models in life-span developmental psychology that emphasize the importance of person-context transactions as influences on development (Lerner, 1995). Such transactions affect the rate of aging within and across individuals as they are exposed to and select environments that differentially affect their physical, psychological, and social characteristics. Another factor that

Some dieting practices are safe and moderately effective, while others are not. Attempts to lose weight are indicated in some individuals and not others. Discovering the specific practices that are safe and effective, identifying those most likely to benefit, and understanding the conditions under which the practices are most likely to succeed will lead down a more productive path than will asking whether dieting is good or bad.

[See also Eating Disorders.]

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DIFFERENTIAL AGING is a term in psychological gerontology describing the aging process as multidimensional within individuals (intra-individual change) and across individuals (interindividual differences). This term implies that aging must be studied in a multifaceted manner, examining age differences by comparing age groups, age changes over time by studying the same individuals longitudinally, and variations within age groups by examining individual differences in psychological performance (Baltes, Reese, & Nesselrode, 1977; Thomae, 1979).

The term *differential aging* stands in sharp contrast to the erroneous conceptions of aging as a uniform process of decline. Although it is true that the natural and inevitable outcome of the aging process is death of the organism, this fact does not rule out diverse avenues toward death including the possibility of growth in psychological functions even at the end of life. A corollary of the term *differential aging* is the premise that chronological age is not necessarily a good index of an individual's level of functioning. Gerontologists have long argued for the necessity of distinguishing among the biological, psychological, and social clocks that are assumed to tick at different rates within and across individuals.

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may account for heightened variability among older populations in the rate and timing of aging is that of secondary aging, or disease processes that become more prevalent in later life. Pathological aging, when it occurs, adds to the diversity of patterns of change within and across individuals.

Differential Aging in the Relationship between Physical and Psychological Functioning

An interesting question is the interrelationship between physical (Schneider & Rowe, 1996) and psychological aging. The multiple threshold model (Whitbourne, 1996) postulates a reciprocal relationship between the aging of the physical systems and the individual's identity or self-conception throughout the years of adulthood. The term *multiple* in this model refers to the multidimensionality of the aging process and the fact that it involves potentially every system in the body. Changes occur within these systems at varying rates over time, both as a function of genetic predisposition and as a function of interactions with the environment. The term *threshold* in this model refers to the point at which the individual becomes aware of having experienced an age-related change in an area of functioning. Before this threshold is reached, the individual does not think of the self as "aging" or "old," or even as having the potential to be "aging" or "old." After the threshold is crossed, the individual becomes aware of having moved from the world of the middle-aged and young to the world of the elders. At this point, the individual recognizes the possibility of losing functions through aging (or disease) and begins to adapt to this possibility by incorporating this change into identity. Furthermore, as the threshold is crossed, the individual's objective adaptation to the environment may be altered as the age change impinges on daily activities. Even if the individual is not aware of the actual change, he or she may be made aware as the result of altered performance on familiar tasks.

The differential nature of the model is represented by the proposition that there is no single threshold leading to the view of the self as aging. The individual may feel "old" in one domain of functioning, but feel "not old," "middle-aged," or possibly "young" in other domains. Whether a threshold is crossed, it is theorized, depends in part on whether a particular area of functioning has been affected by the aging process, but also on the importance to the individual of the domain. Mobility may not be as important to an individual whose major source of pleasure is derived from sedentary activities. In the multiple threshold model, it is assumed that changes in areas important to the individual's adaptation and sense of competence will have greater potential for affecting identity than changes in relatively

unimportant areas. Changes in life-sustaining functions may, however, supersede changes in nonvital functions.

Not only are changes in important functions likely to have a greater impact on adaptation and identity, it is assumed further that the functions that are most central to identity will be watched for most carefully by the individual. Thus, the model becomes reciprocal in the sense that the individual's identity can affect the way that age changes are anticipated. Heightened vigilance to age-related changes in central aspects of identity results in the individual's greater sensitivity to noticing early signs of age-related changes in some areas but not others. As a result of the increased vigilance and sensitivity, the impact of changes in these areas can be predicted to be even higher than they might otherwise be. The individual may become more motivated to adopt compensatory strategies in anticipation of age-related changes and avoid activities that may exacerbate the aging process in that area. Heightened sensitivity may also lead the individual to be more likely to react negatively to signs that loss has occurred. If such negative reactions occur, the individual may give up in despair over the inevitability and inexorable progression of the aging process. Such reactions are the complementary process in the reciprocal relationship between physical and psychological aging.

As applied to interindividual variations in the rate of aging, the second aspect of differential aging, the multiple threshold model, regards interindividual variations as a function of actions that individuals engage in to regulate the rate of their own aging. There are a number of preventive and compensatory mechanisms that individuals can take advantage of across a wide area of functions. For example, in the case of aerobic capacity, it is well known that regular activity can help to offset the aging process, even if this activity is begun quite late in life. By contrast, individuals can also choose to hasten the rate of their aging process by adopting harmful health habits, such as cigarette smoking or a sedentary life style. The decision to engage in protective or risky activities may reflect social as well as psychological factors. Individuals with higher levels of affluence are able to take advantage of certain preventative or compensatory steps (such as joining a health club) that are not available to those from less fortunate circumstances. Education and occupational background are further contributing factors, as individuals from higher socioeconomic levels are more likely to be aware of strategies they need to employ to moderate the rate of their own aging. For whatever reasons, the choices that individuals make with regard to these behaviors may be seen as a major factor influencing individual differences in the rate of aging in addition to differential genetic predispositions for diseases within specific organ systems.

As it is assumed to operate in the actual lives of individuals, the multiple threshold model is not seen as a series of linear, unconnected processes. Instead, the processes are highly interconnected. Crossing a threshold in one area (appearance) may reset the threshold for functioning in another area (aerobic capacity). Each new threshold has the potential to alter the individual's identity which, in turn, can alter the individual's vigilance regarding future age-related changes in other areas of functioning and the behaviors relevant to the threshold just crossed.

Research based on the multiple threshold model provides support for the notion that individuals are in fact differentially sensitive to the aging process and its effects on their functioning (Whitbourne, 1996). Middle-aged adults are more aware of the effects of aging on the appearance of the face and body in contrast to older adults, who are more sensitive to the effects of aging on mobility and balance. There are also gender differences in aging thresholds, with men more likely to cross thresholds related to physical strength and women to physical appearance. Further testing on larger age samples of adults will provide greater specificity regarding the nature of these aging thresholds as well as refinements in the specified relationships among aging processes, identity, coping, and adaptation.

Differential Aging of Intelligence

As the result of greater awareness of intra- and inter-individual variations in patterns of intellectual aging, the search for consistent patterns of age effects on intelligence that characterized early investigations, has been replaced in the past few decades with a more differential picture. Following the realization of a discrepancy between the findings of cross-sectional and longitudinal studies on intelligence, with cross-sectional studies showing a more exaggerated pattern of negative age effects than longitudinal studies, researchers in the mid-1960s first became aware of the need to develop a more refined conception of aging and intelligence. Horn and Donaldson (1980), who postulated the existence of two broad types of abilities, fluid and crystallized intelligence, based their theory on observations of differential patterns of age differences for verbal compared to nonverbal subscales of intelligence. Subsequent investigations by Schaie (1983) and Baltes (1993) have provided ample evidence of interindividual and intra-individual variations in the aging of intelligence. It is now generally accepted that fluid abilities show a pronounced decline in adulthood, but that crystallized intelligence is maintained well into old age. However, these overall patterns mask the variations associated with health status, socioeconomic background, personality, and degree of activity in one's life style.

The multiple threshold model may also have some applicability to intellectual changes in later life. The findings of one of Schaie's studies on intelligence suggests that individuals who have adjusted their identities in response to changes in intellectual performance may hold certain advantages in maintaining their abilities into the future (Schaie, Willis, & O'Hanlon, 1994). In the 1984 testing, respondents in the Seattle Longitudinal Study were asked to compare their current performance with their scores seven years earlier. By comparing these self-assessments with the actual performance changes, it was possible to categorize the respondents into three groups: the "optimists" (those who overestimated positive changes), "pessimists" (who overestimated negative changes), and "realists" (whose ratings were accurate). The findings revealed that the pessimists declined the least or even gained compared to the optimists, who declined the most. Thus, the incorporation of changes in performance into identity seemed to have a protective effect on actual ability, perhaps by moderating future activity.

Implications

As shown in these two examples presented here, from theories and data in the area of physical and intellectual aging, the term *differential aging* provides a useful heuristic for conceptualizing the complex and multifaceted nature of development in the later years. Within the life of one individual, the aging process occurs at varying rates, both through factors that are outside of the individual's control and through actions that the individual has the power to take to alter the rate of aging. The interaction of the individual's identity with these physical changes suggests reciprocal relationships in these developmental processes that further contribute to the variation within individuals in the rate of their own aging. The individual's appraisal of cognitive abilities may also influence the course and progression of the multiple dimensions that constitute intelligence. Across individuals, variations in the rate of physical and intellectual aging may be seen as increasing over the years of adulthood and old age as the result of variations in aging processes and, again, in the compensatory and preventative actions that individuals engage in as a response to these changes.

These examples have demonstrated not only the value of the concept of differential aging as an explanatory vehicle, but also suggest the necessity of developing research strategies for the study of aging that incorporate reciprocal multidimensional assumptions, methods, and analytical strategies. It is not sufficient to document the existence of age differences or changes over time employing standard analytical methods. With the increasing availability of sophisticated structural modeling programs current scholars have the oppor-

tunity to translate the principle of differential aging into operational terms. Research based on the notion of differential aging will not only reflect more accurately the nature of the aging process but can also provide the basis for more effective interventions to improve the lives of older individuals.

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Susan Krauss Whitbourne

DIFFERENTIAL PSYCHOLOGY. The concept of individual differences and its romantic counterconcept of uniqueness refer to anything that marks a person as a distinct human being. This may run from superficial properties such as a flattering hat or one's bodily characteristics to basic psychological qualities such as instincts, motives, and dispositions. The set of possible characteristics includes attitudes, values, ideologies, interests, emotions, capacities, skills, socio-economical

status, gender, height, and so forth. Differential psychology, therefore, is concerned with individual differences in the broadest sense of the word, and its focus traditionally has been description and taxonomy.

Stability and Individuality

All definitions of individual differences and personality assume the relevance of individuality and stability. Descriptions of personality should emphasize individual variations from person to person but only to the extent that those individualizing features exhibit continuity over time. Without such continuity, the study of personality is impossible.

A first listing of virtually all differential characteristics was constructed by Gordon Allport and Henry Odbert (1936). They collected 17,953 descriptive words from an English dictionary, each suggesting an individual-difference variable. The history of philosophy and psychology has tried to separate the wheat from the chaff, by distinguishing temporal and stable characteristics, good and bad, appearance and reality, superficiality and depth. The delineation of individual differences has been documented in textbooks under such rubrics as character, temperament, personality, and intelligence.

The issues captured by those rubrics are repeatedly discussed in the *Journal of Personality*, the *Journal of Research in Personality*, the *European Journal of Personality* (publication medium of the European Association of Personality Psychology), the *Journal of Personality Assessment* (medium of the Society for Personality Assessment), the *Journal of Personality and Social Psychology*, *Personality and Individual Differences* (International Society for the Study of Individual Differences), and the *Personality and Social Psychology Bulletin* (Society for Personality and Social Psychology).

Character

Since time immemorial people have tried to catch the characteristic features of humans in a word or striking expression. Such a word or expression functions *pars pro toto*, because it stands for a complex of traits and features, habits and inclinations, partially inborn, partially learned. We use a single word but mean a story, a life story or personal paradigm: it is about the mark someone sets on all his or her actions. The best-known antique "psychological" system is that of Theophrastus. His 30 characters had mainly suggestive, edifying meaning. They convey aspects of the morals of the time and were provided to give observers the opportunity to become better people.

Psychological types of all kinds have been put forward throughout history (Roback, 1927). Plato's categorization into those who are developed well intellectually, those in whom passion and competition play an

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Psychological types of all kinds have been put forward throughout history (Roback, 1927). Plato's categorization into those who are developed well intellectually, those in whom passion and competition play an

important role, and those who are mainly led by lust and desire, is an early example. In the writings of Theophrastus, Plato, and many others, a major aim is to point out the societal importance of the scarce psychological resources of high moral and educated nature. In order to be useful, character descriptions should be easily recognized and understood, and they should have a generalized form. Since the term *character* was largely replaced by *personality*, the moral aspect has faded into the background of differential psychology.

Temperament

Among personality psychologists, it is widely accepted that the gist of personality is temperamental. The history of temperamental thinking closely paralleled that of characterology but had, instead of a moral, a medical emphasis. Prototemperamental thinking like that of Empedocles, Hippocrates, and, half a millennium later, Galen, emphasized the medical function of their elementary principles, the meaning of which was colored by mythological thinking. Though Galen made some reference to character, those references were at best fragmentary; the four humors, blood, phlegm, black bile and yellow bile, "were foremost the determinants of illness, constitution, and physiognomy" (Stelmack & Stalikas, 1991). No psychological, let alone dispositional, meaning was involved. Quite the contrary, temperament, consisting of mixtures of those four humors, could change by the minute. About one-and-a-half millennia later, when the medical function was taken over by a moralistic function, under the influence of Thomism, temperaments came to be conceived of as having a stable form. Behaviors were seen as resonating physical processes and characteristics of the nerve tissue.

Temperament is usually distinguished from personality, in that the first emphasizes formal (Strelau, 1987) or stylistic aspects (Thomas & Chess, 1977), and the second emphasizes the content of traits and behavior. Historically, character, less personality, may have emphasized the description of individualizing features instead of focusing on generalization and abstraction of behavior. Ultimately, however, in all domains of individual differences, the emphasis is on recurrent patterns, stable structures, paradigms, or typical tales, and therefore on form and style.

Personality

Allport (1937, pp. 25–26) discussed the etymology of the concept *personality* by referring to the Latin *per sonare*, meaning "to sound through," that is, to sound through the mouthpiece of a mask as used by actors in Greek theater. This "verbal" meaning is hardly recognized nowadays and has been replaced by the mask concept of personality through the noun *persona*. The mask concept is about appearance, which is controlled

by a variety of expressive means. A partial reading of the common sense understanding of personality conveys this conception: a person who "has" personality is one who makes a strong, lasting, good impression.

The study of personality is often understood as the approach to "unmask," to uncover the hidden reality concealed by the mask. Psychologists do not listen to the content of what the voice conveys through the mask, but they rather listen to how the person talks and to characteristics of the voice. Also here, formal and stylistic features are emphasized in studying behavior for its recurrent pattern. This is the way to find out about the person behind the mask. Listening to the content, and therefore listening to the person, would mean communicating with that person as a unique individual. The unique person is someone to talk with, not to try to describe and to study. Uniqueness is thus not an object of scientific investigation but rather a presupposition.

Personality is not an unequivocal concept. For example, does one refer to structure or dynamics? Dynamics are excluded from this discussion because individual differences do not form the primary focus for dynamic conceptions. In a theoretical analysis, Alston (1976) proposes a distinction between disposition and goal as conceptual alternatives. The trait conception has fared by its emphasis on response predisposition (frequency of response or typical behavior). Alternatively, Wallace (1966) formulated the abilities conception of personality, which emphasizes response capability or performance under maximal conditions. This alternative conception expresses efficiency of performance and stresses the importance of stimulus conditions for behavior.

Intelligence

Sir Francis Galton was the first who attempted to measure intelligence, referred to as "natural ability" covering "those qualities of intellect and disposition, which urge and qualify a man to perform acts that lead to reputation" (Galton, 1869, p. 37). Galton conceived of intelligence as a single, underlying, pervasive, mental power, for which he developed the mental test largely consisting of the psychophysical measures typical of the beginnings of psychological experimentation: how well can a person distinguish between small differences in weights, smells, lengths of lines, and so forth. These measures did not prove useful in predicting achievement outcomes. Instead of the sensory skills tested by Galton, the French psychologist Alfred Binet focused on higher-order skills such as "comprehension, judgment, reasoning, and invention" (Binet & Simon, 1916/1973, p. 40). In 1905, Binet and Simon constructed the first "Metrical Scale of Intelligence," which did prove useful in predicting academic achievement.

The emphasis on single, pervasive constructs was

reinforced by the psychometric method of the time, namely Charles Spearman's two-factor method. Spearman's model matched most of the theorizing on personality and abilities of that period. Spearman (1904) thus sustained the search for a single, unitary construct of ability, and he envisaged the general factor *g* of mental ability and eventually identified group factors, such as verbal ability, numerical ability, and speed, each peculiar to one specific (*s* factor) test. This became the basis of a hierarchical view of intelligence, group factors being subordinate to the general factor *g*.

The hierarchical view of ability has been conditioned by those who favored a multifactor view of abilities, a view reinforced by findings from factor analysis. After the first few decades of the twentieth century, there was a shift toward common factors, supported by Lewis L. Thurstone's psychometric model (Thurstone, 1938) in which a certain number of "factors" or components are supposed to be common to a given number of variables. Thurstone identified seven independent abilities, termed primary mental abilities, such as verbal comprehension, verbal fluency, and perceptual speed. The growth of separate abilities escalated in J. P. Guilford's (1959) "Structure of Intellect Model," representing 120 distinct abilities displayed in a cube.

The main problem with Thurstone's analyses was that subsequent research showed the primary abilities being correlated, so that it became logical to search for second-order factors. Horn and Cattell (1966) distinguished "fluid" intelligence and "crystallized" intelligence as second-order factors of primary importance. Fluid intelligence is reasoning ability that develops independently from schooling, while crystallized intelligence reflects scholastic and cultural knowledge acquisition.

Basic Personality Factors

The contemporary search for basic factors of personality started during the first three or four decades of this century when there was an emphasis on broad, unitary constructs that had a bearing upon the total personality. A first factor of a unitary nature was provided in Webb's (1915) conception of character. Webb, working under Spearman's guidance, performed a first "attempt at an exact study of character." His conception of personality was twofold: intelligence on the one hand and character, defined as "the sum of all personal qualities which are not distinctly intellectual" (1915, p. 2), on the other hand. Webb listed a large number of "mental qualities," both intellectual and nonintellectual, in a rating scale for schoolteachers. Using a prototype of factor analysis, he found support for the general factor of intelligence, *g*, and he found evidence for a second factor of wide generality, prominent on the character side of mental activity. Webb conceived of the

latter factor as persistence of motives or will (*w*) (1915, p. 60).

With the shift toward Thurstone's common factors approach also for personality, the search started for a larger number of independent factors. In order to summarize the interrelationships among 60 trait variables, for example, Thurstone (1934) reported five common factors to account for the trait information. These five independent factors form an interesting foretaste of a model of personality traits over which there is a growing universal acceptance, particularly regarding its coverage of the field of individual differences. The rationale of the model, stating that important individual differences are represented in language, was given by Cattell (1943), who tried to summarize the lexicon of trait terms. It took about half a century of research for this model, the so-called Big Five model of traits, to gain the status of an effective, crossculturally reproducible, organizing framework of individual differences. The model also evoked criticisms, especially over the exact number and nature of basic traits. The contemporary understanding is that extraversion (*E*) and neuroticism (*N*) are beyond dispute. Of *E* and *N*, *N* has acquired the strongest position in the early personality literature, not only because of its easily identifiable and distinct nature but also because of its direct clinical relevance. Thurstone and Thurstone's (1930) "A Personality Schedule," compiled mostly from work by others, including Woodworth (1920), was the first "Neurotic Inventory" discussed in some length.

Allport and Odbert (1936) and Cattell (1943, 1945) were the pioneers who tried to identify all relevant traits of personality. But it took a few decades before this descriptive approach provided the Big Five as a rather solid framework, consisting of the dimensions extraversion, agreeableness, conscientiousness, emotional stability (or neuroticism), and intellectual autonomy or openness to experience. The model came about through the use of correlational procedures, the most frequently used methods in individual differences research. The main figure responsible for the breakthrough of both the approach and of the model was Lewis Goldberg (1990). The Big Five movement probably received its strongest impetus from the team of Costa and McCrea (1992), whose Five Factor model and the corresponding assessment instrument, the NEO-PI, find their origin in the psycholexical school. The model has internationally been accepted as the best working hypothesis for personality-taxonomic work in the near future.

The Big Five model has undergone a metamorphosis through a fine-grained representational configuration (Hofstee, De Raad, & Goldberg, 1992) that shows a maximum of 90 distinct facets within the five-dimensional system. Because of its explicit coverage of the trait domain, the latter model, the so-called

Abridged Big Five Circumplex (AB5C), provides an excellent starting point for the development of personality assessment instruments. The FFPI (Five Factor Personality Inventory, Hendriks, 1997), which is the first that is based on this faceted model, marks the beginning of a new generation of personality assessment instruments in which systematic coverage of the various facets of the trait domain is realized. The earlier mentioned NEO-PI is another faceted Big Five assessment instrument in case.

[See also Individual Differences.]

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Boele De Raad

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Contemporary direct observation techniques have their origins in empiricism, a scientific philosophy in which it is argued that careful examination of relationships among observable events yields the best understanding of cause-effect relationships (James, Mulaik, & Brett, 1983). Empiricism exerted a profound influence on the behavioral sciences and promoted the development of behaviorism, a philosophy of behavior in which it is argued that the most effective way to study and learn about human behavior is to combine careful observation with experimentation (Bongar & Butler [Eds.], 1995; Freedheim, Kessler, Messer, Peterson, & Strup [Eds.], 1992). In turn, behavioral scientists and clinicians who endorsed the behaviorist position significantly contributed to the development and use of direct observation systems as a way to assess human behavior in basic and applied research (Suen & Ary, 1989).

Direct observation is used for a wide variety of research and clinical purposes. Additionally, many types of direct observation systems have been developed.

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Direct observation is used for a wide variety of research and clinical purposes. Additionally, many types of direct observation systems have been developed.

These systems are similar to the extent that they all emphasize the importance of carefully defining, recording, and quantifying behavior. They also share a fundamental goal of identifying and evaluating relationships between behavior and factors that control it. They differ, however, in three main ways: (1) how behavior will be sampled, (2) where behavior will be observed, and (3) who will observe the behavior.

Common Goals: Establishing Operational Definitions and Identifying Relationships among Behavior and Controlling Factors

The principal objective in direct observation is to empirically assess behavior and the many factors that control it. In order to accomplish this, the behavioral scientist must initially generate precise operational definitions of key behaviors, labeled target behaviors, and situational events that exert an influence on the target behaviors. These latter situational variables are sometimes labeled controlling factors. The process of generating operational definitions of target behaviors and controlling factors is referred to as a topographical analysis.

There are many ways that behaviors and situations can be measured. In order to simplify this complexity, one can sort target behaviors into three main categories: cognitive-verbal behaviors, emotional-physiological behaviors, and overt-motor behaviors. Although these different components of behavior could be evaluated in many different ways, most direct observation systems emphasize the measurement of: (a) the magnitude or intensity of responding, (b) the frequency of responding, and/or (c) the duration of responding.

Situational controlling factors can be divided into two main categories: social/interpersonal events and nonsocial/environmental events. Social/interpersonal events refer to controlling factors that involve interactions with other people or groups of people. Nonsocial/environmental events refer to controlling factors that exist in the environment outside of social interactions. Examples of these latter types of controlling factors include temperature, noise levels, season of the year, lighting levels, and the structure of the built environment. Similar to the dimensions that are used to evaluate behavior, the magnitude, frequency, and duration of social/interpersonal and nonsocial/environmental controlling factors are routinely measured in direct observation systems.

Once target behaviors and controlling factors have been operationally defined, behavioral scientists using direct observation systems will often carefully examine relationships among these sets of variables in order to determine the function of a behavior. The term *functional analysis* has been used to describe this second common purpose of direct observation systems (Haynes

& O'Brien, 1990) and it is most effectively accomplished using experimentation, conditional probability analysis, or time series analyses (Schundt, 1985; Watson & Gresham, 1998).

Differentiating Element I: How Behavior Is Sampled and Where Behavior Is Observed

Because behavior occurs in a continuous stream and because it cannot be observed at all times in all locations, behavioral scientists using direct observation must design strategies for sampling behavior. In designing sampling procedures, the behavioral scientist must consider how behavior will be sampled and where it will be sampled. The overarching goal in selecting the method and location of sampling is to generate information that is most representative of target behaviors and controlling factors. It is also often important to collect data that generalize to true world environments.

Method of Sampling. There are four types of sampling strategies that are commonly used in direct observation: event sampling, duration sampling, interval sampling, and time sampling. Event sampling involves noting and recording the occurrence of a carefully specified behavior whenever it is observed. A frequency measure is then calculated by summing the number of times the behavior occurs within a relevant time interval (for example, number of occurrences per minute, hour, day, week) and/or context (for example, number of occurrences in a particular setting such as a classroom or simulated social interaction). In duration sampling, the amount of time that elapses between the beginning and end of a target behavior is measured. Event and duration sampling are most readily accomplished when the target behavior has clear beginning and end points. Additionally, these sampling methods are well suited for evaluating behaviors that do not occur at high frequencies.

Interval sampling refers to a procedure where discrete and time-limited observation periods are used to sample behavior. These intervals typically range from several seconds to hours. If the target behavior reaches a prespecified criterion, usually based on the proportion of the interval during which the behavior is observed, the entire interval is coded as an occurrence of the target behavior. A summary measure of the number of intervals in which the target behavior reached the prespecified criterion is then generated. Interval sampling is most useful when the target behavior occurs at a high frequency or when the beginning and end of the target behavior are not easily discernible.

Time sampling combines elements of event, duration, and interval sampling. In time sampling, the observer records the time at beginning and end of a target behavior whenever it occurs. Frequency information is derived by counting the number of times the behavior

occurs across a relevant time frame. Duration is derived by calculating the average time that elapses between the beginning and end of the target behavior. Interval information can be obtained by dividing the observation periods into discrete intervals and calculating the number of intervals that met the prespecified criterion of target behavior occurrence. In many cases, time sampling is aided by hand-held computerized coding devices that will automatically time stamp the beginning and end of an observed behavior when the observer enters specific codes on a keyboard. The availability of such automated devices has increased the accessibility of time sampling in observational research and applications.

Settings Where Direct Observation Can Be Conducted. Direct observation can occur in naturalistic settings or analogue settings. Observation in naturalistic settings occurs when the target behavior is evaluated in everyday, social, occupational, or domestic settings. Naturalistic observation provides the most ecologically valid type of assessment information. This means that the collected information more closely approximates "real life" behavior in "real world" situations.

Because direct observation can be very difficult to use in naturalistic settings, behavioral scientists frequently conduct assessments in analogue settings. An analogue setting is a controlled environment that is specifically designed to make it easier for the observers to measure target behaviors, controlling factors, and the relationships among them. Analogue settings can range from highly controlled laboratory settings to "quasi-naturalistic" settings such as a structured living environment or office.

Differentiating Elements II: Types of Observers

Observational data can be coded by human judges and/or technological devices. Human judges include: nonparticipant observers, participant observers, and self-observers. Nonparticipant observers are specifically trained to conduct observations of target behaviors exhibited by a person or groups of persons. They have no other relationship with the persons under scrutiny aside from this function. Typically, nonparticipant observers include paid research technicians and students working in a research setting. Participant observers are trained to carry out direct observation of a person or persons with whom they maintain an ongoing relationship outside of their function as an observer. Participant observers may include family members, health care providers, coworkers, teachers, and peers.

The third type of observer is the self. Self-monitoring is a technique where the target person is trained to conduct systematic observations of his or her own be-

havior. This strategy has the advantage of allowing behavioral scientists to evaluate behaviors that are only accessible to the person being observed. Examples of these types of behaviors include thoughts, emotional reactions, and covert activities that would be suppressed in the presence of nonparticipant or participant observers.

Technological device coding involves the use of mechanical or electronic instruments to record the occurrence of target behaviors and controlling factors. Commonly used technological devices include audiotape recorders, videotape recorders, keyboard-stroke detectors, motion sensors, speech analyzers, and psychophysiological recording equipment. Technological devices have become more readily available to behavioral scientists within the recent past. As a result, they are being increasingly used to collect information on a wide variety of target behaviors in the workplace (for example, work productivity, telephone use), community (for example, car speed), clinical settings (for example, behavioral responses to stressors), and home (for example, television use, computer use).

Psychophysiological recording systems are a special type of technological observation system. In psychophysiological assessment, mechanical and electronic recording devices are used to measure physiological responses that are not visible to external observers. Commonly used psychophysiological measures include cardiovascular measures (heart rate, blood pressure, blood flow), central nervous system activity (electroencephalogram, evoked potentials), and peripheral nervous system activity (skin conductance, hand temperature, muscle tension).

Psychometric Issues

The reliability and validity of observational data are dependent upon the quality of the recording system. Specifically, valid and reliable observational data can be collected when there are well-trained observers and/or appropriately calibrated technological devices recording clearly specified target behaviors and controlling factors in an appropriate setting. Alternatively, problems with reliability and validity most commonly arise when (a) target behaviors and controlling factors have not been adequately operationalized, (b) observers have not been adequately trained and monitored for continued accuracy, (c) technological devices have not been properly calibrated and routinely checked for accuracy, and (d) the observational setting is not conducive to target behavior occurrence or accurate observation of behavior.

An additional psychometric issue related to observation is reactivity. Reactivity effects occur when the person or persons under scrutiny modify their behavior in the presence of observers. In some cases, reactivity effects can lead to behavioral suppression (for example,

participants may suppress behaviors that they perceive to be socially undesirable) or behavioral intensification (for example, socially desirable behaviors may occur at a higher rate of frequency, intensity, or duration). Reactivity effects associated with direct observation can be lessened when the salience and intrusiveness of an observational system are minimized.

Conclusion

The primary goals of direct observation are to provide precise, quantifiable, information about behavior, controlling factors, and the relationships among them. Direct observation systems can use several methods for sampling behavior in settings that range from naturalistic settings to analogue settings. Different types of human observers or technological devices can record the occurrence of target behaviors and controlling factors. The reliability and validity of direct observation varies with the integrity of the methods used to collect data. Enhanced levels of reliability and validity are expected when carefully defined behaviors and controlling factors are recorded by properly trained observers or correctly calibrated technical devices in settings that promote target behavior occurrence and unobstructed observation.

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- William H. O'Brien and Stephen N. Haynes**

DISCIPLINE involves values, power, and beliefs about people and institutions. Within hierarchical relationships (parent-child, teacher-student), society defines the adult as having the legitimate power, or discipline, to control or influence the child. The American Psychological Association opposes the use of corporal punishment in all institutions, public or private, where children are cared for or educated. It maintains that effective use of punishment is difficult, rare, and fraught with unintended consequences, for example, displacement or imitation (APA, 1975, p. 632).

Discipline Goals, Strategies, and Situations

Kelman (1958, 1961) distinguishes among three discipline goals: compliance, identification, and internalization. Compliance occurs when the individual behaves to get a reward or avoid a punishment. Identification is achieved when the individual acts appropriately as long as a valued model is salient. Internalization is inferred when the behavior endures across a variety of settings without external constraints or inducements. Discipline goals are value and situationally sensitive. For example, compliance is probably a sufficient goal for raising your hand for recognition in school; however, valuing and living a healthy life (internalization) is preferable to simple avoidance of illicit drug use when monitored.

Research on discipline strategies primarily is based upon behavioral principles of control as operationalized by B. F. Skinner (1953). Skinner focused on reinforcements and the acquisition and maintenance of behavior, noting that individuals are more predictably (and better) controlled by reinforcement schedules than by punishments. Modern theories of behaviorism evoke covert processes (for example, mediation) with overt behavior and reinforcements to promote the ultimate goal of self-regulation, defined in part as self-reinforcement for self-defined goals. Current recommendations for effective use of reinforcements are consistent with Skinnerian principles and modern elaborations: Reinforcements are more effective to the extent that they are specific to the targeted behavior, informative, and subtle. Modern theorists stress in particular the subtlety factor. Subtle reinforcements, defined by the minimal sufficiency principle of social control, are hypothesized to promote internalization goals because they do not make external (compliance) reasons salient.

Discipline strategies reportedly used by adults and

participants may suppress behaviors that they perceive to be socially undesirable) or behavioral intensification (for example, socially desirable behaviors may occur at a higher rate of frequency, intensity, or duration). Reactivity effects associated with direct observation can be lessened when the salience and intrusiveness of an observational system are minimized.

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children predictably differ by interpersonal conflict situation. Gordon (1970) defines these situations by the needs they arouse and identifies three levels of "problem ownership." In self-owned problems, the protagonist feels personally challenged, threatened, irritated, or angry. In other-owned problems, he does not feel responsible for the problem but may feel sympathetic. In shared problems, self and other are both involved in thwarting each other's needs.

Research on parent discipline, classroom management, and peer relations has found a distinct discipline profile associated with each level of problem ownership. Self-owned problems involve short-term control/desist goals. Self-owned problems impose attributions that the offending individual is behaving intentionally and with personal control (and therefore choice). These attributions elicit anger and salient punishment strategies that interfere with internalization goals.

Other-owned problems promote long-term mental hygiene goals. Other-owned problems involve attributions that the problem individual is not behaving with control or intention; rather, he is a "victim." Victim attributions elicit pity and long-term supportive strategies meant to foster internalization. Finally, shared problems promote specific and immediate behavioral substitution goals. Shared problems involve attributions that, whether or not there is personal control, the offending individual's behavior is unintentional. Discipline strategies are primarily contingent-reward focused.

Models of Parent Discipline

Five domains of parent behavior are considered essential in the promotion of children's mental health: verbal interaction between mother and child, affective relationship between parent and child, discipline and control strategies, expectations for achievement, and parent beliefs and attributions about their children. Discipline strategies can serve as a proxy for each domain because they are based in an affective relationship and communication pattern that convey parent understandings, beliefs, and expectations about their children. Parent discipline is defined by parent control of and affect toward their children. Parent control and affect are independent; a parent may discipline out of concern or hostility. Primarily, research focuses on general trends rather than situational differences in three styles of parent control (*laissez-faire*, authoritarian, authoritative).

One extreme of parent control is *laissez-faire* or permissive management. Permissive parents provide little structure, control, or instruction; their policy is non-interference. The burden is on the child to seek parent involvement. The lack of structure inherent in this approach is not associated with positive child outcomes.

Authoritarian control anchors the dimension at the opposite extreme. Authoritarian control is dogmatic

and obedience focused. Authoritarian parents control their children independent of present or emerging capabilities; thus these parents may have unrealistically high or low expectations for their children. Coercive authority may involve rewards and punishments, but it does not involve explanation of parent reasoning. Rationales for parent demands are of the "because I said so" genre. Ironically, this approach creates the conditions for its continued coercive presence because external reasons for behavior are salient. It also is inefficient: power derived from rewards and punishments requires continuous monitoring.

In contrast, authoritative control is reciprocal: The parent recognizes the influence of the developing child on the appropriateness of parent control. These parents explain the reasons for their "firm yet flexible" rules. Children's self-control, rather than parent control, is the goal. Self-control is learned through parental instruction and supports that are enacted when needed and removed when superfluous. In this manner, authoritative parents "co-regulate" the development of their children's self-regulation. The authoritative model of parent control is associated with child mental health (autonomy, healthy risk-taking) and school achievement.

Models of Classroom Management and School Discipline

Current recommendations for teacher management involve combinations of instructional pacing and group-level strategies to minimize disruption, individual behavior modification strategies to instill or maintain behavior, and instruction in and opportunities for student goal-setting, self-evaluation, and self-control. Recommended task requirements, feedback, and reward structures also are designed to promote student self-reflection rather than social comparison. Students progressively assume more responsibility for self-control. Modern calls for classroom management include features of authoritative parenting.

Similarly, recommendations for school administrators include systems based upon behavioral principles and self-control strategies to coordinate classroom management across grades and teachers. These publications stress behavior modification that targets substitution and focus on positive relationships between educators and students.

In practice, however, much of classroom and school-based discipline targets the form and schedule of punishment. This is especially the case with schoolwide management packages. For example, certain transgressions (for example, tardiness) are "tolerated" to some maximum number and then finally punished. In "three-strikes-you're-out" policies, transgressions accrue independent of the culpability associated with each offense (for example, individual fighting provoked

or otherwise). In "zero-tolerance" policies, a single incidence of certain behaviors compel expulsion (for example, gang activity), which guarantees that appropriate substitute behavior cannot be influenced by the school—self-owned problem "solving" at the school level that seems especially egregious.

Congruence Between Management at Home and School

Overlap between home and school discipline results in at least four considerations. First, parents respond to school events through their own management style; children's reports of mistakes at school can lead to quite different responses at home (for example, instruction, punishment). Second, incongruence between home and school norms can lead to misunderstandings that are difficult to clarify. For example, the child of authoritative parents who asks questions to better understand and value the rules may be viewed as challenging rather than respecting authority. Third, parent discipline styles and the level of self-regulation they promote can be ahead or behind classroom practices, particularly in expectations for individual responsibility and autonomy. Conformity can be seen as immaturity rather than good behavior. Fourth, students can have difficulty with discipline policies that are more primitive than their attributional knowledge of personal and cultural rules for social behavior. It *does* matter why you were fighting, why you joined a gang. A critical feature of these discrepancies is the extent to which the child is able to interpret and meet differing expectations and rules. Some discipline goals and strategies promote this flexibility, others thwart it.

Conclusions

Discipline is about power; it is also about learning. In what appears to be the most successful approach to discipline, authoritative management at home and/or school, power is shared and learning is reciprocal. As the child develops strategies, skills, and dispositions, the authoritative adult "co-regulates"—adjusts expectations, removes unnecessary supports, and provides new opportunities to challenge and promote the child's development of self-regulation. Co-regulation also promotes the internalization of goals we wish a child to seek. In this manner, self-regulation is inherently social and learned.

[See also Punishment.]

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Mary McCaslin and Helen Infanti

DISCRIMINATION. Understanding the concept of discrimination has been a steadfast pursuit among social scientists for the past several decades. While knowledge of this complex phenomenon has substantially increased because of these efforts, the dynamic nature of our society necessitates ongoing efforts toward not only describing the nature and consequences of discrimination but also developing effective strategies for eliminated the negative impact of discrimination. Although complex, the concept of discrimination has had unique consistency across many attempts at a conceptual definition. As Jones writes, "discrimination is . . . actionable" (1998, p. 10). This focus on behaviors or actions that are derived, in part from negative (or positive) attitudes toward an individual or a group represents a key feature of most contemporary definition of discrimination. While these definitions are somewhat consistent, the different types, consequences, and remedies for discrimination are quite varied.

Types, Levels, and Targets of Discrimination

Clearly, discriminatory acts and behaviors take on many different forms. Attempts to describe and classify

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Types, Levels, and Targets of Discrimination

Clearly, discriminatory acts and behaviors take on many different forms. Attempts to describe and classify

the different types of discrimination have focused on three key issues: whether discriminatory behavior is overt or subtle; whether discrimination occurs at the individual, institutional, or societal level; and, whether discriminatory actions vary based on the characteristics of the target group.

Early on, attention focused on "classic" or traditional forms of discrimination. This involved both overt forms of discrimination in which the target (person or group), the action, and the intention of the actor were clear and identifiable. Overt discrimination was viewed as the result of "old-fashioned" forms of racism (or sexism, and so forth) that involve the desire to establish and maintain superiority through the differential use of power based on group (for example, race, sex, nationality) membership. The emergence of civil rights legislation and other legal statutes banning discrimination based on race (then sex and later, other specific groups) attention shifted toward identifying new or "modern" forms of discrimination. Dovidio and Gaertner (1998) developed the concept of "aversive racism" to describe a subtle and unintentional form of bias that is based on a conflict between egalitarian individual values and negative attitudes toward specific groups. This concept is quite similar to the notions of ambivalent racism, (Katz, Wackenhut, & Hass, 1986), symbolic racism (Sears, 1988) and modern racism (McConahay, 1986). Each of these concepts attempts to describe the catalyst for what scholars characterized as discriminatory actions that are covert rather than overt, unconscious rather than conscious, and denied rather than acknowledged. Thus, a key issue in understanding the different types of discrimination is whether these biased actions involve intentional inequity that is based on group membership (or what Pettigrew labels as "direct discrimination") versus actions that are hidden ("indirect") and thus, more difficult to detect (Pettigrew & Taylor, 1992).

As to whether discrimination is subtle compared to overt, the level at which the behavior occurs has been studied as a key aspect of discrimination. Typically, there are three different levels at which discrimination can occur: individual, institutional, and structural. Researchers have studied individual attitudes and demonstrated their ability to explain or predict later discriminatory actions by these individuals (Jones, 1998). Another aspect of work that focuses on individual-level factors, involves whether individuals are able to detect discriminatory actions based on the type of information available to them and whether or not they are the targets of discrimination (Rutte, Diekmann, Polzer, Crosby, & Messick, 1994). This work represents a very intriguing view on the issue of micro- versus macro-indices of discrimination. One may argue that an outgrowth of the shift in discrimination from overt to subtle has not only been in researcher's efforts to develop different

ways to measure discrimination but also in the different skills that an individual needs in order to detect discrimination even when they themselves are the target.

Macro-level factors such as institutional and structural discrimination have traditionally received less attention than their micro-level counterparts. Most conceptualizations of institutional discrimination focus on the role that social structures play in allocating different opportunities and consequences based on group membership. A widely studied example of institutional discrimination is occupational segregation. This concept captures the disproportionate over-representation of women and minorities in low-paying, low-status occupations compared to men and nonminorities. One explanation for the persistence of this type of discrimination is the impact of institutional barriers such as the "dual labor market" (Morrison, White, & Van Velsor, 1987). While most majority group members are employed in the "primary labor market," women and minorities have been shown to dominate the "secondary labor market." The notion of different labor markets based on demographic factors such as race and sex helps to explain issues such as pay inequity, differences in mobility and advancement, and other workplace disparities. The dual labor market as an impermeable barrier for career advancement is a well-studied example of macro-level forms of discrimination, particularly within the work setting.

Other examples of macro-level or structural types of discrimination can be found in studies of biases that exist within the social structures such as the legal system. For example, evidence shows racial disparities in conviction rates, severity of sentencing, and public perception of guilt versus innocence (Nickerson, Mayo, & Smith, 1986). Notions about the structural aspects of discrimination have also been introduced through other concepts such as "environmental racism." Similar to work examining disparities within the legal system, this research argues that exposure to toxic substances is related to group differences such as social class and race. For example, exposure to lead poisoning in youth and toxic waste disposal have been shown to occur more frequently in poor and minority communities than in White and affluent communities (Needleman, Riess, Tobin, Biesecker, & Greenhouse, 1996).

In addition to characterizing the different types and levels of discrimination, previous research has explored discrimination based on a specific target group. The two most widely groups studied have been African Americans and women; however, other groups have received some attention (for example, elderly, social class, sexual orientation). The most frequently studied setting for sex discrimination is the workplace, where the concept of the "glass ceiling" defines the invisible barrier that prevents many women and minorities from advancing into senior and executive management positions within or-

ganizations (Morrison, White, & Van Velsor, 1987). Thus, a number of studies have shown that women perceive and experience more discrimination in the workplace than men as manifested by disparities in job opportunities, pay, career mobility, work-family conflict, and exposure to sexual harassment at work (Nieva & Gutek, 1980).

Research examining discrimination based on sex is not limited to the workplace. For example, a wide variety of research on women in educational settings found that a "chilly climate" on college campuses often discourages young women from pursuing nontraditional careers such as math, science, and engineering (Pettigrew, 1998). Previous studies have shown that women are often excluded as research subjects in tests of new drugs, medical treatments, and surgical techniques, whereas men are routinely included. Similar evidence of sex-based discrimination has been shown to occur for women in government and public service sectors, consumer marketing, the political arena, and the military (Lawn-Day & Ballard, 1996). Women of color can be targets of both sex and race discrimination, although less research has addressed this intersection.

There is emerging literature on discrimination targeted toward other racial and ethnic groups. Evidence exists for discrimination in the workplace of Latinas and Asians. Work by James Jackson and his colleagues focuses on the international dimensions of discrimination and demonstrates that the forms and targets of discriminatory behavior and actions represent a global phenomenon (Jackson, Brown, & Kirby, 1998).

Other targets of discrimination are emerging as important areas of investigation. For example, Birt and Dion (1987) showed that gay men and lesbians perceived discriminatory treatment based on sexual orientation, resulting in higher militancy and lower life and community satisfaction. The Age Discrimination in Employment Act of 1967 (and amended in 1986) outlawed the differential treatment of workers based on age. This legislation protects individuals in the workplace age 40 and older, covering issues, such as hiring, firing, promotion, training, compensation, and retirement. As a result, there has been an increase in the attention paid to issues of age discrimination in the workplace. For example, Perry, Kulik, and Bourhis (1996) argue that both personal and contextual factors inhibit the use of older persons and can often facilitate the negative impact of stereotypes of these individuals in work settings.

Consequences of Discrimination

Clearly discrimination, which varies by the type level and targeted group, has consequences that are profound and frequently negative. Missed opportunities and limited access can create barriers to success and

serve as a significant source of stress. Discrimination can lead to lower levels of physical and psychological well being and impair individuals, families, and communities. A number of studies demonstrate that the targets of discrimination experience stress particularly in occupational settings. Jerome Taylor (Taylor & Jackson, 1990) has shown that individuals who have experienced racial discrimination are at greater risk of social maladjustment compared to other groups. These individuals report low marital satisfaction and feelings of aggression and report less warmth toward others, even within their same racial/ethnic group. Other consequences include low self-esteem, frequent depression, and low ego maturity.

Another area of study that illustrates the consequences of discrimination focuses on issues related to access such as education and housing. The notion of limited access as a consequence of discrimination in other aspects of daily life has been studied by Lucas (1996). He has shown that consumer behavior and marketers' assumptions concerning spending, needs, and preferences are often based on race and gender. There are also data that shows patterns of discrimination in terms of access to capital, bank lending, and investment. According to this research, minority communities received less mortgage credit for every dollar deposited in banks compared to their White counterparts (Shearer, 1992). Even controlling for income disparities between different communities, profound differences by race and ethnic background were reported (Nesiba, 1996). Clearly issues related to access represent one of the most profound yet hard to detect consequences of long-term discrimination.

Remedies for Discrimination

While the types, levels, and consequences of discrimination have been researched, there are now efforts in research to develop strategies to eliminate discrimination in its various forms as well as its consequences. The classic individual-level approach that has been widely studied as a strategy for eliminating discrimination on racial group membership is the contact hypothesis (Cook, 1985). This construct specifies the conditions under which positive interactions between previously advantaged and previously disadvantaged groups can and should exist in order to decrease discrimination and achieve equality. However, after extensive research, a number of limitations and shortcomings of this theory have been delineated. In fact, some research shows that if cooperative interactions as facilitated by intergroup contact fail, conflict (and discriminatory actions) will actually escalate. It seems, therefore, that increased contact may have a limited positive impact on attitudes toward members of disadvantaged groups and does not necessarily assure that

discrimination (particularly macro-level format) will be eliminated.

With the infusion of cognitive models such as categorization and social identity theory, attempts to reduce discrimination have been focused on the process of altering an individual's category representations based on group membership. Recategorization, decategorization, individuation, and personalization are all techniques for reducing discrimination by changing one's cognitive representation of group membership. For example, recategorization requires that a superordinate group membership is created, and, thus, discrimination against "others" is reduced because individuals are seen as part of the same group. Providing more personalized interaction that is less category based has been shown to have some impact, although limited.

It appears that when an individual is made aware of inconsistencies or contradictions in his or her values, attitudes, self-conceptions, and behaviors, a sufficient state of dissatisfaction is created that can, under some circumstances, lead to attitude and behavior change. This approach is heavily dependent on theories such as cognitive dissonance as a mechanism for creating an individual-level change in discriminatory behavior as well as negative attitudes. Many have speculated that in the face of apparent inconsistencies, individuals are motivated to protect their self-concept, which is seen as egalitarian, nonprejudiced and nondiscriminatory (Murrell, Dietz-Uhler, Dovidio, Gaertner, and Drout, 1994). Thus, being faced with discrepancies between what they "believe they would do" and what they "should do," most people will increase the amount of effort they put forth in controlling their discriminatory acts in the future. While this perspective has conceptual appeal, extensive empirical validation remains elusive.

Despite a frequent focus on individual-level strategies to end discrimination in its various forms, a widely studied macro-level strategy for reducing discrimination involves antidiscriminatory efforts, most notably, affirmative action. This legislation, outlined by the Civil Rights Act of 1964 (and the subsequent Executive Order No. 11246), banned discrimination based on race and later discrimination based on sex, religion, and national origin. Social scientists have studied individual and social perceptions of affirmative action as well as the overall impact and effectiveness of these programs and policies (Murrell & Jones, 1996). Despite the enormous amount of public attention paid to this issue, there is a lack of definitive research that clearly demonstrates the impact of policies and programs like affirmative action as an effective remedy for eliminating discrimination. Notwithstanding, advancements by women and minorities have been attributed, at least in part, to these antidiscriminatory efforts (Murrell & Jones, 1996).

At the beginning of the 1990s, attention turned to diversity initiatives as a remedy for discrimination in the workplace and educational settings. Diversity initiatives may have an important impact on increasing access to opportunities for women and minorities in the workplace and educational settings. In the early stages, diversity initiatives focused primarily on race and sex. This focus has broadened and includes age, sexual orientation, people with disabilities, religion, national origin, and professional expertise. Other work highlights the notion of "valuing" diversity, a perspective that emphasizes interpersonal communication and economic equality. While programs and initiatives aimed in increasing diversity are themselves, quite diverse, there are a number of common attributes. Most contemporary diversity efforts include dimensions such as broadened recruitment efforts, standard selection methods, skills training, enhancement of the environment, and career development. Similar to the evaluation of affirmative action as an antidiscriminatory effort, the impact of diversity is still under exploration by social scientists and organizational scholars.

Looking Toward the Future

Clearly, the factors that underlie and help to prevent discrimination are complex and dynamic ones. While most research has focused on better understanding the different forms and consequences of discrimination, there are efforts in developing strategies for preventing discrimination in a number of settings. The nature and impact of discrimination touches each member of a society both directly and indirectly. Understanding and preventing the negative consequences of these acts requires increased research across a number of settings and levels of analyses.

Many legal scholars have noted the problems in contemporary approaches to remedy past discrimination such as the increased demand set forth by legal standards of "strict scrutiny." Issues such as burden of proof, isolation of cause, and evidence of intentionality pose threats to our ability to detect the existence and demonstrate the impact of emergent forms of discrimination within society. In addition, as group conflict theory asserts, competition for shared resources contributes to bias and discrimination. Thus, as shared resources become more scarce, the incidents of intergroup discrimination will increase particularly in subtle or indirect form. While our ability to understand and classify different types, levels, and consequences of discrimination may have increased somewhat over the past several decades, our ability to detect more subtle forms of discrimination and their impact, as well as our ability to predict the factors that exacerbate this behavior, has not.

Another topic that represents a priority for future

work relates to global dimensions of discrimination in key areas such as social justice and employment. Contemporary researchers (for example, Jackson, Brown, & Kirby, 1997) challenge the largely U.S.-specific focus that previous work on discrimination has taken. Their work examines actions toward people across nationalities, religions, race, cultures, and social class. These researchers argue that more attention to cross-national (and cross-cultural) studies should be given in order to understand better the concept of discrimination. By examining discrimination in comparative studies, we can better understand this concept in diverse settings, economic systems, historical contexts, and social structures.

There is also need to study the complex and dynamic nature of how discrimination varies by the specific target group. Much of the previous work has focused on the factors that define discrimination, what forms discrimination may take, and strategies for reducing its occurrence. This work almost exclusively takes the perspective of the empowered or majority group in terms of the definitions of group membership, nature of power and status within our society, and desired outcomes for intergroup interactions. However, the nature and meaning of group membership, particularly multiple group memberships, must play a critical role in understanding the type, severity, consequences, and remedies for discrimination. While scholars write about the social construction of categories such as race and gender, theoretical paradigms that explore the meaning and identity of these groups continue to contribute new perspectives to our understanding of the concept of discrimination.

[See also Ageism; Employment Discrimination; Heterosexism; Homophobia; Prejudice; Racism; Sexism; and Stereotypes.]

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DISENGAGEMENT THEORY. See Social Gerontological Theories.

DISHABITUATION. See Habituation.

DISRUPTIVE BEHAVIOR DISORDERS, now generally out of usage, applies to those patterns of behavior in which there is a pervasive and sustained disregard for authority or lack of regard for the feelings or well being of others (American Psychiatric Association, 1994). The category "disruptive behavior disorders" did not appear in the *Diagnostic and Statistical Manual (DSM)* classification until *DSM-III-R* (1987), where it refers to attentional, conduct, and oppositional disorders. Each revision of the *DSM* reflects substantive changes in the selection criteria for the disruptive behavior disorders. These changes represent refinements in the diagnostic criteria and subtypes resulting from new data about the validity and reliability of the criteria for disruptive behavior disorders.

In *DSM-IV* (1994), the category "attention-deficit and disruptive behavior disorders" refers to a range of behavior problems including attention-deficit/hyperactivity disorder (ADHD), conduct disorder (CD), and oppositional defiant disorder (ODD). The two most common disruptive behavior disorders are conduct disorder and oppositional defiant disorder.

Conduct disorder is characterized by repetitive and persistent violation of age-appropriate norms and disregard for the basic rights of others. *DSM-IV* (1994) groups the behaviors of this disorder in four categories: aggressive conduct, nonaggressive conduct, deceitfulness or theft, and serious violation of rules. Although ODD includes some of the features observed in conduct disorder (for example, disobedience and opposition to authority figures), it does not include the persistent pattern of the more serious forms of behavior in which either the basic rights of others or age-appropriate societal norms or rules are violated. Diagnosis of ODD is

based on eight criteria, most of which are manifestations of suspicion of and hostility toward authority figures. When an individual's pattern of behavior meets the criteria for both conduct disorder and oppositional defiant disorder, the diagnosis of CD takes precedence and ODD is not diagnosed.

No definitive cause of disruptive behavior disorders has been identified. Some studies show both genetic and environmental components. There is increasing sentiment from a developmental perspective that explanations of disruptive behavior disorders need to be couched in terms of multiple influences among phenomena at many levels of analysis, from genes to national culture (Costello & Angold, 1993). Some studies suggest that risk factors for disruptive behavior disorders include learning difficulties, school failure, perinatal complications, and violence in the home. Protective factors are thought to include a positive relationship with grandparents and ability to express feelings (Grizenko & Pawliuk, 1994).

The onset of CD tends to be in late childhood or early adolescence; diagnoses have been made as early as age 5 but rarely after 16 years of age. Oppositional defiant disorder, which develops earlier than CD, may lead to the development of conduct disorder (Loeber, Lahey, & Thomas, 1991). Conduct disorder is relatively persistent over time, although specific behaviors may vary from year to year (Lahey, Applegate, Barkley, & Garfinkel, 1994). Early onset increases risk for adult antisocial personality disorder, while later onset and milder symptoms usually results in academic and occupational adjustment in adulthood. Onset of ODD is usually slow, occurring over a number of months or years. Typically, the disorder is evident before 8 years of age and rarely emerges after early adolescence.

[See also Attention-Deficit/Hyperactivity Disorder; Conduct Disorder; and Oppositional Defiant Disorder.]

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Audrey J. Murrell

DISENGAGEMENT THEORY. See Social Gerontological Theories.

DISHABITUATION. See Habituation.

DISRUPTIVE BEHAVIOR DISORDERS, now generally out of usage, applies to those patterns of behavior in which there is a pervasive and sustained disregard for authority or lack of regard for the feelings or well being of others (American Psychiatric Association, 1994). The category "disruptive behavior disorders" did not appear in the *Diagnostic and Statistical Manual (DSM)* classification until *DSM-III-R* (1987), where it refers to attentional, conduct, and oppositional disorders. Each revision of the *DSM* reflects substantive changes in the selection criteria for the disruptive behavior disorders. These changes represent refinements in the diagnostic criteria and subtypes resulting from new data about the validity and reliability of the criteria for disruptive behavior disorders.

In *DSM-IV* (1994), the category "attention-deficit and disruptive behavior disorders" refers to a range of behavior problems including attention-deficit/hyperactivity disorder (ADHD), conduct disorder (CD), and oppositional defiant disorder (ODD). The two most common disruptive behavior disorders are conduct disorder and oppositional defiant disorder.

Conduct disorder is characterized by repetitive and persistent violation of age-appropriate norms and disregard for the basic rights of others. *DSM-IV* (1994) groups the behaviors of this disorder in four categories: aggressive conduct, nonaggressive conduct, deceitfulness or theft, and serious violation of rules. Although ODD includes some of the features observed in conduct disorder (for example, disobedience and opposition to authority figures), it does not include the persistent pattern of the more serious forms of behavior in which either the basic rights of others or age-appropriate societal norms or rules are violated. Diagnosis of ODD is

based on eight criteria, most of which are manifestations of suspicion of and hostility toward authority figures. When an individual's pattern of behavior meets the criteria for both conduct disorder and oppositional defiant disorder, the diagnosis of CD takes precedence and ODD is not diagnosed.

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Mary E. Walsh and Natasha M. Howard

DISSOCIATIVE DISORDERS. The *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; 1994)* defines dissociative disorders as disruptions "in the usually integrated functions of consciousness, memory, identity, or perception of the environment" (p. 477). This succinct definition does not begin to describe the fascinating history of conditions that include people unable to remember even who they are or who experience themselves as embodying different identities.

This article will focus on dissociative disorders in adults, although there is an incipient but growing literature on dissociative disorders in children and adolescents. Dissociative *symptoms* can occur in many neurological (e.g., "seizure disorders") and psychiatric conditions (e.g., panic attacks), or as the result of ingesting some psychoactive substances. However, a diagnosis of dissociative *disorders* requires that the dissociative symptoms be a central presenting problem, produce clinically significant distress and/or maladjustment, and not be produced by neuropathies or the effect of a substance. Finally, dissociative *phenomena* are not necessarily pathological and can occur in everyday life and in special but benign contexts, such as hypnosis or meditation.

The term *dissociation* is used inconsistently in the clinical literature. It is used sometimes as an explanatory construct (e.g., "To tolerate that trauma, X dissociated from it"), and sometimes as a descriptive construct for incongruity between two or more indicators of information (e.g., "She honestly believes she is not anxious, but her skin conductance shows otherwise"), psychogenic amnesia (e.g., "Y cannot remember her name even though she has no neurological damage"), or a state of consciousness characterized by experiential detachment from the self or the environment (e.g., "During the rape I observed my body from above").

Perhaps the clearest understanding of dissociative phenomena can be attained by describing psychological processes in which dissociation occurs. Dissociative alterations in the sense of the self include experiences in which individuals feel estranged from themselves, or experience dreamlike or unreal states. Individuals who cannot experience any emotions, although their behaviors imply intense emotions, are good examples. *Depersonalization* is a term often used for these type of experiences. Dissociation of physical sensations usually entails a lack of awareness of interoceptive or exteroceptive stimulation not explainable by sensory damage

or receptor fatigue. Lack of physical sensations in a physiologically intact hand is a good example.

Dissociative alterations in the sense of the environment involve experiencing estrangement from the environment, or perceiving it as dreamlike or unreal. An example is experiencing events as if they occurred in a fog. A more extreme example would be losing awareness of the environment, either because the mind seems to go blank, or because of being so involved in an internal event that one seems temporarily incapable of regaining awareness of the surrounding environment. *Derealization* is a term commonly used for such phenomena.

Dissociation in the sense of agency involves experiencing lack of control of voluntary muscles in the body, either as paralysis or uncontrollable movements. Pathological dissociation of physical sensations or sense of agency are the province of some somatoform disorders, which are not part of the dissociative disorders category in the *DSM-IV* classification.

Dissociative alterations of memory include the inability to remember important personal information, which cannot be explained by ordinary forgetfulness or neurological conditions, as in the case of soldiers who may not remember what happened during a battle in which they participated. Even though conscious recollection may be absent, the information that cannot be recalled may still affect behavior (a deficit of explicit, but not of implicit, memory). A different alteration consists in the recollection of an event as if the person had watched it rather than experienced it (impersonal recollection, or lack of episodic memory).

Finally, at the level of identity, there are two typical dissociative variants. In one, the person experiences two or more different identities that concurrently or alternatively inhabit his or her physical body; in the other, a person sometimes experiences that his or her usual identity is displaced by another identity, as in experiences of spirit possession.

History

Either as alterations of consciousness or mixed with complaints of lack of somatic sensation or control, references to dissociative phenomena go back to pharaonic Egypt and have been observed in preindustrial societies. The systematic study of dissociation began in earnest in the latter part of the nineteenth century. The development of modern psychological theories of mental illness overlaps considerably with attempts by Jean-Martin Charcot, Pierre Janet, Edouard Claparède, Josef Breuer, Sigmund Freud, and William James, among others, to explain what was then termed *hysteria*. The hysterical patients that so puzzled those authors typically suffered from a number of somatization and dissociative symptoms.

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Charcot, an eminent neurologist in the latter part

of the nineteenth century, provided a psychological explanation for the display of hysterical patients including those who, after exposure to patients with epilepsy, developed hysteroepilepsy, or what might now be called *pseudoseizures*. Along with these displays, hysterical patients also exhibited other alterations of consciousness, such as amnesia, restriction of awareness, dreamlike states, and alterations of identity.

The credit for a comprehensive psychological theory of dissociative disorders and phenomena has to go to Pierre Janet, who provided a theory about normal and abnormal psychological "automatisms," similar to current notions of cognitive-emotional-behavioral schemata. In Janet's account, predisposed individuals exposed to intense emotions may experience alterations of consciousness, and the events experienced at the time will not be integrated with the usual stream of consciousness, but will have an independent life outside the awareness and/or control of the person. In the case of repeated or chronic dissociative phenomena, such independent units can become alternate identities.

Janet's theories and observations became well-known and influential in Europe and the United States. However, the overwhelming impact of psychoanalytic theory and the success of Eugen Bleuler's proposed category of schizophrenia in the earlier part of the century soon drowned most vestiges of Janet's theory. The eminent North American psychologist Ernest Hilgard rediscovered Janet's ideas through his influential neodissociation theory in the 1970s. Hilgard's casting of Janet's theory in modern cognitive terms, and various studies showing a higher prevalence than once thought of dissociative disorders, and of traumatic events and their dissociative sequelae have all produced an interest in dissociation unseen since the end of the nineteenth century. At the close of the twentieth century, there is an organization, a journal, and evaluation instruments exclusively devoted to the study of dissociation.

In the 1990s, a controversy arose over the possibility that dissociative disorders, especially dissociative identity disorder, are caused by overzealous therapists using inappropriately suggestive techniques. Nonetheless, systematic studies on whether the condition is only diagnosed by therapists who use suggestive techniques or hold an apriori belief in the validity of dissociative identity disorder, have failed to support the iatrogenic explanation for the condition. This does not deny, of course, that some therapists working with dissociative patients have made exaggerated or unfounded pronouncements, and that in this, as in other conditions, incompetent therapists can have an iatrogenic effect. A number of recent clinical guidelines have advocated caution in the diagnosis and treatment of individuals with dissociative disorders to avoid reinforcing symptoms and possibly false recollections.

The classification of dissociative disorders in North

America began in the early part of the twentieth century. Various editions of the *Statistical Manual* (1918–1942), a predecessor of the *Diagnostic and Statistical Manual of Mental Disorders* (Washington, DC), included hysteria within its purview. In *DSM-I* (1952), the psychoneurotic disorders included the categories of dissociative reaction (depersonalization, dissociated personality, fugue, amnesia, and others) and conversion reaction (anesthesia, paralysis, and diskinesis). *DSM-II* (1968) characterized these phenomena as hysterical neuroses, either of a dissociative or conversion type. *DSM-III* (1980) and *DSM-III-R* (1987) brought two major changes: First, detailed descriptions were provided for psychogenic amnesia, psychogenic fugue, multiple personality disorder, depersonalization disorder, and dissociative disorder not otherwise specified (DDNOS); and second, conversion phenomena were separated from the category of dissociative disorders and included as a subcategory of the somatoform disorders. Notwithstanding this separation, research has shown considerable symptom and traumatic history overlap between dissociative and conversion disorders, thus some authors have advocated the relocation of conversion under the dissociation umbrella. In the latest edition of the *International Classification of Diseases* (WHO, 1992, Geneva, Switzerland), the most widely used clinical taxonomy in some countries, conversion disorders have remained part of the dissociative disorders.

DSM-IV (1994) modifications included relabeling multiple personality disorder as *dissociative identity disorder*, changes in the criteria for dissociative amnesia and fugue, and greater discussion of the cross-cultural variation of dissociation. A proposal for a secondary dissociative disorder due to a medical condition was not accepted into the *DSM-IV*, although there is some evidence that seizure disorder and other medical conditions are associated with dissociative symptoms.

The *DSM-IV* included the new diagnosis of acute stress disorder, which was originally proposed as a dissociative disorder, but became a subcategory of the anxiety disorders. Its criteria include dissociative and anxiety symptoms. Individuals with posttraumatic stress disorder also commonly exhibit dissociation. The symptom overlap and traumatic etiology of the dissociative and posttraumatic disorders suggest that further study is needed before a final determination as to the correct placement of these conditions can be made.

Descriptions of the Dissociative Disorders

The remainder of this article will focus on the dissociative disorders categorized in *DSM-IV*. There have been some studies, most of them in the North American continent, that have evaluated the prevalence of dissociative disorders in various samples. Among clinical or

traumatized groups, there is a wide range, from 10% comorbidity among individuals with obsessive-compulsive disorder (a similar figure to that found in some studies with nonclinical populations), to 88% among women reporting sexual abuse. Individuals with a dissociative disorder, especially those with severe conditions, typically have a history of other diagnoses, partly because of a misunderstanding of their condition, and partly because many also have other Axis I and Axis II conditions. The usefulness of a dissociative diagnosis in these individuals depends on a good match with diagnostic criteria and on a good response to treatment that deals with their dissociative symptoms.

The most frequent comorbidity of the dissociative disorders is with the following conditions: depression and affective lability; anxiety, either as panic attacks or generalized; conversion and somatization; sexual dysfunction (not surprising considering that many of these individuals have an independently corroborated history of early sexual abuse); and, less frequently, substance abuse and eating disorders. Individuals with dissociative identity disorder also often fulfill criteria for borderline and avoidant personality disorders. Many, if not most, of these individuals have a recent or remote history of trauma. Nonetheless, a history of abuse cannot be considered a sufficient cause for these disorders because many individuals with a history of abuse do not develop them.

Dissociative Amnesia. Dissociative amnesia is defined as one or more instances of inability to remember important personal information, which cannot be explained by ordinary forgetfulness, developmental amnesia for the first years of life, or an organic condition. In dissociative amnesia, the individual loses explicit memory for personal experience, although implicit memory for general knowledge, skills, habits and conditioned responses is usually unimpaired.

Episodes of dissociative amnesia can be generalized, localized, or selective. In generalized amnesia, the individual is unable to remember all or most of his or her personal information. In localized amnesia, the individual cannot remember certain periods of time. In selective amnesia, memories related to particular issues or persons cannot be recalled. The vast majority of dissociative amnesias are of a selective nature, organized according to emotional rather than temporal parameters. As with the other dissociative disorders, a common precipitating factor is severe stress or trauma. Reported triggers for amnesia episodes include combat, legal or financial problems, natural disasters, serious crime, and sexual and physical abuse.

There has been acrimonious debate on the validity of amnesia for early sexual or physical abuse when there has been later recovery of such memories. Although not absent of methodological shortcomings, there are now dozens of published studies and legal

cases that consistently show that, at some point, a substantial minority of individuals have not recalled instances of early abuse that were later recalled, and in some cases, independently corroborated. Besides early abuse, instances of amnesia following other types of trauma, such as war or disasters, have been documented for over a century. It should be borne in mind, however, that the considerable support for the validity of some recalled memories does not preclude the possibility that other memories may be partially or completely false. The evidence suggests that memories of abuse "recovered" in or out of therapy have about the same validity as memories maintained all along. Every case should be judged on its own merits, considering both the reality of dissociative amnesia and the reconstructive and fallible nature of memory.

A differential diagnosis for dissociative amnesia should include malingering, neurological conditions that involve amnesia such as transient global amnesia, seizure disorders, and head injury, and the effect of psychoactive substances. Dissociative fugue is a superordinate diagnosis to dissociative amnesia.

Dissociative Fugue. The definition of dissociative fugue includes sudden and unexpected travel away from home or work accompanied by generalized amnesia, and confusion about personal identity or the development of a new identity. A typical example involves an individual who, after enduring severe stress or trauma, leaves home and becomes confused as to his or her whereabouts and identity. There are many descriptions of dissociative amnesia and fugue in the literature about war, but more recently, fugue has been described in cases of sexual or physical abuse. The differential diagnosis includes malingering, poriomania in complex partial seizure episodes, and other organic conditions such as drug-related fugues. Dissociative identity disorder (DID) is a superordinate diagnosis to dissociative fugue.

Dissociative Identity Disorder. This condition used to be called *multiple personality disorder* in previous editions of the *DSM*, and is considered the most severe of these disorders. The name was changed to indicate that the problem is not a multiplicity of personalities, but the inability to forge a coherent and consistent identity. The core of this condition is the presence of two or more distinct identities, each with a characteristic way of perceiving, thinking, feeling, and relating to the environment and the self, associated with dissociative amnesia for previous or current events. At least two of these identities or personality states recurrently control the person's behavior. It is important to point out that there is no need to reinforce these individuals' experience of different identities by treating them as if they were indeed different people, but there is no evidence that ignoring their experience has therapeutic value either. Most therapists use individual psy-

chotherapy with hypnosis as an adjunct with these individuals, but there are no comparative data on the efficacy of different therapeutic approaches.

The validity of this disorder has been seriously questioned, with some critics arguing that the apparent explosion in its diagnosis is the result of therapist reinforcement of the symptoms or, at the very least, of a joint delusion between the therapist and the patient. However, many of the critiques have carried little evidential weight (e.g., single cases of presumed therapeutic incompetence, or the argument that because a clinician has not encountered such individuals, the diagnosis lacks validity). As mentioned previously, studies have failed to support an iatrogenic explanation for the condition. On the other hand, recently developed assessment tools show that this and other dissociative disorders can be evaluated reliably. Also, initial survey and experimental studies indicate that these individuals show a consistent profile of symptoms and phenomena, and perform in projective, memory, and psychophysiological tests in a way that is consistent with the validity of the diagnosis and inconsistent with malingering or mere role-playing. Nonetheless, our understanding of this condition is very limited and demands further investigation.

The lack of evidence for an iatrogenic explanation for DID does not preclude a role for culture in the shaping and epidemiology of this and other disorders. Although there is growing evidence that this disorder is found in other countries besides the United States, cultures still provide information on what are the expected "idioms of distress" given certain conditions, and interpret discontinuities in experience as being caused by, for instance, psychological problems or spiritual forces.

There is no other psychiatric or neurological condition that closely resembles DID, but there is some surface resemblance between DID and some forms of psychosis. Individuals with DID typically have other dissociative symptoms such as fugues and depersonalization, and may be polysymptomatic with affective, anxiety, personality, and other disorders.

Depersonalization. Depersonalization disorder is defined as chronic and recurrent experiences of feeling detached from one's thoughts, feelings, or sensations, or experiencing that they are somehow unreal or dreamlike. These episodes are not accompanied by the failures in reality testing typical of psychosis.

It is important to distinguish depersonalization disorder, which involves recurrent episodes of depersonalization as the central problem, from depersonalization symptoms, which are common as secondary symptoms in other disorders including panic attacks, or as transient reactions to severe stress, trauma, or intoxication. Common features of depersonalization episodes include alterations in the sense of self such as experiencing the

body as an object, a precipitating event such as stress or a psychoactive substance, a sense of unreality, and sensory alterations such as diminished experience of colors or sounds. A related phenomenon, derealization, refers to a sense of unreality or estrangement from the environment. Although depersonalization and derealization are described as different phenomena, they usually occur together.

Differential diagnosis includes dissociative and other psychiatric conditions where depersonalization is a secondary symptom, and neurological conditions that are frequently accompanied by depersonalization episodes such as temporal lobe epilepsy.

Dissociative Disorders Not Otherwise Specified. Some studies have found that most individuals with dissociative disorders do not clearly fit the criteria for the disorders described here. A number of dissociative disorders not otherwise specified (DDNOS) are described in the *DSM-IV*, including identity alterations that do not fulfill all criteria for DID, derealization without depersonalization in adults, loss of consciousness in the absence of a neurological condition, and dissociative states in individuals subjected to intense forms of coercion.

Particular mention must be made of dissociative trance disorder, a condition that was deemed to deserve further study by the *DSM-IV* task force. This condition includes pathological forms of *trance*, defined as episodes of unawareness, unresponsiveness, or lack of control over one's behaviors, and of *spirit possession*, defined as alterations of identity and consciousness interpreted as the displacement of the usual identity by that of a putative external entity, often accompanied by reports of *amnesia*. It is important to mention that this diagnosis refers only to forms of trance or possession that produce serious distress or maladjustment and are not part of culturally sanctioned rituals. Dissociative presentations in many nonindustrialized cultures seem to fit the criteria for this diagnosis better than the criteria for the other dissociative diagnoses.

[See also *Amnesia; and Dissociative Identity Disorder.*]

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Etzel A. Cardena

DISSOCIATIVE IDENTITY DISORDER. A complex and complicated dissociative disorder characterized by disturbances of memory and identity, dissociative identity disorder (DID) was previously referred to as multiple personality disorder. Society’s view of this disorder has largely been shaped by the popular press, TV, and movies in which separate personalities are seen to switch in an all-or-nothing fashion with clear amnesia about the other identities. In reality, this disorder is more complex and less clear-cut than commonly portrayed. There may even be periods in which symptoms are not expressed. In-depth discussions of DID are available (Kluft, 1995, 1996; Putnam, 1989; Ross, 1997), on which the current discussion draws.

In this disorder, relatively consistent but alternating subjectively separate identities are manifested in a single individual who may display memory disruptions or amnesia for autobiographical material. These identities may have characteristics such as being controlling, self-destructive, or using a vocabulary which differs from the primary identity. A given identity may deny knowledge of other identities as well as show amnesia for

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autobiographical information. This amnesia may be experienced as not remembering significant portions of one's past, not knowing how one acquired various objects in one's house, or having people describe one's behavior or interactions with others in ways that are not remembered. Similar manifestations of the disorder have been reported in North America, Europe, and Asia.

The *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; American Psychiatric Association, 1994) characterizes dissociation as a "disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment." Thus, the disorder is characterized by a failure to integrate identity, memory, and consciousness which may lead to confusion and internal struggle over the nature of one's identity. In this sense, the disorder represents not the development of multiple personalities but the lack of development of one coherent personality with a singular identity. It is commonly assumed that this lack of development results from the experiencing of traumatic events such as sexual, physical, or psychological assault, especially in childhood. However, the experience of trauma in itself does not necessarily lead to DID. Thus, it is possible that critical environmental events (e.g., trauma) in conjunction with other factors (e.g., critical period in which attachment to a caregiver is being developed, a specific vulnerability on the part of the child, etc.) leads to DID. However, no clear etiology has been identified.

DSM-IV lists four diagnostic criteria for dissociative identity disorder. First, the presence of two or more distinct identities or personality states (each with its own relatively enduring pattern of perceiving, relating to, and thinking about the environment and self). Second, at least two of these identities or personality states recurrently take control of the person's behavior. Third, there is an inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness. And fourth, the disturbance is not due to the direct physiological effects of a substance (e.g., blackouts or chaotic behavior during alcohol intoxication) or a general medical condition (e.g., complex partial seizures). It should also be noted that children who have imaginary playmates or other such fantasy activity are not suffering from DID.

During the late 1800s and early 1900s a number of respected scientists and clinicians including Pierre Janet, Sigmund Freud, William James, and Morton Prince described cases in which there were pronounced shifts in identity, memory, and consciousness consistent with current DID diagnosis. Following this initial interest, the study of dissociative processes was largely ignored until the 1980s. At this time, the study of dissociation began to regain prominence, and the dissociative disorders category was added to the *Diagnostic and Statis-*

tical Manual of Mental Disorders. This twentieth-century gap in the study of dissociative disorders has resulted in fewer epidemiological and etiological studies than for most other psychopathological disorders.

Epidemiology

Although dissociative processes such as "spacing out" while listening to a boring talk or driving are common experiences in almost all individuals (Ray, 1996), psychopathological dissociative symptoms are much less common. In one study of over 1,000 individuals in a large Canadian city, it was concluded that as many as 3% of the population had a dissociative disorder, although other studies have placed this number closer to 1%. In terms of psychiatric populations, it has been reported that 3 to 8% of psychiatric inpatients have previously undiagnosed dissociative identity disorder. This is consistent with the report that most DID patients have spent many years in the mental health system with nondissociative disorder diagnoses before being given a DID diagnosis.

Current statistics report that male and female children show signs of DID in equal numbers whereas in adults, more females than males, by about 9 to 1, are hospitalized with DID. The adult data may be skewed because of differences between male and female behavior and help-seeking patterns. It has been suggested that whereas females utilize the health-care system, male DID patients do not and may also have more negative interactions with the criminal justice system. However, the data is lacking to support or refute this speculation. In terms of the characteristic manifestations of the disorder or prior sexual abuse history, it is reported that males and females appear similar. Assessment instruments such as the Structured Clinical Interview for *DSM-IV* disorders (SCID-D; Steinberg, 1996) and the Dissociative Disorders Interview Schedule (DDIS; Ross, 1997) should aid reliability and validity studies in future years.

Etiology

There exist a variety of suggestions concerning the etiology of DID with most experts suggesting that there are multiple routes for the development of the disorder. The most common pathway suggested is that of severe, chronic childhood trauma in which the child cannot escape or control the situation. This model suggests that in order to cope, the child dissociates the experience. This may occur by watching the experience in a detached manner to the extent of even imagining it is happening to someone else. Chronic neglect has been suggested as another pathway to dissociative disorders. In this situation, a substance abusing, depressed, or otherwise unavailable caregiver does not offer the child needed physical and emotional attention. Whether these pathways work independently or through other

processes such as attachment mechanisms is not known at this time.

An important neurological question is the relationship between dissociative processes and other neurological disorders, especially temporal lobe epilepsy (see Zahn, Moraga, & Ray, 1997 for a review). While the appearance of dissociative phenomena among individuals with temporal lobe epilepsy has been well documented, the data do not support a seizure disorder model as a primary mechanism for dissociation. Thus, although it is clear that individuals with temporal lobe epilepsy can show dissociative symptoms, it does not appear that the presence of dissociative symptoms suggests temporal lobe epilepsy.

Treatment

The treatment of dissociative disorders has been approached from a variety of perspectives including cognitive, psychodynamic, psychopharmacological, and inpatient using a variety of techniques including hypnosis (see Michelson & Ray, 1996 for a description of these techniques). Although there are a variety of approaches, there appear to be some common themes that cut across therapeutic approaches: (1) the initial establishment of safety in the therapeutic relationship; (2) allowing experiences and memories to come forth on the part of the patient rather than instituting a "search" for "forgotten" events. Because dissociative defenses are seen to help individuals separate themselves from experiencing traumatic events (Speigel, 1991), it follows that most therapeutic approaches emphasize in some manner understanding and putting into perspective a variety of levels of prior history including traumatic experiences. The underlying goal of the therapy work is an integration of current functioning with a personal history. Current functioning is worked on in terms of developing new behaviors and coping skills. As with any therapy, a social network and support group needs to be established. Although Kluft (Kluft, 1996; Ross, 1997, for a bibliography) has described a variety of case study therapy reports, there currently exist few if any studies of the effectiveness of different therapeutic interventions with DID.

[See also Dissociative Disorders.]

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William J. Ray

DIVORCE. Since 1960, as marriage has become a more optional, less permanent institution in Western industrialized nations, the divorce rate has more than doubled. Although there has been a modest decrease in the divorce rate since the late 1970s, almost one half of marriages in the United States end in divorce, and one million children a year experience their parents' divorce. Following divorce, most children reside in a mother-headed household. Although father-headed households are the most rapidly increasing type of household in the United States, and although there has been an increase in joint legal custody, 84% of children reside with their mothers following divorce and see their fathers intermittently or not at all. This usually is a temporary situation since 75% of men and 66% of women remarry. However, divorce occurs more rapidly and frequently in remarriages than in first marriages, especially if children are involved. Thus, more adults and children are encountering multiple marital transitions and rearrangements in family structure, roles, and relationships. Although the changes and stresses accompanying divorce may put adults and children at risk for developing psychological, behavioral, and health disorders, it also may give them an opportunity to escape from conflictual, unsatisfactory, deleterious family relationships, to find more fulfilling relationships, and in the case of some women, to attain a greater sense of individuation, competence, and achievement.

Who Divorces?

Divorce rates are higher in couples who marry young, are poor, uneducated, urban, and African American.

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Who Divorces?

Divorce rates are higher in couples who marry young, are poor, uneducated, urban, and African American.

The role of poverty and education is not quite as simple as this statement would indicate, because highly educated, economically independent women and couples in which the wife's income exceeds that of the husband also are more likely to divorce. African Americans not only are more likely to divorce, but are also more likely to separate without legal divorce and are less likely to remarry. Hence, compared to non-Hispanic Whites, African American spouses and children spend more time in a single-parent family or in one with a cohabiting partner or other family members such as a grandparent.

Both parents and children in families in which divorce will later occur show more problems in adjustment long before the divorce than do those who will remain in nondivorced families. This may be attributed to dysfunctional relationships and stresses in an unhappy marriage. However, it has been proposed that there is a divorce-prone personality. Some adults have characteristics, such as being neurotic, depressed, alcoholic or antisocial, that increase their probability of marital instability and of troubled relationships within and outside the family, of displaying inept parenting, and of encountering stressful life events.

In marital interactions, couples who will later divorce in comparison to those who will not exhibit contempt, denial, withdrawal, reciprocated aggression, more negative attributions about their spouse's behavior, dysfunctional beliefs about relationships, and generally poor problem-solving and conflict-resolution skills. They also are more erratic, irritable, and inept in parenting prior to the divorce than are parents whose marriages will not later be disrupted. The characteristics and social interactions of such individuals not only place them at risk for multiple marital transitions, but contribute to problems in family relations and children's adjustment following divorce.

Adjustment of Adults Following Divorce

Most adults, even those adults who have initiated divorce, encounter notable changes and stresses in their lives following a marital dissolution that may compromise their psychological and physical well-being. Both divorced men and women complain about loneliness, a sense of failure and being externally controlled, diminished self-worth, emotional lability, difficulty forming significant new intimate relationships, and anxiety about the unknowns and rapid alterations in their lives. Custodial parents express concerns about child rearing and task overload, noncustodial parents about alienation from, and loss of, their children. Although men show modest declines in retainable income following divorce, women show a substantial economic decrement, which has been estimated to be from 19% to as much as 35% in various studies. For divorced women,

this is associated with multiple occupational and residential changes. These changes are often to less desirable, more disordered neighborhoods with fewer resources, inadequate schools, and deviant peer groups, which makes raising competent children more difficult. However, the economic decrement for women following divorce has diminished as education and employment of women have increased, and as more aggressive legal means of enforcing support awards by spouses have been pursued.

Parents and children in divorced families encounter more stressful life events than do those in nondivorced families, and the more negative changes they experience, the more problems in adjustment they exhibit. Increased rates of psychopathology such as depression, alcoholism, and antisocial behavior and elevated rates of suicide, violence, homicide, and automobile accidents occur in adults following divorce. Furthermore, a breakdown in the immune system associated with an increased incidence of physical illness and morbidity from diseases also is found.

There is evidence that marriage is more strongly associated with the well-being of men than women. Perhaps that is why men remarry more rapidly. Even controlling for initial health and health habits, marriage is a stronger predictor of survival for men and friendship for women. Divorced fathers who do not reside with their children may be at special risk for engaging in impulsive and health-compromising behavior. However, there is a substantial subset of women who show notable benefits from divorce and report a sense of increased individuation, achievement, competence, and relief from no longer having to deal with a nonsupportive or undermining spouse in childrearing. Over time both divorced men and women become less depressed, anxious, and likely to engage in risky behavior, and this recovery is facilitated by the formation of new intimate relationships.

Adjustment of Children Following Divorce

Children exposed to divorce, on the average, show more antisocial, psychological, social, emotional, and academic problems than those whose parents have never divorced, especially compared to children in harmonious nondivorced families. These problems decrease over the first few years following divorce as children adjust to their new family situation. However, adolescence may trigger new problems in adjustment for adolescents in divorced, single-parent or remarried households. In adolescence there is about a twofold increase in the rates of school dropout, teenaged pregnancy, delinquency, and total behavior problems in the offspring of divorced parents over that found among adolescents in nondivorced families. Problems continue or increase in young adulthood and are reflected in lower socio-

economic status and educational attainment, more unemployment and welfare dependency, higher divorce rates, and more difficult or distant relationships with parents, especially with fathers. The average children from divorced families show more problems than those in nondivorced families and a twofold increase in certain specific problem behaviors, which must be viewed with concern. However, there is considerable overlap in the adjustment of children in the two types of families. Most children are resilient in the long-term response to their parents' divorce and emerge as reasonably competent, well-functioning individuals.

There is considerable diversity in children's responses to divorce and living in a single-parent family. The most important factors protecting against adverse outcomes of divorce include the personal factors of intelligence, an easy temperament, high academic achievement, self-worth, ego strength, and an internal locus of control. Important is a harmonious, supportive family environment with an authoritative residential parent who is high in warmth, responsiveness, control, and monitoring, and low conflict between the divorcing parents. Helpful are extrafamilial factors such as a close relationship with an adult, for example, with a teacher or a parent of a friend, positive relations with nondeviant peers, and an authoritative school environment. For girls, a supportive relationship with a female sibling or a noncustodial mother may help to mitigate some of the adverse effects of divorce. For boys, the involvement of an authoritative custodial or noncustodial father or a caring stepfather plays an especially important protective function.

The most important single protective factor is the quality of the relationship with the residential custodial parent. If the parent can remain responsive, supportive, and authoritative, it can to a considerable extent moderate the adverse effects not only of divorce, but of some of its concomitant risks such as parental depression, poverty, infrequent contact with the noncustodial parent, and conflict between the divorced parents. It frequently has been found that family functioning, rather than family structure or type, is more important to the adjustment of children.

Finally, probably the most frequently asked question about divorce is whether couples in conflictual, unhappy marriages should stay together for the sake of the children. This depends to a large extent on the conditions before and after divorce. If children have not been aware of family problems or exposed to conflict before divorce and move into a more stressful environment with inept parenting following divorce, problems in their adjustment increase. If they move from a conflictual family environment to a more harmonious family situation with an authoritative custodial parent, problems decrease. However, children who have a difficult temperament, high levels of behavior problems,

multiple problems in multiple domains such as the family, peer group, school, or neighborhood prior to the divorce are most likely to have difficulty in adjusting after their parents' divorce.

Relations of Custodial Parents and Children

Although both joint legal custody and physical custody have become more common in recent years, even when joint custody is awarded, most children reside almost full time with their mothers. Divorced mothers, especially in the early years following divorce, are lower in warmth, responsiveness, control, and monitoring; that is, they are less authoritative parents than those in nondivorced families. Children following divorce also often exhibit anxious, angry, resistant, and noncompliant behavior toward their parents. Mothers and sons are especially likely to become involved in coercive exchanges of irritable, aggressive behavior. Problems between mothers and sons are more intense and long lasting than those between mothers and daughters, who often develop close companionable relationships. However, conflict in the relationship between mothers and daughters may emerge in adolescence as these girls often become more precociously sexually active. Children in divorced families grow up faster and spend less time under adult supervision, are more active in family decision making, and more vulnerable to the influences of peers. About one quarter of adolescent girls and one third of adolescent boys in divorced homes in comparison to about one tenth in nondivorced families become disengaged from their families, spending little time in shared activities or in the home. If this disengagement is accompanied by the involvement and supervision of another caring adult, it may be a good solution to a difficult family situation; if it is associated with involvement with an antisocial peer group, it can have adverse consequences on the achievement and conduct of these adolescents.

Custodial fathers experience many of the same problems in parenting and the isolation and interference with work and social life experienced by custodial mothers. However, fathers have greater economic resources to gain assistance in household tasks and child care, better housing, schools, and neighborhoods. Custodial fathers do not have the difficulties in control and discipline characteristic of custodial mothers. However, they report more problems in monitoring their children's health, activities, schoolwork, and behavior. Fathers who seek custody of their children are more capable parents and have more positive relations with their children than those who assent to custody because of maternal incompetence or disinterest.

Children can thrive in either a mother-custody or father-custody home, and there is little evidence of the superiority measured in terms of child adjustment of

joint custody over sole custody in a well-functioning, single-parent household. Some research findings have indicated that children may fare better in the custody of a parent of the same sex, and that boys may be especially disadvantaged by the lack of a close relationship with a caring man, but again, the quality of the home environment appears more important than parental gender.

Noncustodial Parents

Contact with noncustodial parents diminishes rapidly after divorce. Only about one quarter of noncustodial fathers see their children once a week or more, and one quarter do not see their children at all or only a few times a year by one year following divorce. Noncustodial mothers maintain about twice as much contact with their children as do noncustodial fathers and are more likely to rearrange their living situation to accommodate their children's visits. Noncustodial mothers are more likely than noncustodial fathers to try to sustain an active parenting role, monitoring their children's activities, giving them instrumental help in such things as homework, serving as confidants and advisors, and providing support in times of stress. Noncustodial fathers are more likely to assume a recreational, companion role than the role of monitor, disciplinarian, or teacher.

Sheer amount of contact with the noncustodial parent is not associated with child adjustment. It is the quality of the contact that counts. Contact with a warm, supportive, authoritative parent under conditions of low conflict promotes the well-being of children with some evidence that contact with a same-sex noncustodial parent is most advantageous. Parents are most likely to maintain contact if interparental conflict is low, if they feel they have some control about decisions in their children's lives, and if proximity is close. African American fathers are more likely to maintain contact than are non-Hispanic White fathers, and Hispanic fathers are least likely.

No-Fault Divorce, Joint Custody, and Divorce Mediation

No-fault divorce, joint custody, and divorce mediation were advanced to minimize conflict during and after the divorce process, and/or to promote contact of the child with both parents. All have been partially successful in their goals. No-fault divorce laws have reduced the prolonged, acrimonious disputes, blaming, and vindictive and demeaning evidence gathering common under fault divorce laws. However, it also has allowed people to divorce who were going through temporary perturbations in what might have been a salvageable marriage. Even with no-fault divorce, marital dissolution is seldom a happy cooperative endeavor, and is more often painful and rancorous. Community

property laws have helped, but not solved, the inequities to women in divorce, but financial distributions and support and child custody remain the areas of most dissension in divorce.

Joint legal custody was promoted as a way to involve both parents in the responsibility, care, and welfare of their children and reduce conflict over custody. It has been successful in those regards. Contact with both parents and child support by fathers is more sustained, and returns to court to resolve disagreements are less frequent under joint custody. However, for the 25% of parents who have intensely conflictual relationships, the continued contact in joint custody may lead to greater exposure and enmeshment of children in parental dissension.

Although divorce mediation does not have notable effects on the long-term adjustment of children, it has reduced returns to court, and fathers, but not mothers, are more satisfied with mediated than with nonmediated divorces.

Legislators continue to be concerned about the high rates of marital dissolution. Some states have initiated fault divorce laws or have promoted the option of covenant divorces requiring demonstration of fault in divorce. Making divorces more acrimonious, or locking parents and children into unhappy, conflictual marriage is not an appropriate solution to divorce. Promoting satisfying stable marriages through support, workplace policies that reduce the conflicting requirements of families and jobs, affordable child care, and premarital and marital counseling and education programs may be more effective in limiting marital dissolution.

[See also Couples Therapy; Family Therapy; and Marriage.]

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E. Mavis Hetherington and Margaret M. Stanley-Hagan

DIX, DOROTHEA LYNDE (1802-1887). American teacher, humanitarian reformer, and Superintendent of Women Nurses during the Civil War. Though Dorothea Dix had three careers, she is remembered primarily as an impassioned advocate for humane living accommodations and a therapeutic climate for the insane poor.

Dorothea Dix was born in Hampden, Maine, 4 April 1802. Following a turbulent and unhappy childhood she opened a private school for small children in Worcester, Massachusetts. Later in Boston, she ran a private school during the day and a charity school dur-

ing the evenings. As a teacher, Dix was an active researcher and scholar, publishing books designed to involve parents in the education of their children. Her best known book, *Conversations on Common Things* (Boston, 1824), is a treasury of information on geography, history, word origins, and natural science.

Dix's career as a reformer was launched in 1841 following a visit to the East Cambridge, Massachusetts jail. There she found the mentally ill housed with hardened criminals in unfurnished, frigid, damp quarters. The deplorable conditions of the East Cambridge facility prompted Dix to travel throughout the state of Massachusetts to visit jails, prisons, and almshouses. As in Cambridge, she encountered insane persons living in unconscionable conditions; confined or chained in cages, boxes, sheds, and cellars, and often living in accumulations of their own filth. Following her travels she prepared a petition to the Massachusetts legislature documenting her observations and asking for funds for a new hospital to provide comfortable accommodations for the incurably insane and a therapeutic climate for those deemed curable. Her petition resulted in a major addition to the existing hospital at Worcester. Following success in Massachusetts, Dix thrust herself into a political-social arena reserved exclusively for men in Victorian society. She campaigned tirelessly on behalf of the insane throughout the United States and in foreign countries such as Canada, England, Italy, Scotland, Russia, and Turkey. Helen Marshall, in her biography *Dorothea Dix: Forgotten Samaritan* (New York, 1937), underscores Dix's capacity to raise money, shape public opinion, and shepherd legislation by pointing out that Dix was instrumental in founding 32 hospitals in the United States and several in foreign countries.

At the outbreak of the Civil War the 58-year-old Dix volunteered her services to the government and was named Superintendent of Women Nurses. She helped organize the medical infrastructure needed to accommodate wounded and dying soldiers. However, Dix's career as an independent reformer had been a poor training ground for daily work in a military-medical bureaucracy. She irritated physicians with her insistence on sobriety and sanitation and she was overly rigid and restrictive in her selection criteria for nurses. She performed a valuable service at the end of the war by assisting veterans with pensions and helping families secure records on soldiers missing in action.

In her later years, Dix returned to her work as a reformer traveling the country to raise money, inspect facilities, and consult with lawmakers and professionals. In her final years she was aware of the deterioration of the hospitals she had helped found. Never properly funded, her hospitals fell victim to neglect and became as custodial as the jails and almshouses they had replaced. She died at the age of 85 on 17 July 1887.

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Women of Psychology (Cambridge, 1982) suggest that Dix became the “soul and conscience of psychology in its earliest days” and helped sensitize early psychologists to problems that existed outside the restricted atmosphere of the laboratory. Dix’s work is also an invaluable study for professionals who must deal with political systems to apply psychological principles to social problems. Dix’s intellectual contributions are often overlooked, but it is clear that her humanitarian mission was guided by the earlier values of the scholar-teacher. Her knowledge of history and statistics are evident in her petitions to lawmakers, and she embraced an informed view of mental illness, regarding it as a disease of the brain and as a product of civilization. She pointed to religious excitement, unemployment, and personal loss as proximate causes of insanity. Dix had expertise in astronomy and botany. The careful observation associated with these disciplines served as a model for her reform work. She argued that what she stated for fact she must see for herself. Her emphasis on institutionalization for the mentally disturbed has proven to be untenable, but her methods and her pioneering quest for benevolence, justice, and an informed social-political conscience continue to be relevant to our unsolved problems.

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Wayne Viney

DOCTORAL DEGREE. The highest academic degree awarded by universities in North America is the doctor of philosophy (Ph.D.) degree, a research degree. According to the Council of Graduate Schools (1990, p. 1), “The doctor of philosophy program is designed to prepare a student to become a scholar, that is, to discover, integrate, and apply knowledge, as well as communicate and disseminate it.” Other doctorates—such as doctor of education (Ed.D.), doctor of jurisprudence (J.D.), and doctor of medicine (M.D.)—are intended to train professionals or emphasize applied research.

The first earned doctorates in America were doctor of philosophy degrees awarded by Yale University in 1861. The first such degree in psychology was awarded by Harvard University in 1878. A century later nearly 3,000 doctorates were awarded annually in psychology, reflecting the discipline’s growth as a science and a profession (Bartlett, 1994). Much of that growth occurred after World War II, but its earliest roots took hold in American universities during the late nineteenth century, with psychology’s evolution from a discipline of philosophy into one of experimental science. With that change came the earliest research laboratories (Caddwallader, 1992) and the first psychological clinic in which the new science of psychology could be applied to everyday problems (Benjamin, 1996). For all students of that day, the emphasis in doctoral education was on the science of psychology, for which the Ph.D. degree was appropriate recognition of scholarly achievement in research. To this day, that remains the predominant degree of choice among university graduate programs, even those preparing students for the professional practice of psychology.

The wisdom of this academic model as preparation for a licensed profession, as psychology became by the mid-twentieth century, was seriously challenged during the 1960s in the face of increasing public need for psychological services and what some regarded as lack of sufficient attention in university graduate departments to the knowledge, skills, and attitudes essential to professional practice. This resulted in debates about pedagogical issues that differentiate graduate education in research from that required for the practice of a profession, the genesis of professional schools in psychology, and the adoption of the professional doctor of psychology (Psy.D.) degree (Peterson, 1997). The first

Women of Psychology (Cambridge, 1982) suggest that Dix became the “soul and conscience of psychology in its earliest days” and helped sensitize early psychologists to problems that existed outside the restricted atmosphere of the laboratory. Dix’s work is also an invaluable study for professionals who must deal with political systems to apply psychological principles to social problems. Dix’s intellectual contributions are often overlooked, but it is clear that her humanitarian mission was guided by the earlier values of the scholar-teacher. Her knowledge of history and statistics are evident in her petitions to lawmakers, and she embraced an informed view of mental illness, regarding it as a disease of the brain and as a product of civilization. She pointed to religious excitement, unemployment, and personal loss as proximate causes of insanity. Dix had expertise in astronomy and botany. The careful observation associated with these disciplines served as a model for her reform work. She argued that what she stated for fact she must see for herself. Her emphasis on institutionalization for the mentally disturbed has proven to be untenable, but her methods and her pioneering quest for benevolence, justice, and an informed social-political conscience continue to be relevant to our unsolved problems.

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Psy.D. degree was awarded in 1971 by the University of Illinois, and within the next two decades more than 30 Psy.D. degree programs were established. By the mid-1990s, approximately 4,000 doctorates in psychology were awarded annually, about 20% being Psy.D. degrees, almost all of which were awarded by professional schools of psychology (APA Research Office, 1995). A few professional schools also award the Ph.D. degree, and, over the years, the doctor of education (Ed.D.) degree has been awarded to a small percentage of graduates whose psychology doctoral programs were located within university colleges of education.

A remaining challenge for the discipline of psychology is to clarify for the public its doctoral degree structure in relation to other professions and learned disciplines as guided by policy of the Council of Graduate Schools.

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Paul D. Nelson

DOCTOR OF PSYCHOLOGY DEGREE. The doctor of psychology (Psy.D.) degree is awarded to psychologists whose education is designed to prepare them for careers of professional practice. With considerable variation in content and emphasis, the programs that lead to the degree include the basic scientific knowledge relevant to professional psychology, training in the six professional competency areas (relationship, assessment, intervention, research and evaluation, consultation and education, and management and supervision) identified by the National Council of Schools and Programs of Professional Psychology (NCSPP), supervised practicum

experiences, and an internship. Dissertation requirements usually have an applied focus and range from relatively small, clinically oriented doctoral projects to products of the level and scope that might be found in Ph.D. programs. A typical program requires five years of graduate study beyond the baccalaureate degree.

The first formal proposal for a professional degree in psychology was advanced by Loyal Crane in 1925. The proposal was not cordially received in the academic community. Only two "Ps.D." programs, both in Canada and both short lived, were attempted. The scientist-practitioner model leading to the Ph.D. degree, established at the Boulder, Colorado, conference on clinical training in 1949, remains the most common design for the education of professional psychologists. The "Boulder model," as it came to be called, prepares graduates as researchers as well as clinicians, in the belief that each form of activity enhances the other.

By the middle of the 1960s, however, critics expressed discontent with some clinical programs in academic departments, which were seen as overemphasizing research at the expense of education for practice, the career the majority of graduates entered even at that time. After deliberation, an American Psychological Association (APA) committee recommended establishment of practitioner programs leading to the Psy.D. degree. In 1968, the Department of Psychology at the Urbana-Champaign campus of the University of Illinois inaugurated the first Psy.D. program in the United States.

Five years later, the concept of explicit education for the practice of psychology and the use of the Psy.D. degree were endorsed at the conference in Vail, Colorado. In the years that followed, additional Psy.D. programs were developed in universities and professional schools throughout the United States, although the initial program at the University of Illinois was discontinued in 1980. Throughout the 1980s there was still debate as to whether the Ph.D. or Psy.D. was the preferred degree for professional programs, but by the mid-1990s the consensus designation was the Psy.D. Also, some regional accrediting bodies asked professional programs to move to the Psy.D. from the Ph.D. By early 1997, at least 45 professional education programs were in operation, the great majority awarding the Psy.D. Approximately half of these were in universities, half were in free-standing professional schools, and 33 had been approved by the APA Committee on Accreditation. Almost all of these programs belong to the NCSPP, which, over a period of 20 years, has developed an explicit model for professional psychology education.

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Roger L. Peterson

DOCTOR-PATIENT RELATIONSHIP. Until the last quarter of the twentieth century in the United States, the doctor-patient relationship could best be described as paternalistic. Major medical decisions, often involving the use of increasingly sophisticated technology, were made by the physician (who was usually male). It was believed that such decisions were made with beneficent intent, but they did not involve open discussion or participation by the patient or the family. The major advantage of such a relationship was that the patient and his or her family were spared from making difficult and complex decisions and put their trust in the physician, with whom they often had a long-standing relationship. The major disadvantage, though it was not perceived to be so at the time, was that patients were deprived of the opportunity to make decisions reflecting their own cultural, gender, racial, and socioeconomic factors, which might not be shared or understood by the physician.

Balint and Shelton (1996) suggested several trends that resulted in the questioning of this paternalistic model: (a) the steady growth of the concept of individual freedom, begun with the American and French revolutions; (b) the ongoing scientific developments in medicine resulting in the physician's ability to cure as well as care, but creating the dilemma of how aggressive treatment should be if cure is not likely, and (c) the development of the National Health Service in Great Britain, and Medicaid and Medicare in the United States, leading to the possibility of universal access to care and increasingly involving the government in decisions regarding the use of societal resources for medical care. The medical horrors of physicians under the Nazi regime in World War II and the recognition of examples of medical experimentation in the United States where patients' rights were clearly violated, raised issues of patient autonomy and rights in medical decision making. The civil rights movement and the women's movement further strengthened the move toward more individual autonomy. The explosion of the information age with toll free numbers for patients to

request information about a specific disease, treatment, clinical trials, and local community resources, along with access to the Internet, allows patients to become well informed about their disease and treatment from both the traditional and the alternative/unconventional/complementary approaches. The transition from the fee-for-service (retrospective) to the managed care (prospective) health care system has altered the role of physicians by giving them less control over societal resources, and thus, has also lessened the power of physicians in their relationship with patients.

Models have been developed that give the patient more power in a relationship that has increasingly begun to be viewed as a partnership (Szasz & Hollender, 1956). Descriptions of this partnership emphasize patient autonomy, or independent choice (Quill & Brody, 1996). Patients and families are often asked to make medical decisions on the basis of information and statistics presented by the physician, as free as possible from a clear recommendation by the physician, which might influence the decision. Many physicians believe that this is the best way to respect patients' rights, as well as to provide further protection for themselves.

Increasingly, criticisms of this approach have been raised because patients are asked to make complex decisions without medical guidance, and physicians resort to the provision of information rather than careful consideration of the best course of action. Thus, a new model is being proposed, combining components of both the paternalism and autonomy approaches. Quill and Brody (1996) called this *enhanced autonomy* because their model suggests that autonomous decisions actually require the input or recommendation by the physician after a dialogue with the patient in which the physician has informed the patient of options and explored the patient's values. This is a relationship model, rather than a physician-or patient-dominated model, and includes consideration of the family as an important factor in patient care. Such a model allows the physician to support and guide the patient's decisions while also expressing an expert recommendation. This model is more demanding of the physician than the paternalistic or autonomous models because the physician's discourse with the patient and family must take into account the latter's values, their life stories, and their ability to hear information ("bad news"; see Girgis & Sanson-Fisher, 1995) at key points in an illness.

Recognizing this two-way interaction, Charles, Gafni, and Whelan (1999) term this a shared decision-making model. They have suggested the analogy that shared decision making takes "two to tango" (Charles, Gafni, & Whelan, 1997). The physician must know what "dance" the patient prefers and the required steps. Sometimes it is more important for the physician to lead (e.g., when technical information is given), while

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Roger L. Peterson

DOCTOR-PATIENT RELATIONSHIP. Until the last quarter of the twentieth century in the United States, the doctor-patient relationship could best be described as paternalistic. Major medical decisions, often involving the use of increasingly sophisticated technology, were made by the physician (who was usually male). It was believed that such decisions were made with beneficent intent, but they did not involve open discussion or participation by the patient or the family. The major advantage of such a relationship was that the patient and his or her family were spared from making difficult and complex decisions and put their trust in the physician, with whom they often had a long-standing relationship. The major disadvantage, though it was not perceived to be so at the time, was that patients were deprived of the opportunity to make decisions reflecting their own cultural, gender, racial, and socioeconomic factors, which might not be shared or understood by the physician.

Balint and Shelton (1996) suggested several trends that resulted in the questioning of this paternalistic model: (a) the steady growth of the concept of individual freedom, begun with the American and French revolutions; (b) the ongoing scientific developments in medicine resulting in the physician's ability to cure as well as care, but creating the dilemma of how aggressive treatment should be if cure is not likely, and (c) the development of the National Health Service in Great Britain, and Medicaid and Medicare in the United States, leading to the possibility of universal access to care and increasingly involving the government in decisions regarding the use of societal resources for medical care. The medical horrors of physicians under the Nazi regime in World War II and the recognition of examples of medical experimentation in the United States where patients' rights were clearly violated, raised issues of patient autonomy and rights in medical decision making. The civil rights movement and the women's movement further strengthened the move toward more individual autonomy. The explosion of the information age with toll free numbers for patients to

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at other times, the patient must lead (e.g., when expressing preferences for treatment).

The complexity of this model can be seen from several studies showing that almost all patients do indeed want all the information, good or bad, about their illness, but fewer want to participate in decision making (e.g., Blanchard, Labreque, Ruckdeschel, & Blanchard, 1988). Predictors of cancer patient preference for participation in decision making have been found to be age (with younger patients desiring greater involvement) and education (with better-educated patients preferring greater involvement). It is not clear whether those with serious illness desire a higher degree of participation in decision making. Patients who asked more questions, expressed more concerns, and were more anxious have been found to receive more information from physicians than those who asked fewer questions, expressed fewer concerns, and showed less anxiety (R. L. Stewart, 1991).

Outcomes of the Doctor-Patient Relationship

Patient-physician discussions have long been seen as the way in which much of the caring and curing of medical care is conveyed. However, it was not until the 1960s that investigators began studying communication processes in the interactions between patients and providers and relating those to outcome measures, particularly satisfaction either with total care or with aspects of the provider's behavior. Studies vary considerably in the degree of patient satisfaction found, due to a variety of instruments being used and different diseases being studied. An average of 40 to 50% of patients are found to be noncompliant/nonadherent, and many studies have found that patients do not recall what is said to them, especially when receiving a potentially life-threatening diagnosis (see Ong, de Haes, Hoos, & Lammes, 1995).

Hall, Roter, and Katz (1988) published a meta-analysis of 41 studies examining correlates of physician behaviors in encounters with patient outcomes. Results showed that satisfaction had the most consistent relationship with provider behavior. Satisfaction was most predicted by the amount of information provided by physicians. Satisfaction was related to greater technical and interpersonal competence by the physician, more partnership building, more immediate and positive non-verbal behavior, more social conversation, more positive talk, less negative talk (excluding negative voice quality), and more communication overall. Only question asking showed no relationship to satisfaction. Thus, it seems that satisfaction reflects both task and socioemotional physician behaviors. Task behaviors were seen as those serving the instrumental goals of the medical visit: information giving, question asking, and

technical competence. Socioemotional behaviors were those in the expressive realm: partnership building, social conversation, positive and negative talk, and interpersonal competence.

Compliance was found to have a comparatively weak relationship to provider behavior. Analyses showed that compliance was associated with more information given, fewer questions asked overall (but more questions asked about compliance), more positive talk, and less negative talk. Compliance seemed to increase when providers took a more dominant role in the interaction. Not surprisingly, recall/understanding was best predicted by information giving and was also significantly predicted by less question asking, more partnership building, and more positive talk.

Patients of a higher social class received both more information and more communication overall. They also received higher quality care (both technical and interpersonal) and more positive talk. Female patients received more information and total communication than male patients did. Female patients also received more positive talk and more partnership-building behaviors. Other research has shown that women ask for more information and receive more health care services (tests, prescriptions, appointments); thus, the greater amount of information could be a response to more questions being addressed. Older patients received more information, more total communication, and asked more questions concerning drugs; they also elicited more courtesy and more laughter than younger patients. Perhaps this is one reason why older patients have consistently been found to be more satisfied, although this may also reflect different expectations of the interaction.

It appears from this meta-analysis that patients' task-relevant behaviors of recall and compliance are primarily related to physicians' task behaviors, whereas satisfaction is related to provider's task and socioemotional behaviors. This countered the then-prevailing view that patients were rather poor judges of physicians' task behaviors, and instead, relied on socioemotional behaviors when evaluating quality of care. It would seem that task behaviors by physicians trigger socioemotional attributions by patients, but socioemotional behaviors by themselves do not result in patients' task behaviors (recall, compliance). More recently, Lewis (1994) made the appropriate suggestion that perhaps the distinction drawn between task and socioemotional behaviors is too dichotomous as communication skills can be seen as a technical skill. The best physicians thus have been found to exhibit both technical skills (including communication) and interpersonal skills (politeness, sensitivity and perceptiveness, patient rapport, kindness, humaneness, compassion, and empathy; see DiMatteo, 1995).

Patient dissatisfaction with care has been reported to be connected to health-related litigation, changing health care providers, disenrollment from prepaid health plans, and nonadherence to a physician's recommendations (Marshall, Hays, & Mazel, 1996). Little is known about the typically found positive relationship between satisfaction and health status. Marshall et al. examined health status and satisfaction with health care using data obtained at baseline and at 12 months for 952 participants in the Medical Outcomes Study. General satisfaction was found to be related to mental, but not physical, health in cross-sectional analyses. Longitudinal analyses showed the same pattern. Baseline satisfaction with care was linked to subsequent mental health; initial mental health was linked to subsequent satisfaction with care. Both the cross-sectional and longitudinal findings were found for patients with significant depressive symptoms and for those with other health problems. Thus, it is possible that dissatisfaction with care may reflect general dissatisfaction, or a tendency to experience depressive symptoms. What was not measured in that study was the possible relationship to satisfaction of objective measures of health status such as disability days, blood glucose levels, or cholesterol.

M. A. Stewart (1995) reviewed randomized controlled trials and analytic studies with health as an outcome variable. She reported that studies focusing on history taking found physician education regarding patients' understanding and concerns regarding the problem, and the impact of the problem on function, affected the patients' emotional status. Patient education affected physical health, level of function, blood glucose level, and blood pressure.

An analysis of studies examining discussions of the management plan found that patient education had an impact on emotional and physical status, and physician education (e.g., patient encouraged to ask questions) impacted patients' emotional status. Several intervention studies targeting either physician communication skills or patient information-asking skills reported positive impacts on patient health outcomes. These findings support the theoretical model of partnership discussed earlier. Patients do better or are more satisfied when they are participants in their own care and decision making. They should be encouraged to ask questions and be given emotional support and, when possible, written information. Agreement between patient and physician regarding the nature of the problem and the direction of management is an effective interaction that may have an impact on health outcome.

Future Challenges

Several key challenges are apparent that will shape the future physician-patient relationship. Balint and Shel-

ton (1996) point to the ongoing and increasing tension between the needs or preferences of a particular patient, the role of the physician as patient advocate, and the use of societal resources. The role of the physician in end-of-life care as goals of treatment move from cure to care is increasingly being explored, due in large part to the hospice movement. Finally, the use of complementary and alternative methods continues to expand, resulting in a mounting need for education of the physician about such methods, and research investigations to study the contributions of these methods.

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their needs. In this process, work plays a central role. By means of physical work, people modify their external environment and thus affect the possibilities of biological existence. It is through psychological activities that humans create the cultural values, including morality, which in turn affect their behavior.

In addition to his outstanding organizational talent, Doležal was an innovative designer of psychological tests and apparatuses, some of which are held in a permanent collection housed in the department of psychology at Charles University (Hoskovec & Štikar, 1994). In one version of an instrument designed to measure the latency of reactions to stimuli (Doležal, Břicháček, & Fischer, 1965), the stimulus was the stopping, at random intervals, of the movement of a rotating arm. Doležal died in Prague on 12 January 1965.

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DOMESTIC VIOLENCE, by legislation and statute law, is generally defined as an intentional abuse or physical assault committed by a past or present spouse, intimate partner, or family or household member against an-

other spouse, intimate partner, or family or household member, regardless of age or gender. The issue of child abuse, spousal abuse, intimate partner abuse, and elder abuse are now integral and fundamental components of most domestic violence legislation (Miller, 1998). There are few statistics universally agreed on. In fact, while some academics argue that domestic violence is a serious social problem, others continue to question its true gravity (Swisher, 1996).

Regardless of the rhetoric, the *Bureau of Justice Statistics Sourcebook* data demonstrate that abuse suffered by children and women in the home is a greater problem for them than is violence in the streets. These data also offer little doubt that while domestic violence does cross all socioeconomic and educational strata, it is not classless. Indisputably, numerous National Institute of Justice studies show that the difference in numbers of domestic violence abuse is proportional to the wealth and education of the victim. Families with incomes of less than \$7,500 have higher rates of aggravated assault than families with incomes of more than \$50,000. Data from the *Bureau of Justice Statistics Sourcebook* and other National Institute of Justice studies demonstrate that although domestic violence occurs in all racial, socioeconomic, and educational groups, it is more prevalent among people in poverty with little education. This does not mean that domestic violence is confined to the underclass, but that it is simply more prevalent there. This is also not intended to dispute the proposition that domestic violence does indeed permeate all racial, socioeconomic, and educational tiers.

There are little empirical scientific data to deny that, overwhelmingly, the majority of severe spousal abuse in our homes is inflicted on women by men. Bureau of Justice Statistics data demonstrate that in America a woman is more likely to be physically assaulted, raped, or murdered by a current or former male partner than any other assailant. The August 5, 1998, issue of the *Journal of the American Medical Association* estimates that between 700,000 and 1.1 million women each year seek care at hospital emergency rooms for acute injuries incurred from abuse by a present or former husband, boyfriend, or intimate partner. In violence between men and women, because of the greater physical and emotional injuries suffered by women, there can be little argument that men are the abusers and women the predominant victims of severe injuries (Straus & Gelles, 1990). Women are seven to ten times more likely to be injured in acts of intimate violence than are men. The November 1998 Research in Brief, *Prevalence, Incidence, and Consequences of Violence Against Women: Findings From the National Violence Against Women Survey*, sponsored by the National Institute of Justice, reports that of women who were raped and/or physically assaulted since the age of 18, three quarters were victimized by a current or former husband, cohabiting

their needs. In this process, work plays a central role. By means of physical work, people modify their external environment and thus affect the possibilities of biological existence. It is through psychological activities that humans create the cultural values, including morality, which in turn affect their behavior.

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Josef Brožek and Jiří Hoskovec

DOMESTIC VIOLENCE, by legislation and statute law, is generally defined as an intentional abuse or physical assault committed by a past or present spouse, intimate partner, or family or household member against an-

other spouse, intimate partner, or family or household member, regardless of age or gender. The issue of child abuse, spousal abuse, intimate partner abuse, and elder abuse are now integral and fundamental components of most domestic violence legislation (Miller, 1998). There are few statistics universally agreed on. In fact, while some academics argue that domestic violence is a serious social problem, others continue to question its true gravity (Swisher, 1996).

Regardless of the rhetoric, the *Bureau of Justice Statistics Sourcebook* data demonstrate that abuse suffered by children and women in the home is a greater problem for them than is violence in the streets. These data also offer little doubt that while domestic violence does cross all socioeconomic and educational strata, it is not classless. Indisputably, numerous National Institute of Justice studies show that the difference in numbers of domestic violence abuse is proportional to the wealth and education of the victim. Families with incomes of less than \$7,500 have higher rates of aggravated assault than families with incomes of more than \$50,000. Data from the *Bureau of Justice Statistics Sourcebook* and other National Institute of Justice studies demonstrate that although domestic violence occurs in all racial, socioeconomic, and educational groups, it is more prevalent among people in poverty with little education. This does not mean that domestic violence is confined to the underclass, but that it is simply more prevalent there. This is also not intended to dispute the proposition that domestic violence does indeed permeate all racial, socioeconomic, and educational tiers.

There are little empirical scientific data to deny that, overwhelmingly, the majority of severe spousal abuse in our homes is inflicted on women by men. Bureau of Justice Statistics data demonstrate that in America a woman is more likely to be physically assaulted, raped, or murdered by a current or former male partner than any other assailant. The August 5, 1998, issue of the *Journal of the American Medical Association* estimates that between 700,000 and 1.1 million women each year seek care at hospital emergency rooms for acute injuries incurred from abuse by a present or former husband, boyfriend, or intimate partner. In violence between men and women, because of the greater physical and emotional injuries suffered by women, there can be little argument that men are the abusers and women the predominant victims of severe injuries (Straus & Gelles, 1990). Women are seven to ten times more likely to be injured in acts of intimate violence than are men. The November 1998 Research in Brief, *Prevalence, Incidence, and Consequences of Violence Against Women: Findings From the National Violence Against Women Survey*, sponsored by the National Institute of Justice, reports that of women who were raped and/or physically assaulted since the age of 18, three quarters were victimized by a current or former husband, cohabiting

partner, date, or boyfriend. Women are significantly more likely to be killed by intimates, such as husbands and boyfriends, compared to men. However, reams of data in the *Bureau of Justice Statistics Sourcebook* also demonstrate that when the victim is weaker than the perpetrator, abuse can and often does occur regardless of age or gender.

In *Violence in Families: Assessing Prevention and Treatment Programs*, the editors in the executive summary report that "running through discussions of child maltreatment, domestic violence [spousal/intimate partner abuse], and elder abuse is the idea of unequal power in the relationship between the abuser and victim." Recent government data reveal that as many as 3 million children in the United States are annually reported to child protective agencies as alleged victims of maltreatment and at least one third of these cases are confirmed. There are 210,000 incidents of child sexual abuse that occur every year (Wallace, 1996, p. 37). Data from the *Bureau of Justice Statistics Sourcebook* demonstrate that when physical abuse and not sexual abuse is examined, the majority of child abuse is by female care givers. This high rate of abuse includes abuse by single mothers. When child abuse occurs in a two-parent household the abuse is equally shared between women and men. The July 1994 Justice Department special report, *Murder in Families*, examined 8,000 homicides in 75 large urban counties and found that one third of family murders involved a female as the murderer. In sibling murders, females were 15% of the murderers, and in the murder of their parents 18%; in the murder of a spouse, 41%, and in the murder of children, 55% of the killers were the mother of the child. In 1992, a congressional committee reported an estimate that as many as 1.5 million elder Americans suffer from physical, psychological, or financial abuse. *The National Elder Abuse Incidence Study 1998* reports that 47% of the abusers of the elderly are women. Data demonstrate that this form of behavior, domestic violence, is displayed more by men than women. However, data also demonstrate that this behavior is *not exclusive to men only*. Data by government and private agencies can and should be carefully examined to expose bias and discover truths.

Domestic violence is an aberrant, sometimes pathological, and profoundly complicated form of social, economic, and institutional power and control behavior, regardless of the age or gender of the abuser or victim. There are now hundreds of studies, both public and private, that demonstrate, in varying degrees, that the majority of abusers are people who display one or more of the following behaviors:

1. Grew up in a violent home or environment
2. Have chronic alcohol and drug abuse problems
3. Lack interpersonal skills
4. Have low socioeconomic and/or educational status
5. Have high levels of anger and exhibit hostile behaviors that may be caused by a variety of antisocial behavioral and personality disorders, such as passive dependent/compulsive behavior and borderline personality.

In the past few decades, domestic violence has emerged as a major social, health, and law enforcement issue. Contemporary intervention programs include both public and private child and adult protective services, battered women's shelters, batterers programs, specific criminal justice laws and programs, victim-witness advocates focused on spousal abuse in health and criminal justice agencies, and child advocacy centers. Too often the victims of domestic violence discover that many of these intervention efforts consist of multifaceted, competing, and independent agencies, each with diverse policies and strategies, and they are often unconcerned or unaware of other agencies' goals. Many of these diverse agencies' successes or failures remain largely undocumented and unanalyzed, and their efforts remain uncoordinated (Chalk & King, 1998).

Violence in our homes between family members has long been considered a private family matter rather than a criminal matter. We as a society, and more specifically the civil and criminal justice systems, social service providers, health officials, and researchers, are just beginning to understand the causes and research the long-term consequences of domestic violence. Because of the fragmentation of services, the lack of cooperation between service providers, and problems with the study designs and methodology of researchers, it has been difficult if not impossible to determine the effectiveness of the interventions. Presently, there is little disagreement that reactive policies (civil, criminal justice system, and court mandated battering programs) rather than preventive strategies (proactive education and early health-care intervention) predominate (Chalk & King, 1998).

Over the last 20 years major changes have been made by the criminal justice system. Every state now allows for warrantless arrest by law enforcement officers in misdemeanor domestic violence cases. There is general agreement in law enforcement that their intervention in domestic violence is necessary to solve the problem. Law enforcement's role should be to rigorously enforce existing law, provide emergency intervention to stop the violence, and restore the peace. Law enforcement should further provide the victim with information regarding what other agencies are available for further assistance.

In all 50 states, civil protective or restraining orders designed to augment criminal prosecution are also available for victims of domestic abuse. It is the intent of these policies that sanctions against abusers will act as a deterrent by demonstrating that criminal sanctions

would occur if abusers violated a restraining order or abused a family member. It was further anticipated that these criminal sanctions would create a deterrent affect not only on the abuser and prevent the abuser from repeating the act, but that they would also deter others in society who might have a desire to commit the same type of criminal behavior. The July 1998 National Institute of Justice Research in Brief, *Preventing Crime: What Works, What Doesn't, What's Promising*, reports that studies demonstrate that arresting abusers reduces repeat domestic abuse by employed suspects as well as people who "have roots in the community." The arrest of abusers who have a history of criminal behavior, or unemployed suspects, seems to have had less success, and, in fact, the arrest process may cause higher rates of repeat offense. Batterer intervention programs were established in the late 1970s, as rape crisis centers, women's shelters, and feminists called attention to the victimization of women because of spousal abuse. The use of batterer intervention programs or court imposed sanctions is increasingly becoming a condition of probation in many jurisdictions. It is here, in battering intervention, that the origins, causes, and proper interventions of domestic violence are most intensely debated. There is general agreement that there are three theoretical categories. Although few batterers programs claim to promulgate a single theory, there is little disagreement that the majority have profeminist affiliation, and hence almost all such programs favor the feminist educational approach designed for male clients only (Healy & Smith, 1998).

In *Family Violence: Legal, Medical, and Social Perspectives*, Harvey Wallace writes that most researchers agree that there are three categories of domestic violence theories of spousal abuse that locate the cause, and hence the cure, differently: (1) the psychiatric classifications that examine and analyze the abuser's personality traits and mental status; (2) the social-psychological classifications that examine and analyze external factors that affect families, such as individual stress, family stress, and the typology of family interaction; and (3) the sociocultural classifications that focus on the social and familial interaction between men and women and the cultural acceptance of the role of violence in society. All major evaluations have produced data that demonstrate that the majority of men who successfully complete a structured educational program do not abuse their partner during the 6 to 18 months following completion. Favorable evaluations supporting the use of batterers programs also demonstrate their imperfections. Studies report that it is not unusual for one third to one half of the men to drop out after the first session. In one recent evaluation, over 500 men initially contacted the program over a 12-month period. Of these, only 283 completed the intake process, and of that number, only 153

completed the program. In the final analysis, only 20% of those who contacted the program completed it successfully. Most researchers concur that the majority of these studies are inconclusive because of methodological problems. Studies that are methodologically sound have produced only modest results (Edleson, 1995).

There are many controversies that continue to contentiously rage among feminists, scholars, academics, and other professionals concerning the definition, causal factors, and proper remedy of domestic violence. However, one proposition that creates little debate is that this form of abusive behavior requires additional research before we determine all of its ramifications. Another proposition that causes little to no disagreement is that however domestic violence manifests itself, it is aberrant and unacceptable behavior. Psychologists in hospitals, clinics, and a myriad of agencies both public and private already provide clinical and counseling services to people who display these forms of behavior. They also provide numerous services for the victims of abuse. As counselors, clinicians, and researchers, psychologists have much to contribute to a clearer understanding of personality and behavioral typologies and characteristics of abuses. Often, members of the medical profession are the first to come into contact with victims of domestic violence. They must understand and recognize not only the physical, emotional, and psychological symptoms of the victims, because of the criminalization of domestic violence they must now appreciate how their role can relate to both the civil and criminal justice system and prepare themselves for that eventuality.

To end this multilayered, complex, and contentious dilemma, the identification of abuse and treatment interventions must not continue to take precedence over preventive strategies. Proper progress will not be made until there is a national collective method of implementation that all researchers, the civil and criminal justice systems, and service providers are willing to accept.

[See also Child Abuse and Neglect: Family Violence; and Violence and Aggression.]

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Richard L. Davis

DONDERS, FRANCISCUS CORNELIS (1818–1889), Dutch physiologist and ophthalmologist. Born in Tilburg, he attended a village school and a monastery before entering a military medical school and beginning study of medicine at the University of Utrecht in 1835. Five years later he sat for his examination for doctor of medicine in Leyden and received the degree. Donders worked for several years as a military medical officer and began teaching and contributing to medical journals. In 1847, he was appointed professor extraordinary on the medical faculty at the University of Utrecht. His interest in physiological optics led him to the practice of ophthalmology. In 1852 he became ordinary professor at Utrecht and in 1858 opened a charity hospital that served as a research and educational institution attracting international attention and educating students who became outstanding practitioners. He accepted the professorship in physiology at Utrecht in 1862 but continued also as director of the hospital until 1883. Required to retire at age 80, he died soon thereafter.

Donders was a close friend and collaborator with many of the mid-nineteenth-century international set of physiologists who were forging ahead in establishing experimental physiology and medical science. He edited the *Nederlandsch Lancet* and with A. von Graefe served as coeditor of the *Archiv für Ophthalmologie* from 1855. His publications (numbering more than 340) covered a broad range of topics and included clinical observations, laboratory studies, theoretical explanations of physiological phenomena, and practical applications. His most influential investigations focused on theory and applied aspects of the physiology and pathology of the eye, from which came prescriptions on how to employ corrective glasses for farsightedness, nearsightedness, and astigmatism. The culmination of that work, *On the Anomalies of Accommodation and Refraction of the Eye* (1864), was published in London (translated by W. D. Moore) and widely recognized as a stellar contribution. Elected a foreign member of the Royal Society of London in 1866, he was also active as officer of and presider over scientific societies and assemblies, both in his own country and abroad.

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mately 300,000 U.S. citizens. Down syndrome ranks second to fragile X syndrome as the most frequent genetic cause of mental retardation. Although recognized by Edouard Seguin, a French physician and educator, as early as 1846, the first written description of the disorder was published in 1866 by John Langdon Down, a British physician from whom the syndrome derives its name. Jerome LeJeune, a French geneticist, and his colleagues established the genetic basis of Down syndrome in 1959.

Epidemiology

The incidence of Down syndrome has been estimated to be 1 in 700 to 1 in 1,000 live births. Down syndrome is evident prenatally and may be detected through chromosomal analysis derived from either chorionic villus sampling (at 8–10 weeks gestation) or amniocentesis (at 14–17 weeks gestation). Although less conclusive, low levels of maternal serum alpha-fetoprotein measured in the second trimester of pregnancy have been associated with the presence of a Down syndrome fetus. If prenatal diagnosis is not conducted, Down syndrome is generally determined soon after birth because health professionals are very familiar with its physical characteristics. Boys outnumber girls 1.3 to 1.0, and the disorder occurs in all racial and ethnic groups.

Ninety-five percent of Down syndrome is due to trisomy of chromosome 21. Trisomy results from nondisjunction or a failure of the two chromosomes of pair 21 to separate during meiosis prior to ovulation. In Down syndrome the nondisjunction is almost always maternal in origin (95% of cases), and is significantly related to increased maternal age. Five percent of Down syndrome results from translocation in which a portion of chromosome 21 attaches to another chromosome or from mosaicism due to an error in cell division soon after conception.

Clinical Characteristics

Affected individuals share, to varying degrees, a set of physical stigmata. The most common features of Down syndrome include microcephaly (small head), flattened face with a recessed bridge of the nose, upward slanting eyes, small ears and mouth, large tongue, short, broad hands and feet, stubby fingers, broad neck, stocky appearance, and loose skin folds at the nape of the neck. Down syndrome has a large number of associated medical problems including congenital gastrointestinal and cardiac abnormalities, obesity, diabetes, hypothyroidism, eye problems such as myopia, strabismus, nystagmus, and cataracts, mild to moderate conductive hearing loss secondary to chronic middle ear infections, sleep apnea, hair loss, and low muscle tone. Infants and young children with Down syndrome are also at increased risk for acute leukemia as compared to the general population.

There has been considerable study of the neuroanatomical aspects of Down syndrome. Research shows that the cortex and cerebellum are markedly reduced in overall size relative to matched controls. Moreover, there is an immaturity of brain development evident in both neurons and their synaptic connections. Comparative studies of people with Down syndrome and matched controls reveal underdevelopment of cerebellar, limbic, and frontal regions especially. A particularly interesting aspect of the disorder is the propensity for people with Down syndrome to manifest neurological abnormalities associated with Alzheimer's dementia. Investigators have suggested that the premature aging and neurological anomalies evident in Down syndrome might present a model for the study of Alzheimer's disease. Several longitudinal studies are currently underway to characterize the cognitive and behavioral changes that occur in older adults with Down syndrome, and to differentiate between precocious but normal aging and Alzheimer's disease.

Intellectual and Adaptive Functioning

Most people with Down syndrome function within the mild to moderate range of mental retardation on standardized intelligence tests. Some function in the borderline or low-average ranges, and only a few have severe mental retardation. They demonstrate greater deficits in verbal-linguistic skills relative to visuospatial skills. Delayed language acquisition has been linked to deceleration of overall intellectual development in longitudinal studies of infants and young children with Down syndrome. People with Down syndrome mosaicism typically have higher IQs, by 12 to 15 points on average, than people with trisomy 21. Performance on measures of adaptive behavior is generally commensurate with intellectual ability.

Developmental Aspects

Children with Down syndrome attain early developmental milestones at much later ages than typically developing children. In particular, children with Down syndrome have significantly delayed gross motor development, which has come to represent a cardinal behavioral feature of the syndrome. Independent sitting is usually attained at 1 year of age, whereas independent walking is not achieved until an average age of 2 years. Slow progress is also noted in early language development, particularly in language production.

Early clinical descriptions of people with Down syndrome propagated a behavioral stereotype that has not been supported by empirical study. For example, the stereotype suggested that people with Down syndrome are highly sociable. Studies of sociability suggest that people with Down syndrome are not universally more sociable. Rather, sociability seems to be both age and

gender dependent with young, particularly female, children being the most sociable. Similarly, there is inconsistent support for the belief that people with Down syndrome have a characteristically easy temperament. Although many people with Down syndrome are perceived as having an "easy temperament," there is also a restless, aggressive, and difficult to manage subgroup.

Studies of mother-child interactions reveal that children with Down syndrome generate fewer positive social signals, exhibit delayed responsiveness, and demonstrate less predictable responses than do typically developing children. In the absence of clear and frequent signals from their children, mothers of children with Down syndrome may be more likely than mothers of typically developing children to adopt a controlling and directive interactive style during naturalistic play. These studies demonstrate the interrelatedness of child characteristics and parental behavior contribute greatly to professionals' understanding of delayed language and concept development, and suggest intervention techniques to enhance the quality of early interactions.

Adults with Down syndrome may reside in family homes, small-group homes in the community, or in situations of independent or semi-independent living. The majority of Down syndrome adults work in paid employment settings with some degree of support (e.g., supervision, training, or transportation). People with Down syndrome show interest in sexual expression and, therefore, sex education is an important issue. Although men with Down syndrome are sterile, women with Down syndrome are typically fertile and may deliver children with or without Down syndrome.

People with Down syndrome have a greater early mortality rate as compared to people of similar ages from the general population and to people with comparable levels of mental retardation due to other causes. Congenital heart disease contributes greatly to the increased early mortality rate, as do respiratory tract infections, leukemia, and congenital gastrointestinal tract anomalies. Children are at marked risk for early death. For example, a population-based study showed that children with Down syndrome between the ages of 1 and 9 years are approximately 17 times more likely to die than matched controls. Improved medical management of respiratory infection and congenital heart disease in young children with Down syndrome has significantly increased life expectancy. However, the average life expectancy for people with Down syndrome is still less than the general population. For example, 44% of people with Down syndrome are alive at age 60 as compared to 78% of the general population.

Psychological Disorders

Like other people with mental retardation, people with Down syndrome are susceptible to the full range of mental disorders evident in nonretarded people. Re-

search has shown increased rates of conduct problems (e.g., oppositional behavior) during childhood, and greater risk for depression and dementia, perhaps of the Alzheimer's type, in adulthood. Depression may not be diagnosed because the family may attribute the depressive symptoms to Down syndrome, or misinterpret changes in cognitive and behavioral functioning as dementia. Researchers are working to establish new measures to facilitate accurate differential diagnosis.

Family Issues

The presence of a person with mental retardation can have a profound effect on all facets of family functioning. Although not a frequent focus of study in family research, there is a suggestion that families of people with Down syndrome may be better functioning than families with non-Down syndrome retarded children. Further research is necessary to determine the factors that account for greater adaptation among these families.

Prevention and Intervention

Down syndrome is incurable. The only current preventive strategy is termination of pregnancy, an option that is being used and may be affecting incidence rates. Infants and young children with Down syndrome are routinely involved in early intervention programs aimed at maximizing their developmental potential. Such participation has been shown to mitigate, to some degree, the developmental deceleration in intelligence described previously. School-age children and adolescents with Down syndrome benefit from academic curricula that embed reading, writing, and arithmetic skills within teaching of daily living and personal-social skills. The ability to care for oneself, maintain good interpersonal relationships, and exhibit appropriate work habits and behaviors is crucial to successful transition from school to work and from home to community living.

[See also Mental Retardation.]

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William E. MacLean, Jr.

DREAMS. [This entry comprises three articles: a definition and description of the physiology of dreaming; a broad overview of the psychological theories of and research on dreaming; and a survey of various cross-cultural perspectives about the causes and significance of dreams and altered states of consciousness. See also the many independent entries that relate to or affect dreams; Amnesia; Anger; Brain; Brain Imaging Techniques; Cognition; Consciousness and Unconsciousness; Daydreams; Emotion; Experimental Psychology; Fantasy; Fear and Terror; Hallucinations; Memory; Nightmares; Night Terrors; Psychoanalysis, article on Theories; Sleep; and the biographies of Freud and Wundt.]

Physiology

Modern sleep science and folk psychology concur in defining dreaming as a mental state which occurs in sleep and which is characterized by a rich panoply of sensory, motor, emotional, and cognitive experiences. When we dream we see, feel, and move through an entirely fabricated world that seems real despite the physical impossibility of some of the imagined events and despite the bizarre improbability of many others. Except for rare and evanescent instances of awareness of our true state (called lucidity), we are duped into believing ourselves awake. And, despite the vivid intensity of this virtual reality we have difficulty remembering our dreams unless we awaken promptly from REM sleep; even then, we may be aware that much content cannot be retrieved from memory.

A dream theory must thus account for the following formal aspects of cognition: (1) vivid imagery, especially vision and movement; (2) intense emotion, especially fear, elation, and anger; (3) delusional acceptance of

dreams as real and as occurring as if in waking; (4) discontinuity and incongruity of plot times, places, and persons; and (5) the amnesia for most of these subjective experiences. [See Memory.] These five features suggest an analogy between dreaming and delirium, a clinical condition caused by organic brain dysfunction. [See Organic Mental Disorder.]

History of Dream Theory

Following eons of attribution of dreaming to extracorporeal agencies, such as the winged gods of the Greeks and the Christians' angels, thinkers of the eighteenth-century Enlightenment boldly proposed an entirely endogenous source of dreams; dreams could arise, they said, from the altered brain activity of sleep. But this theory was quickly eroded by the mysticism of the Romantic movement in the late eighteenth and early nineteenth centuries and found no solid empirical base until the mid-twentieth century.

With the birth of experimental psychology in the second half of the nineteenth century, the brain physiology thesis was enunciated again. The most explicit hypothesis was advanced by Wilhelm Wundt, who held that some brain functions were enhanced (i.e., those subserving visual image generation and emotion) while others were impaired (i.e., those subserving recent memory and self-reflective awareness). Following Wundt, Sigmund Freud at first lauded the brain physiology approach, but for lack of data, he later repudiated this thesis in favor of his psychoanalytic hypothesis that the bizarre features of dreaming were the result of the disguise and censorship of unacceptable unconscious wishes. Freud thus likened dreaming to neurosis rather than delirium.

Physiology of Dreaming

Only after Hans Berger's discovery of brain waves in 1928, and the subdivision of sleep into two distinct phases by Eugene Aserinsky and Nathaniel Kleitman in 1953, was a truly experimental approach to dream psychology possible. Although most of sleep was characterized by electroencephalogram (EEG) evidence of brain deactivation, or non-rapid eye movement sleep (NREM), periods of wakelike EEG activation and rapid eye movements (REMs) recurred at 90- to 100-minute intervals and occupied as much as 25% of sleep. It is the work that sprang from this discovery that established the strong correlation between REM sleep and dreaming, a correlation that has spawned current models relating the formal psychology of dreaming to its origins in the brain. Although dreamlike mentation has been shown to occur in many states including quiet waking, sleep onset, and even in NREM sleep, it is REM sleep that provides by far the most favorable physiological conditions for dreaming. For this reason, it is war-

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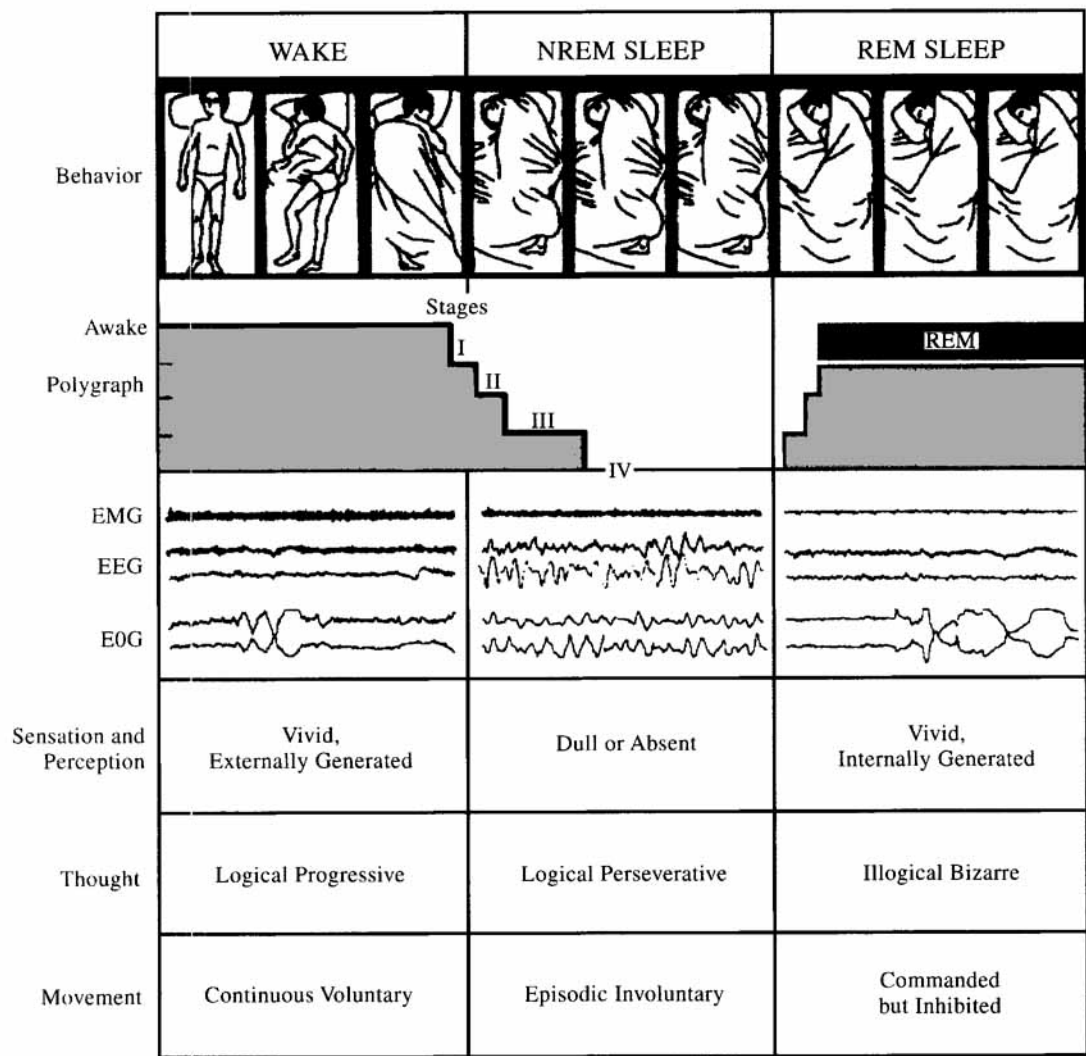
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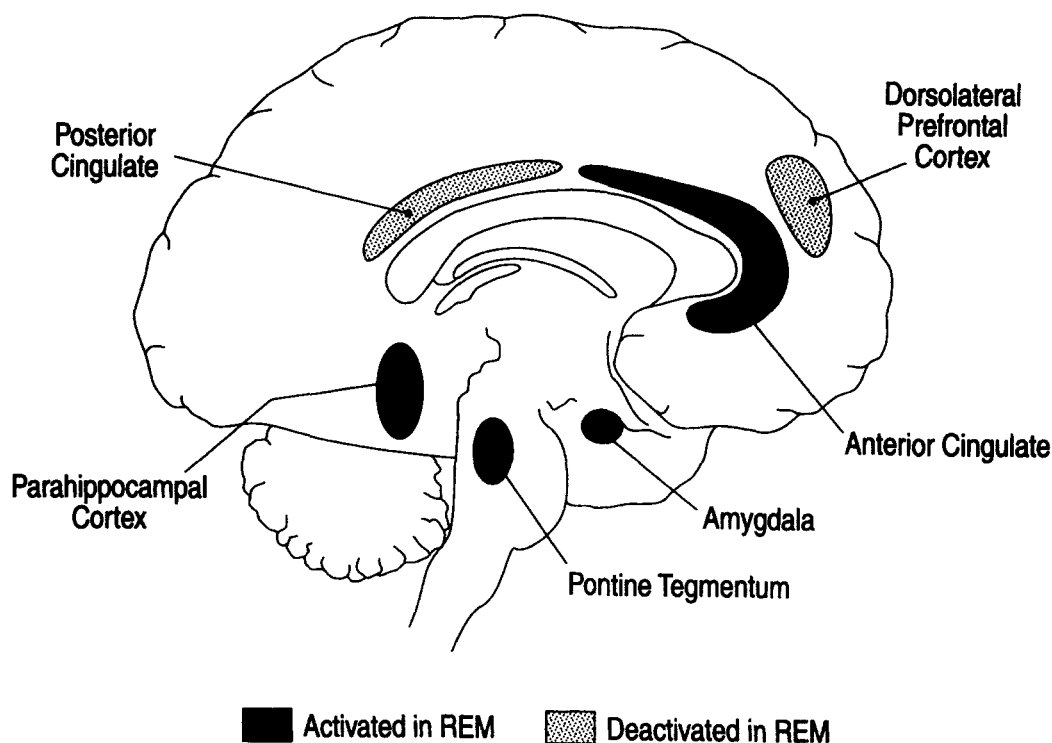
DREAMS: Physiology. Figure 1. Behavioral states in humans. Body position changes during waking and at the time of phase changes in the sleep cycle. Removal of facilitation (during stages 1-4 of NREM sleep) and addition of inhibition (during REM sleep) account for immobility during sleep. In dreams, we imagine that we move, but no movement occurs. Tracings of electrical activity are shown in ~ 20 second sample records. The amplitude of the electromyogram (EMG) is highest in waking, intermediate in NREM sleep, and lowest in REM sleep. The electroencephalogram (EEG) and electrooculogram (EOG) are activated in waking and REM sleep and inactivated in NREM sleep.

ranted to scrutinize REM sleep neurophysiology for clues to the brain mechanisms of dreaming.

**Cellular and Molecular
Neurophysiology of REM**

Because REM sleep is a brain state shared by all mammals, it is possible to conduct experiments in animals that reveal deep neurophysiological mechanisms of relevance to dream theory. Following Michael Jouvet's localization 1962, of the REM-sleep generator to the pon-

tine brain stem and the simultaneous description of the chemical specificity of several brain-stem cell groups, the neuronal activity of that region (as well as many others) was described. Neurons containing the chemicals norepinephrine and serotonin were found to be active in waking but inactive in REM, while neurons containing acetylcholine were more active in REM than in waking. Both groups were relatively quiescent in NREM. These data were utilized to create two complementary models (see Figure 1).



DREAMS: Physiology. Figure 2. Convergent findings on relative regional brain activation and deactivation in REM compared with waking. Schematic sagittal view of the human brain showing those areas of relative activation and deactivation in REM sleep compared to waking and/or NREM sleep. The depicted areas in this figure are representative portions of larger CNS areas subserving similar functions (e.g., limbic-related cortex, ascending activation pathways, and multimodal association cortex).

The first model, reciprocal interaction, ascribes REM to a decline of noradrenergic and serotonergic modulation and to the complementary increase in cholinergic neuromodulation of the brain. Neuromodulation determines the mode of information processing that the brain uses in response to different chemicals. In the reciprocal interaction model, waking consciousness (with its characteristic capacity for attention, analytic thought, and memory) is seen as dependent on the strong noradrenergic and serotonergic modulation of the brain that is lost in REM sleep dreaming (when all three of these wake-state characteristics are impaired). This model led to important chemical tests culminating in the experimental induction of REM (and of dreaming in human subjects) using cholinergic agonist drugs.

Like waking, REM sleep is a state of electrical activation of the brain. But in contrast to waking, both external inputs and motor outputs are blocked, while internal stimuli are generated by a cholinergic process and then processed by the aminergically demodulated forebrain as if the information arose in the outside

world. This set of concepts gave rise to a second model: the activation-synthesis hypothesis of dreaming. Activation-synthesis ascribes the incongruity and discontinuity of dream cognition to both the chaotic nature of the cholinergic autostimulation process while the failure to recognize dreaming as different from waking is caused by the cognitive deficits resulting from aminergic demodulation.

To understand these concepts it is helpful to recognize that most psychoactive drugs used to alter mental state act via these same neuromodulatory systems. For example, stimulants (e.g., amphetamines) mimic aminergic neuromodulation, and the antidepressants (e.g., Prozac) enhance it by blocking the breakdown or reuptake of norepinephrine and/or serotonin.

The Human Brain and REM Sleep Dreaming

Recent positron emission tomography (PET) imaging studies of the human brain in REM have richly elaborated the physiological dream theory, besides showing

the predicted activation of the pontine brain stem, a selective regional activation of the limbic forebrain, especially the amygdala, which are known to be mediators of emotion, especially fear and anxiety, and these are the most common dream emotions. Neuropsychological investigations have simultaneously revealed that when these regions are damaged by stroke lesions, there is a global loss of dreaming. [See Brain Imaging Techniques.]

Taken together, these two complementary data sources indicate that the distinctive character of dreaming, particularly the emotional intensification and the cognitive bizarreness, may derive from direct and preferential activation of the limbic brain by cholinergic inputs from the brain stem. The failure of memory and of directed and critical thought could then be due to the inability of the dreaming brain to control and integrate the emotional activation. This deficit process is evidenced in one PET study by a relative deactivation of the prefrontal cortex in REM compared to waking. This observation also helps explain the loss of self-reflective awareness and the delusion that we are awake when we dream because the dorsolateral prefrontal cortex is the seat of working memory and directed thoughts. As for the visual imagery of dreams, it is significant that both PET studies find as much activation of the medial occipital cortex in REM as in waking and that stroke lesions of this region render dreaming less vivid.

These approaches and extensions of them, which use pharmacological probes to assess neuromodulator receptor activation, can now be further exploited. They could then quantify the regional differentiation of brain chemistry associated with the shift in neuromodulatory balance from aminergic dominance in waking to cholinergic dreaming in REM. Other hypotheses, such as the prediction of frontal activation in REM when dreamers become aware that they are dreaming, may also be testable using imaging technology. The great promise of this physiological approach to dreaming is to provide a unified model of normal and abnormal states of consciousness.

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Allan Hobson

Theories and Research

Dreams occur during a state of sleep from which one must first awaken before being able to describe them. In the course of the transition from sleep to waking, features of the dream are forgotten and a substantial part of the dream is transformed and distorted. To make matters worse, the reported events in the dream, or its content, have little relation to the physical or mental stimuli impinging on the dreaming sleeper and few dream events seem ever to have occurred, or could ever occur, in real life. This situation means that most of the powerful research tools of experimental psychology cannot be used effectively to study dreaming. The mere act of presenting the stimulus alters the sleeping state of the subject, as does the act of making a response. If the dreamer does respond to the stimulus, the response may have such a remote relation to the stimulus that a complex judgment is required to distinguish it from other imaginal events in the dream. Further, the time required before the subject returns to a state where a second stimulus can be delivered may allow only four data samples a night, so that even when useful data can be obtained, the cost of running such studies is prohibitive.

Under these circumstances assumptions about how the dream is produced and what it means are strongly dependent on theories about waking cognitive events and processes. In cultures where the belief in communication with the supernatural is strong, people believe that dreams are messages from the spirit world. Starting with the Greek Enlightenment there were efforts to find a nonsupernatural explanation for the dream. Hippocrates suggested that the dream might provide early diagnostic evidence for disease, and Plato remarked that the dream was evidence of primitive or beastlike characteristics in each of us. This conception reappears in nineteenth-century German poetry, and Freud used it to account for hysterical behavior in otherwise circumspet young women. The opposition of rigid conformity and sexual freedom was a powerful issue in the late nineteenth-century Victorian and Vi-

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ennese middle class. Freud's famous work, *The Interpretation of Dreams* (1900/1953), is based on the assumption that the parts of the mind that represent social strictures (i.e., the superego), and one's *sexuality* (the libido), play out this conflict during sleep when the ego, the most rational part of the mind, is taking a rest. The dream represents the imaginal characteristics of this conflict. Freud seemed confident that every detail in a dream narrative could be interpreted in a way that was consonant with his theory. His consummate skill in inventing plausible explanations of the relationships between events in his patients' dreams, their waking lives, and his theory of neurosis is so remarkable that his scientific stature has been likened by some to that of the physicist Einstein. Some of Freud's colleagues felt that his account was too narrowly sexual. The Swiss psychologist Carl Jung proposed that many of the objects in dreams were universal symbols that could be taken as evidence for mind-brain biological inheritance of some symbols. The Austrian psychiatrist Alfred Adler asserted that feelings of interpersonal inferiority were also played out in the dream.

One hundred years after Freud wrote his masterpiece there is little scientific evidence to support his theory of the interpretation of dream images (Foulkes, 1985), nor is there any evidence that dreams convey messages from other minds. Lacking such evidence, one must ask why psychoanalysts or for that matter anyone continues to interpret dreams with such confidence. Part of the answer is that dreams are interpreted in the context of a substantial amount of information about the dreamer, her or his past behavior, desires, and life situation, and the dream interpretations are constrained by this information. Interpretations are also constrained by the theoretical assumptions and like experience of the interpreter. Freudian analysts tend to give more sexual interpretations than Adlerians, who in turn give more weight to feelings of interpersonal inferiority. As one can imagine, the interpretation of a dream depends on the joint contribution of many sources of information, only one of which is the dream itself. How these different sources of information are integrated to produce an interpretation is undoubtedly quite complex, and the extent to which the interpretation has to do with the dream itself is unknown. Although interpretations of a dream by different interpreters generally have little in common, interpreters nevertheless tend to feel remarkably confident about the accuracy of their interpretations. Perhaps this assurance is the reason why the interpretation process itself has not been systematically studied.

In the practice of psychotherapy, therapists and analysts say that they are aware of the relationships described by the dream well before the dream is reported. They use the dream less for obtaining information about the patient than for attributing the source of the

information to the dreamer. Because people do not feel responsible for the dreams they produce, they can describe embarrassing relationships without taking responsibility for them. The therapist makes the interpretation but says to the patient, in effect, "You said it." Because the interpretation is attributed to the patient's dream, the patient may be more willing to accept it than if it were attributed only to the therapist's interpretation of his or her waking behavior.

The epic discovery in 1953 by Nathaniel Aserinsky, a doctoral degree student in physiology, and his mentor, Kleitman, the father of modern sleep research, marked the beginning of scientific study of dreaming as a neurocognitive process. Studying the electroencephalograph (EEG) and electrooculographs (EOGs) of the sleeper through the entire night, they noticed irregular periods of about 90 minutes in which the slow waves of early sleep returned to a wakelike pattern accompanied by rapid eye movements (REMs) under the closed lids. They called this REM sleep to distinguish it from several other stages of non-REM (NREM) sleep. Aserinsky assumed, as anyone else might have done under the same circumstances, that the sleeper was watching her or his dreams. Therefore, he systematically awakened subjects in REM and NREM sleep and found that long, visually vivid dreams were reported consistently from REM sleep and only rarely from NREM sleep, where the reports were much more thoughtlike. Antrobus (1983) found that 94% of REM reports are more dreamlike than NREM reports matched by sleeper and time of night. The strength of this relationship was that it enabled the scientist to know with remarkable accuracy *when* the sleeper was dreaming. Thus, it became possible to look for physiological and neurophysiological processes that distinguish dreaming from nondreaming—without waking the sleeper for a report.

A single REM period often extends for over 30 minutes, during which time dreaming occurs continuously. Because a dream has no discrete beginning and end, research shifted from the study of the dream to the study of *dreaming* as a process over time. Because they were able to locate dreaming in time, Hoelscher, Klinger, and Barta (1981) were able to show experimentally that sleepers were more likely to incorporate into their dreams verbal stimuli that described personal concerns than stimuli without personal relevance.

Although they cannot report their dreams, subhuman species have provided substantial information about REM dreaming. For example, Jouvet and Michel (1959) demonstrated that when the normal REM sleep inhibition of efferent motor pathways was surgically inhibited in a cat, the animal would motorically act out its dream—hissing and attacking—apparently hallucinating its enemies.

One major line of early research concerned the con-

sequences of dreaming and sleep deprivation. The initial finding that deprivation of REM sleep was followed on subsequent nights by the "makeup" time, almost to the minute, of the lost REM sleep, implied that dreaming sleep was absolutely essential for waking equilibrium, indeed, for survival (Dement, 1960). Interpretation of this and subsequent studies raised the obvious questions of mind versus body and efforts were made to assign processes to either one or the other. Dreaming, or dreaming sleep, was regarded as a compensatory process whose function is to "make up for" cognitive and motivational deficits in waking, including maturation and maintenance of the central nervous system, consolidation of memory, representation of repressed information, and the modulation of motivational systems (for an excellent review of this work, see Ellman & Weinstein, 1991).

Other investigators looked for psychophysiological parallelism across REM sleep and waking (Kerr, 1993). Neural systems that are genetically selected and then trained to carry out a specific process in the waking state should perform the same function in REM sleep. The REMs themselves were assumed to be part of a scanning or tracking process similar to that of waking saccades. An initial study by Roffwarg, Dement, Muzio, & Fisher (1962) supported the parallelism position but was discarded because of methodological problems. Several other studies found little or no supporting evidence. Weitzman (1982) once noticed a sleeper producing such a regular, extended sequence of right-left saccades that even though he was not studying dreaming he awakened him for a report. The sleeper said he was looking out of a window in a subway car and watching the posts in the tunnel as they went by. Anecdotes such as this kept the original hypothesis alive, and Herman (1992) eventually reported evidence for a limited relationship between eye movements and imaginal looking in the dream. Gardner, Grossman, Roffwarg, and Weiner (1975) found that periodic gross body movements also occur throughout REM sleep and are also weakly associated with imagined body movements in the dream.

Some evidence was clearly opposed to the parallelism model. Johnson found that skin potential and conductance measures that are characteristic of highly emotional states in waking are even more dramatic in Stage 4 of NREM sleep, where the sleeper is truly dead to the world. Stage 4 is a state in which some children have night terrors and awaken screaming. Prior to awakening, their EEG shows no sign of disturbance. Johnson suggested that the labile skin potential indices may occur in sleep because the processes that normally dampen them in the waking state have become too weak to maintain the appropriate modulation. Because night terrors tend to occur about an hour after falling asleep, waking the child after a half-hour of sleep will

usually maintain the modulatory process and avoid the night terror.

The primary contradiction to psychophysiological parallelism within REM sleep, of course, is that the mind-brain is actively producing imagery and thought, and the EEG looks very much like that of the waking state; and yet, aside from occasional muscle twitches and REMs, the body looks as though it is in a coma! This is why the Europeans call it paradoxical sleep. The solution to this paradox was provided by Hobson and McCarley (1977) after extensive study of the brain-stem processes that controlled sleep and sleep states in the cat. In 1949, Moruzzi and Magoun located a region in the brain stem, the reticular activating system, that controlled the waking and sleep state of the entire brain. Hobson and McCarley found that during REM sleep most of this region was activated in turn by brain-stem nuclei in the locus coeruleus. But the nuclei that control REM sleep also broadly inhibit both sensory input from the sensory projection regions of the brain and motor commands issued by the brain. Only the cardiac, pulmonary, and oculomotor system are excluded from inhibition.

Although the Hobson and McCarley model is based on the behavior and brain neurophysiology of cats—who cannot report their dreams—it is compelling enough to account for the paradoxical relation between dreaming in humans as the product of an active brain state in the presence of motor flaccidity that is normally associated with an inactive brain.

Inhibition in this context means elevated sensory and neural thresholds. If a stimulus is sufficiently strong one can always waken a person from REM sleep. And in a nightmare, the dreamer's attempt to run can result in a brief twitch or jerk of the leg—which may terminate the REM period.

A second equally plausible component in their model has strong implications for theories of the meaning of dreams as well as for the parallelism models described above, but it is not supported by empirical research on dreaming. They observed during REM sleep a sequence of high-voltage spike bursts in the brachium conjunctivum, a branch connecting the cerebellum to the pons in the brain stem. The bursts were called PGO spikes because they start in the pons and travel up through the lateral geniculate nucleus of the thalamus to the occipital region of the cerebral cortex. During REM sleep, bursts of REMs are always accompanied by these PGO spikes. The possible implication of these spikes for the understanding of dreaming was enormous. The large voltage of the spikes relative to that of surrounding neurons suggested that they might account for the sudden changes of scene that make the dream seem bizarre. Furthermore, they claimed that the spike originated in the pons rather than in the cortex and argued that the absence of cortical participa-

tion in PGO spikes implied that the cortex could not be the source of or control REMs! The dream-producing cortex, Reinsel, Antrobus and Wollman (1992) argued, must receive information about REMs *after* they have occurred and must then "synthesize," that is, make sense of the information. Because the PGO spikes originate in the pontine brain stem, which has no cognitive memory, they argued that the PGO source was random and therefore that the source of the dream was also random, i.e., neural noise. However, they show no support for the PGO synthesis model.

The argument appeared to represent a double blow to the Freudian interpersonal theorists for whom dreams were initiated by basic biological and social conflicts. First, the occurrence of dreaming was determined by a biological 90-minute REM cycle, regardless of an individual's conflicts. If the source of the content of the dream was truly random, then personal conflictual material would be irrelevant.

Although subsequent research has not supported the REM synthesis model of dreaming, the model has spawned research in which brain neurophysiology rather than peripheral-physiological measures and models are used to build neurocognitive models of dreaming. One argument against the REM synthesis model is that while REMs occur during only a portion of any given REM period, reported dreaming occurs throughout the REM period. Therefore dreaming is partially *independent* of whether REMs are present.

If PGO spikes are not the origin of the dream, what is? The question implies a unitary mind-brain whose activity is determined only by external input. But the mind-brain is a quasi-modular system whose modules continuously send messages back and forth to one another. The question is, which modules participate in the construction of dreaming?

In waking perception, the primary visual cortex produces line and visual textures, the next layers produce edges and corners, and the parietal regions interpret the information as the shapes of objects. Other regions interpret the location of the object relative to the individual, the left temporal cortex names the object, and the frontal cortex helps to determine how to respond to it. But Braun et al. (1998), using a sensitive brain imaging technique during the early hours of sleep, have shown that while many of the visual and spatial cortical modules are active in REM sleep, the striate cortex is unexpectedly inactive. As expected the left temporal cortex is inactive, which accounts for why dreamers tend to name their visual images only after they awaken. Their description of the dreaming brain is a set of modules that are dissociated from other modules that are normally active in the waking state. Together with the evidence that the sensory and kinesthetic input to the brain is strongly attenuated in REM

sleep, this conception helps to understand how dreaming differs from waking imagery and thought. For example, if the visual system produces a face and the face is unfamiliar, and the dream setting is one's kitchen, the frontal cortex may interpret this as high risk—there's an unexpected stranger in the kitchen!—and the motor system may give orders to run fast. But the motor commands are inhibited in REM sleep and the sensory motor system gets no feedback that it is moving. The dreamer concludes that she is paralyzed or stuck. The oculomotor system sends commands to look where she is going, but the moved eyes are unable to elicit a new image on their retina. This scenario illustrates that the mind-brain has the capability of producing elaborate dreams without input external to itself. When mind-brain modules are active they send information to each other. The dream need not have a single origin in brain space or time.

One of the most important findings of the Braun group is that the amygdala and limbic-related projection areas that respond to waking threat and create emotional experience, and the parahippocampal cortices that produce short-term memory process, are quite active in REM sleep. The participation of these areas may explain the emphasis of dreaming on personally relevant threats based on events from the prior day. These structures may construct the emotions and memories that we "interpret" when, upon awakening, we note associations between dreaming and waking events (Antrobus & Conroy, 1999).

Although the distribution of activation among different modules changes with the demands of a task in the waking state, the distribution of activation during sleep appears to be determined primarily by the brain-stem reticular formation. Although this distribution appears to be independent of voluntary control, the paradoxical phenomenon of lucid dreaming, where the dreamer reports being awake while still dreaming, suggests that, with training, it can also be elicited voluntarily (LaBerge, 1985).

The most vivid and bizarre dreams occur in the late morning hours, especially on the weekend when one tends to sleep in. Antrobus, Kondo, Reinsel, and Fein (1995) showed that these late-morning vivid dreams are caused by the joint activation effects of the 90-minute REM-NREM sleep cycle and the rising edge of the 24-hour diurnal cycle. Because the reticular activating system activates the cortex in both cycles, the superimposition of the cycles should magnify the imagery and thought characteristics of the normal REM-NREM cycle. This model was supported when subjects who slept three hours past their normal waking time in the laboratory reported visually vivid and unusually dramatic dreams. Verbal imagery, which is rare in normal REM periods, was reported in late-morning REM

dreams. This suggests that it is the distributed pattern of mind-brain activation that determines the imaginal characteristics of the dream.

Knowledge about the participation of different brain regions is immensely helpful in roughing out the main components of a theory of dreaming. But how the individual neural clusters act upon one another to create a stream of credibly integrated meaning cannot be determined by these relatively gross measures. Within the last 15 years, Rumelhart, Smolensky, McClelland, and Hinton (1986) have developed computational models of artificial neural networks that have begun to show us how information distributed across a large number of neural units can be combined in novel yet coherent ways. In demonstrating how a complete percept can be instantiated even though only a small fraction of the neurons that belong to the percept are initially activated, these models demonstrate how the brain might create an entire visual image even though no external sensory information was present (Antrobus, 1991). The active brain consists of a network of pattern-recognizing modules that can continuously transform even chaotic neural activity into coherent patterns of image, meaning, and desire. When this process is experienced during sleep, we call the sequence of coherent patterns our dream.

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John S. Antrobus

Cross-Cultural Perspectives

Since the development of systematic research on different phases of sleep by Aserinsky and Kleitman in the 1950s, it has been known that not only all humans but indeed all mammals dream several times a night and

dreams. This suggests that it is the distributed pattern of mind-brain activation that determines the imaginal characteristics of the dream.

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John S. Antrobus

Cross-Cultural Perspectives

Since the development of systematic research on different phases of sleep by Aserinsky and Kleitman in the 1950s, it has been known that not only all humans but indeed all mammals dream several times a night and

in specific sleep stages. Dreaming is primarily associated with rapid eye movement (REM) sleep. Human societies vary widely in the attention they pay to dreams, the degree to which they cultivate memory of dreams, whether or not dreams are shared, how much specialized practice of dream interpretation exists, what catalogue of dream symbols there may be, and so forth.

In the contemporary United States, it appears, dreams are generally dismissed as unimportant. This is part of a Western philosophical tradition that can be traced back to Aristotle. However, there also exists a contrary trend: there are dream groups and people who keep dream diaries. Specialized interest in dreams exists, specifically in connection with certain forms of psychotherapy, particularly in the Freudian and Jungian traditions. There are also popular dream books, some purporting to be of ancient or medieval origins; which are sometimes used as aids to gambling, predicting the future, or for other forms of divination. While we understand that dreams are intimate, private productions of individuals, it is clear that their content, experience, use, and interpretation are decisively influenced by the culture in which the dreamer lives.

Dreaming in Traditional Societies

In contrast to the devaluation of dreams in Western rationalist philosophies, dreams are assigned a special status in many traditional societies, including those to which our own is heir. Dreams are reported and interpreted in the Bible, as, for example, in the story of Joseph and his brothers and Joseph's adventures in Egypt. There are traditions of dream interpretations in Greek and Roman classical antiquity as well as in the Middle Ages. Other classical traditions, such as that of the Upanishads of India, also accord importance to dreams.

Anthropologists and others have long collected and reported dreams and theories of dreaming from traditional societies in all parts of the world. In one of the earliest comparative studies of dreams, J. S. Lincoln (1935) collected dreams from eight Native American groups. He distinguished between individual, unsought dreams, and what he termed "culture-pattern dreams." The latter category of dreams have major symbolic significance for the individual and often for the society as well. They may be considered to be supernatural revelations and reaffirm traditional understandings or launch innovations in both religious and political institutions. The manifest content of dreams is rarely taken literally; instead there may be rules for the interpretation of dreams and various dream elements may be assigned symbolic meaning. It is important to note that there is no universal consensus on what specific elements mean. For example, Tedlock (1987) notes how the same dream of being given food might be assigned opposite interpretations among two Native American groups. Among the Quiché Maya of Guatemala it is

thought to be a good dream, while among the Zuni of New Mexico, it would be interpreted as predicting death.

Theories of dreaming vary widely and are part of a larger understanding of events and experiences, of cosmology and the relations between human beings and other beings in the universe. In Haitian folk belief, dreams are important sources of information about reasons for "bad luck" (illness, job loss, or other critical events), and they are to be interpreted by a specialist, who finds messages from spirits or dead ancestors in the dreams. The very experience of having (or remembering) many dreams is understood as a sign of supernatural calls for rituals, sacrifices, initiations, or other actions. Some actions may take place within the dream itself.

Since the individual is often thought of as consisting of various components, often translated as "souls," the question arises as to what part of the person does the dreaming. In Haitian folk belief, the dream is the experience of one of two "souls." With regard to the Mekeo of New Guinea, Stephen (1995) speaks of the "dream-self," which leaves the body and has the experiences of the dream. Where dreams are calls to ritual actions among Haitians, for the Mekeo they are primarily omens, often announcing the death of someone. Among these people, the very act of dreaming may be considered dangerous.

In studying dreams cross-culturally, many contextual questions may be asked: Are the events of dreams thought to be real, that is, equal in some way to actions of the waking individual? If so, how must they affect the actions to be taken by the individual? How do the experiences of the dreamer relate to the dreamer's self? Are they predictive? Do they require action? Are the accounts to be shared with others or to be kept secret? Are dreams a means of communication with the dead, with ancestors, with supernatural beings? Are dreams guides to dealing with life situations? Are dreams used for problem solving? Are there specialists in the interpretation of dreams and do they play a significant role in the group—perhaps as diagnosticians or healers?

Some examples may be helpful. Among the people of the Colombian village of Arimatima, we are told that many dream symbols refer to the death of relatives. At the same time, to dream of the death of one's mother, of dead people, graves, and so forth, is a prediction of happiness, and to dream of other people's death portends wealth. A somewhat similar view of dream symbols is held by the Pokoman of Guatemala. Here it is also believed that dreams are the real actions of the soul.

Among some people, dream sharing is considered of great importance. Among the Alorese of Indonesia a household may be roused one or more times at night when some member wishes to share a dream. Dream

sharing also is of importance among the Mekeo of New Guinea, where dreams are intimately involved with magic.

It has often been noted that, as narratives, myths and dreams share certain characteristics. In some societies, for example among the Hopi people of the American Southwest, as studied by Dorothy Eggan (1966), myths are used in the construction of "dream stories," which consist of the remembered content of a dream together with the dreamer's associations to it. The relationship between myths and dreams may be a reciprocal one, that is, mythic material may be used in the construction of dreams, and elements from the dreams of some individuals may be accepted into the mythic repertoire of a community. This is the case among Haitian participants in the Vodou religion. Here, too, at least some dreams are treated as equal to waking actions, as accounts of actions by the spirits or ancestors, warning of dangers and so forth.

It is known that life experiences ("day residues") find their way into dreams. In addition, elements of concern in daily life enter into the manifest content of dreams. In some societies, action taken by the dreamer in a dream may be thought of as dealing with a given situation, particularly one involving supernaturals. Such actions are then thought of as equivalent in reality status to waking actions.

The Social Uses of Dreams

As noted, the interpretation of dreams may be used by specialist in assisting individuals in the resolution of problems, including the healing of illnesses. In Haiti, as in the other African American regions of the Caribbean and Latin America, dreams may be interpreted as calling for initiation into religious groups (Vodou, Santería, Xangô, etc.). Among the Iroquois, dreams used to be interpreted as "the wishes of the soul" and called for the accomplishment of actions that the dream proposed. It was thought that if these actions were not carried out, the dreamer would suffer. Since, however, the wishes of the soul were not always clear, diagnostic and interpretive procedures had to be enacted.

Among North American Indian groups, a guardian spirit was sought by adolescent boys through the "vision quest." This involved isolation, fasting, and other elements of sensory deprivation. It is difficult to distinguish whether these visions were indeed dreams or waking dreams (visions, hallucinations). Among the Ojibwa a series of four night dreams was required to become a medicine man or conjurer. It is clear that in these cases preparation and anticipation were able to influence the content of the dreams or visions and the achievement of the desired goal. The quest and the dream were part of the socialization of young men, giving them the kind of confidence they required in their mature lives. The North American vision quest is

part of a worldwide complex which d'Andrade has referred to as "the use of dreams to seek and control supernatural power" (1961, p. 326).

In situations of rapid social change, dreams have often played an important role in the development of leaders, their innovations, and their revelations of new social programs. This is partly related to the creative imagination that dreams give play to, and partly to the authority dreams have where they are interpreted as supernatural messages. The cargo cults of Melanesia and New Guinea offer a number of examples of such dream inspirations.

While dreams occur spontaneously, and most are not remembered, interpreted, or consciously controlled by the dreamer, it is clear that there are cultural styles of dreaming and that persons can learn to control their dreams. "Lucid dreaming" is a process whereby the individual is aware of dreaming and controls the course of the dream. This is a learned skill and is often associated with shamanism. More generally, as is particularly clear with regard to "culture-pattern dreams," both the content and the very experience of dreams is influenced by what people believe about dreams and by their experience of daily life. The experience of the dream is often transformed by the very act of recording or telling it, putting it into words and often partially analyzing it in the process, according to prevailing beliefs.

Group Studies

The study of individuals' dreams by anthropologists has often been influenced by psychoanalytic approaches and has been conducted as part of life history research, or, more rarely, of psychotherapy. As such, the analysis of symbols and interpretation has played an important role. G. Devereux, both anthropologist and psychoanalyst, worked as a therapist with a Plains Indian veteran. He notes that in people of that cultural tradition, profuse dreaming may be seen not as a sign of anxiety, as in some other groups, but as part of the tradition of the vision quest. By contrast, some social science studies of dreams from given populations have focused instead on the manifest content of dreams and considered the relationship between it and some aspects of the sample population's situation. For example, in studies of groups in conflict situations, anxiety over being attacked appears clearly. In the 1930s, L. Sharp collected a large number of dreams among the Yir Yoront, a group of Australian Aborigines. Analyzing this sample more than 30 years later, D. Schneider (1965) found that in the majority of dreams with themes of aggression it was the dreamer who was the victim, expressing a fear of being attacked rather than a wish to harm others. Similarly, in a study of Jewish and Arab children in Israel and on the West Bank, during the years 1980-1984, Y. Bilu (1994) found that these children ex-

pressed in their dreams the themes of the ongoing conflict. Again, the children tended to dream of themselves as victims rather than perpetrators of aggression. Such dreams were more frequent among the Arab children than among the Jewish children.

Dreams and dreaming offer fertile sources of information about psychological development and adaptation; cultural differences and similarities; the use of intrapersonal and interpersonal dimensions to control the environment; human creativity and innovation; means of self-expression and communication; and many more aspects of psychological functioning.

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Erika Bourguignon

DREVER, JAMES (1873–1950), Scottish psychologist. Drever was born on the island of Shapinsay, one of the Orkney Islands, off the coast of Scotland. He received

his doctorate from Edinburgh University. Much of his early work was in education; however, in 1918 his focus shifted to psychology with his appointment as department head and lecturer in Psychology at Edinburgh University. In 1931, a chair in psychology was established to which he was appointed, thus becoming the first professor of psychology at Edinburgh University. In his 27 years at Edinburgh, Drever played a major role in the development and recognition of the psychology department as a first-rate academic program.

Drever wrote books and articles covering a diverse range of topics. These included his *Instinct In Man* (1916), *The Psychology of Everyday Life* (1921), *The Psychology of Industry* (1921), *A First Laboratory Guide in Psychology* (with Mary Collins, 1926), and *A Dictionary of Psychology* (1952), published after his death.

Drever was also extremely active in the community. In 1925, he established a clinic to address juvenile delinquency in the local community. The clinic was a multidisciplinary collaboration of volunteers from the psychology department and experts in other fields. The success of this clinic led to the development of other child guidance clinics across the country. Drever is also credited with developing a battery of psychological selection tests for apprentice printers. Once again, the success of this venture was such that its use spread to organizations in other areas of Scotland and England.

Drever was also instrumental in developing methods that aided in the instruction of children with special needs. One outcome of these endeavors was the development of a test to assess the abilities of both deaf and hearing children for the purposes of instruction and vocational guidance. This test was used extensively throughout Great Britain and its empire. He also served as chairman of the Royal Blind Asylum and School in Edinburgh, where he was instrumental in developing improvements in the teaching and care of blind children. Drever's contributions to the training of the blind also extended to his involvement in the establishment of a training center for blind war veterans that later became the Scottish National Institute for Blinded Ex-Servicemen.

Drever held a number of important and influential positions in professional associations. These included president of the British Psychological Society, president of the Psychology Section of the British Association for the Advancement of Science, member of the National Advisory Council for Scotland on Physical Training, editor of the *British Journal of Psychology Monographs*, and assistant editor of the *British Journal of Psychology*.

In all of the endeavors with which he has been associated, Drever is credited with having a significant and positive influence on the policies and quality of work provided by these enterprises. The significance of his contributions to psychology, both in its development

pressed in their dreams the themes of the ongoing conflict. Again, the children tended to dream of themselves as victims rather than perpetrators of aggression. Such dreams were more frequent among the Arab children than among the Jewish children.

Dreams and dreaming offer fertile sources of information about psychological development and adaptation; cultural differences and similarities; the use of intrapersonal and interpersonal dimensions to control the environment; human creativity and innovation; means of self-expression and communication; and many more aspects of psychological functioning.

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Erika Bourguignon

DREVER, JAMES (1873–1950), Scottish psychologist. Drever was born on the island of Shapinsay, one of the Orkney Islands, off the coast of Scotland. He received

his doctorate from Edinburgh University. Much of his early work was in education; however, in 1918 his focus shifted to psychology with his appointment as department head and lecturer in Psychology at Edinburgh University. In 1931, a chair in psychology was established to which he was appointed, thus becoming the first professor of psychology at Edinburgh University. In his 27 years at Edinburgh, Drever played a major role in the development and recognition of the psychology department as a first-rate academic program.

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In all of the endeavors with which he has been associated, Drever is credited with having a significant and positive influence on the policies and quality of work provided by these enterprises. The significance of his contributions to psychology, both in its development

as a science and as an educator of future psychologists, has been acknowledged by his peers (e.g., Collins, 1951, *The Psychological Review*). Furthermore, although much of his work was done in his native Scotland, the far-reaching effects of Drever's contributions to psychology and society are aptly demonstrated by his being knighted by the king of Norway in 1938.

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Anthony R. Paquin

DRIVE. One of the central aspects of Freud's concept of mind is that it can be motivated or activated both by external stimulation from the environment or endogenous stimuli, which he termed drive. Freud conceptualized drives as what cause or motivate the mental apparatus to act. For Freud, drives function in accordance with the pleasure principle that dictates that human beings seek maximal pleasure by reducing drive tension through their action. Freud identified two separate drives, libido and aggression, which he attributed to somatic sources. Over the course and evolution of psychoanalytic theory, Freud's original definition of drive as motivation has remained, though the governing principles of how drives are directed has changed a great deal. Ronald Fairbairn (1952) suggested that drives are directed toward contact with others as primary sources of motivation. Fairbairn also suggested that the pleasure principle is not the primary source of motivation and that human beings seek contact with others as an inherent and primary source of motivation.

The Freudian Concept of Drive

For Freud, drives have a somatic source but create a psychic effect or result. Freud wrote that drives are "on the frontier between the mental and the somatic . . . a measure of the demand made upon the mind for work, in consequence of its connection with the body" (1915, p. 122). In other words, drive is a mythological concept used to understand the relationship between psyche and soma. In "The New Introductory Lectures on

Psycho-Analysis," Freud was explicit about the mythological nature of the drive concept. He wrote:

The theory of drives is what might be called our mythology. The drives are like mythical creatures, magnificent in their indefiniteness. In our work we cannot disregard them for a moment, yet we are never sure that we have a clear view of them. (1933, p. 95)

Libido and aggression each have a somatic source. The sources for libido are what Freud termed the erogenous zones. Freud identified the erogenous zones as the genitals, anus, and mouth. In "Three Essays on Sexuality" (1905), Freud used his observations from childhood and the nature of sexual perversions to provide support for the notion that the erogenous zones provide sexual stimulation. He also noted that other sources of stimulation include sensations such as sound, smell, touch, and sight. He asserted that the sexual wishes and activities of both children and perverts are related to the unconscious fantasies and wishes of adult neurotic patients. In other words, Freud's support for the libido theory came primarily from distinctly psychoanalytic data, that is, the elucidation of unconscious fantasy which he associated with the erogenous zones.

Prior to 1920, Freud's theory of drive revolved more exclusively around the concept of libido. After 1920, Freud elucidated the notion of aggression or the death instinct as another primary drive. The aggressive drive was seen as a death drive that all living matter demonstrates. The aim of aggression is death and the destruction of the self or the object (Freud, 1920, 1924). In "Beyond the Pleasure Principle," Freud wrote that the death drive is omnipresent in all living matter, including cellular activity. It is not related, however, to any specific body parts or process as he had suggested with libido.

The life and death drives are separate and in biological opposition to one another. But as Brenner (1982) suggested, the distinction between the two drives is seen more accurately as a psychological polarity, that is, in the minds of human beings more than a biological opposition. Brenner pointed out that life and death, organic and inorganic, are not chemically distinct or distinctly separable from each other. Contemporary molecular biology finds little support for the idea that there is a discontinuity between living and not living. Instead, there is a continuum between physical and chemical systems we refer to as inorganic and those that we refer to as living animals and plants. On the contrary, there is a gradual change in chemical properties from one system to the next that originates with the inorganic and progresses to living matter.

For Freud, the aims of drives are what he terms objects. Thus there is nothing inherent in the wish for contact with objects that motivate us. Instead, drives

as a science and as an educator of future psychologists, has been acknowledged by his peers (e.g., Collins, 1951, *The Psychological Review*). Furthermore, although much of his work was done in his native Scotland, the far-reaching effects of Drever's contributions to psychology and society are aptly demonstrated by his being knighted by the king of Norway in 1938.

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are the force that impels activity and objects are the aims of these drives. British object relations theory viewed this as a rather impersonal or mechanistic depiction of human nature. In fact, Morris Eagle (1984) argued that there is nothing inherent in drive theory that argues that the aim of a drive be an experience with another human being. Eagle cites René Spitz's (1960) research on the deleterious effects of maternal deprivation as a stark example of the power and perhaps the reductionism of drive theory. Spitz found that infants who experienced more maternal deprivation were much less likely to thrive than infants who did not experience such deprivation. Spitz explained his research findings as the results of a lack of opportunity for reduction in drive tension among the maternally deprived infants. Object relations theorists of various kinds would be much more likely to see the deleterious effects of maternal deprivation as explained more by the loss of contact with the mother than the loss of the opportunity for drive tension. Obviously, these explanations are not mutually exclusive.

Within Freudian theory, the aims differ for the two drives. Freud (1905) delineated the variety of libidinal aims of childhood that are bound to the erogenous zones. Libidinal excitement and pleasure are genetically determined through constitutional factors. Post-Freudian analysis has paid a great deal of attention to the importance of experience in determining which objects are chosen to reduce drive tensions. Even for Freud, the final organization of libidinal aims is altered through experience up until puberty.

The aim of aggression is the destruction of whatever is the object of the drive (Freud, 1920, 1930). The equating of destruction and death is a psychical one that exists in the fantasy life and imagination of the individual. The aim follows from Freud's belief in the universality of the death instinct and has been questioned by many analysts such as Leo Stone (1979). He argued that while there is a great deal of evidence for the importance of destructive wishes in mental life, the aims of aggression are so variable and change so much through the life cycle as to raise questions about the notion of aggression as a drive.

The aims of both the libidinal and aggressive drive are influenced by experiential factors but were not well delineated by Freud. In fact, one of the greatest sources of controversy in psychoanalysis involves Freud's assertion that sexual and aggressive drives are most influenced by unconscious fantasy as he minimized the importance of actual event, including trauma. Freud was always bothered by the obscurity of the neurophysiology of drives. It was always Freud's hope that neurophysiological and neurochemical data would eventually be able to inform the psychological inferences that are generated by the psychoanalytic study of the mind.

Fairbairn's Revision of the Drive Concept and Object Relations Theory

In one of the most revolutionary and challenging revisions of Freudian theory, Ronald Fairbairn (1952) suggested that there is a drive that he called object relating. This statement has implications for understanding a number of dimensions related to classical Freudian theory, posing questions especially about the nature of the pleasure principle, the centerpin of human motivation.

Fairbairn suggested that the drive for object relating was at the center of human motivation. Fairbairn reconfigured the central developmental conflicts of the child, moving anxiety to the background and dependency conflicts to the foreground. For Fairbairn, pleasure is an accompaniment of object relating, in contrast to the notion of the pleasure principle as the main source of motivation for human behavior. If pleasure is the accompaniment of object relating, then pleasure is an outcome of object relating, not the primary source of motivation. In fact, Fairbairn took his argument one step further. He suggested that when the pleasure principle is the primary source of motivation, severe psychopathology is implied. Thus the pleasure principle is seen as a breakdown product of an overly frustrating, depriving, or impinging early environment. If the dependency needs of the child are met relatively reliably, then pleasure accompanies the natural pull toward objects.

Fairbairn (1952) also challenged the notion of an aggressive drive inherent to human functioning. He viewed aggression as secondary to environmental failure. In other words, aggression is the result of frustration with other persons, not a primary drive in and of itself. This idea, that aggression is secondary to environmental failure was a central feature of a later analyst, Heinz Kohut (1971), in the development of his theory of self-psychology. Kohut argued that aggression results from empathic failures from parental figures, leading to compensatory psychological structures, chiefly narcissistic character structure. The narcissistic personality results from massive attempts to insulate and protect the individual from environmental failure. Other analysts such as Harry Guntrip (1971), another British object relations theorist, termed this kind of insulation the schizoid citadel, which protects the schizoid individual from revisiting hurtful experiences from others. Its purpose is to ensure that the individual will not be hurt again. Thus the aggressive drive is secondary to frustration with objects. Arnold Modell (1975) in the United States elaborated a similar view of schizoid phenomena in his depiction of what he termed self-sufficiency as a defense against needing others.

Donald Winnicott (1971) was a kind of bridge theorist who retained the notion of Freud's belief in the

libidinal and aggressive drives, while adding a belief in the inherent pull for object relating as a drive. However, Winnicott broadened the view of aggression to include a variety of forms of assertion, including motility itself. In other words, Winnicott viewed the aggressive drive as an inherent destructive force as well as that which impels us as children to assert ourselves in the environment, to explore our surroundings and the object world itself.

Contemporary relational models (for example, Mitchell, 1988) have developed in much more detail the problems with the drive model of Freud's. These theorists have raised questions about the notion of a monadic concept of mind with its accompanying beliefs in an encapsulated infantile neurosis forged by aggressive and libidinal drives. Instead, they have elaborated the ways in which objects reciprocally influence each other through the life cycle. Nevertheless, psychoanalysis continues to struggle with the concept of motivation. While many analysts question the notion of the pleasure principle as a comprehensive explanatory organizing principle for describing human motivation, there is still the problem of explaining seemingly irrational human behavior, including the ubiquitousness of aggressive and destructive forces.

[See also Motivation.]

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Steven H. Cooper

DRIVING AND HIGHWAY SAFETY. There are three interconnecting elements in the highway-vehicle system: the vehicle's dynamics and technology; the roadway environment, including road characteristics, signage, and hazards arising primarily from traffic and pedestrians; and the driver, whose strengths and limitations in such information processing activities as attention, perception, judgment, and response affect his or her own safety and that of other people.

Task Analysis

The driver balances two competing and conflicting goals: to travel to a destination in a timely fashion (productivity); and to travel to a destination without losing control of the vehicle, being involved in a collision, or getting speeding citations or other moving violations (safety). The conflict between these goals is inherent in the role of *speed*, which, while benefiting productivity, greatly compromises safety (Evans, 1991). In the United States, around 40,000 lives are lost annually in vehicle accidents, most involving excess speed (Evans, 1996), and perhaps half a million lives are lost in this fashion worldwide.

In order to accomplish the two goals of productivity and safety, the driver must perform a two-axis vehicle-tracking task, while performing a series of side tasks. The two axes of tracking involve speed control and lateral control. Speed control involves maintaining a relatively constant speed on clear roads, a relatively constant headway or relative speed in heavy traffic, and appropriate braking behavior in response to events ahead. Lateral (steering) control is accomplished by orienting the direction of the vehicle (aimpoint) with the direction of the highway, a goal that will achieve smooth steering in the lane center.

Breakdown in either lateral or speed (headway) tracking compromises safety. Accidents due to loss of lateral control most frequently occur with the youngest drivers at very high speeds, such that the "bandwidth" of the lateral tracking task exceeds human information processing capabilities. Failures of headway control are typically responsible for the more frequent collisions, and these are associated with three causal factors described below: visibility and attention, response time, and risky decision making.

Visibility and Attention

Near continuous visibility of the highway tracking input is necessary to assure proper guidance and hazard

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Visibility and Attention

Near continuous visibility of the highway tracking input is necessary to assure proper guidance and hazard

detection. Driving at night or in bad weather can produce unsafe conditions. But effective overhead lighting has been responsible for some substantial decreases in these types of accident. In the same manner, reflective road markings provide effective feedback of lane position, clearly an aid to safe driving. In addition to external visibility, a second source of compromise of tracking input arises from the diversion of *visual attention* to the variety of side tasks or competing activities: scanning outside for signs, dealing with radios, glancing at the speedometer, or evaluating navigational information. The loss of visual input from the roadway caused by such behavior can be substantial, involving head-down glances as long as 10 seconds for some map-related tasks. While tracking visibility is most seriously degraded by competing visual tasks, nonvisual tasks, such as listening to a conversation, or cellular phone use, can also compete with the processing of related visual channels involved in driver safety.

Response Time

A second contribution to accidents is prolonged response time (RT) to unexpected events on the roadway, such that the time *required* to stop or swerve before contacting a hazard is greater than the time *available* before the hazard is contacted. This RT can be decomposed into three driver-related components: Hazard detection time, maneuver selection time, and maneuver execution time. The first two, determined by human information processing capabilities, have been estimated to be approximately 2.5 seconds, with a range as long as 4 seconds. Detection time is inversely influenced by visibility and is also strongly influenced by the cognitive factor of *expectancy*. Thus unexpected events, such as a stalled car in the lane ahead at night, may double the hazard RT, relative to expected events. The time to select the appropriate maneuver (brake or swerve) will depend upon skill and experience, as well as local traffic conditions. Finally, the time to execute the maneuver will depend both upon the severity of the correction (braking or swerving) and *vehicle inertia*, which is increased by vehicle weight.

The previous analysis reveals the critical role of speed in hazard response. At higher speeds, a given driver's RT will cover a greater distance, thus decreasing the time available for responding to a given hazard ahead. Higher speeds will also increase vehicle inertia, increasing the maneuver time. Finally, higher speeds will increase the damage on impact, or the likelihood of control loss, should a lateral maneuver be selected. The speed at which to drive is heavily governed by the judgment of the driver.

Risky Decision Making

Some of the most important decisions a driver can make are those involving safe behavior (or alternatively,

those that might increase or decrease risk), of which the prime decision is choice of vehicle speed (on an open highway) or vehicle headway (on a crowded one). Despite the hazards of speeding, highway safety data point to the prevalence of speeding behavior. Most people drive over the speed limit, and on busy freeways, most people drive with a headway of only 1.3 seconds, in spite of the mean driver RT of 2.5 seconds (i.e., the time that would be expected to respond, if the driver in front came to a sudden halt).

Why do people speed? First, perceptual factors cause people to underestimate the speed at which they are driving, and hence, drivers accelerate to compensate. For example, quiet vehicles, or those traveling at night diminish auditory and visual feedback of speed. Vehicles in which the driver is higher above the roadway provide feedback of slower speed. Second, drivers may *underestimate* the risk of fast, or unsafe driving, because the probability of unsafe consequences of such behavior are not appreciated. For example, the tendency to drive with less than allowable headway may result from the driver's lack of any expectation that the vehicle ahead will suddenly stop, or that the crossing car at the intersection will run the red light. Third, drivers may intentionally violate the standards of safety, choosing to ignore the known risks. This may be done for reasons of productivity (e.g., to make an appointment on time), or thrill seeking.

Driving Impairments: Fatigue, Alcohol, and Age

Driving at night is around ten times as hazardous per mile driven as daytime driving. While part of the hazard is related to visibility factors, a major contributor is the fact that the night driver will often be both more fatigued, after driving all day, and will be driving during the low arousal portion of the circadian rhythm cycle. These factors compromise driver ability to detect unexpected, low salience events (the unexpected roadway hazard, or the departure of one's own vehicle from the lane).

Alcohol impairs a variety of information processing characteristics related to response speed, attention allocation (i.e., task management), and judgment. The heavy role of alcohol as a cause in approximately 50% of fatal accidents has been well documented.

The effects of age on accident risk follows a U-shaped function, with a high accident rate for younger and older drivers, but for different reasons. For the youngest drivers (age 16), the lack of perceptual-motor skill is a primary source, accounting for the relatively high proportion of loss-of-control accidents. For slightly older drivers (i.e., 17–24, particularly males), the primary factors are speeding and the increased risk of driving at night, and under the influence of alcohol (i.e., while impaired). Above age 60, the cause is asso-

ciated with longer RT, poorer visual capabilities, and poorer attentional skills. However, older drivers partially compensate for these skill losses by reducing risk exposure, e.g., driving more slowly and driving less at night than younger drivers.

Remediations to Safety Concerns

Enforcement has been perhaps the most effective way of ensuring safe driving. Lower speed limits, coupled with enforcement have substantially reduced fatal accidents per mile traveled, as have laws regarding seat-belt usage, and driving under the influence of alcohol. An increase in the minimum driving age to 18, as in Europe and New Jersey, reduces the frequency of accidents for the first-year driver. Proper enforcement of these, and other safety-inducing laws increases driver compliance though social pressures appear to be even more effective in inducing compliance (Evans, 1991). For example, the strong social stigma against driving under the influence of alcohol, developing in the last decade in the United States, appears to be responsible for the substantial reduction in alcohol-related fatalities.

Remediations to roadway design can also induce safer behavior. Standardization of roadway layouts and sign placement can reduce the likelihood of unexpected events and decrease visual search time. Divided highways reduce the risks associated with lane violations.

Driver training, surprisingly, has had relatively little effect on driving safety. This failure may reflect the fact that neither of the two environments selected for such training—the classroom and “behind the wheel”—represent ideal environments for learning the skills necessary for safe driving. The increased use of driving simulators can address these shortcomings.

Technological advances have been introduced with the goal of improved driver safety. They include headlight dimmers, antilock brakes, and high mounted brake lights, or head-up displays designed to keep the driver's eyes on the highway. Some features are designed to reduce the lethal nature of a collision (air bags, seatbelts, car seats for infants and children), while others, such as high mounted brakelights or antilock brakes are designed to support more effective driver response. A criticism of such devices is that they may produce *risk homeostasis*: when a device is introduced to improve safety, drivers may adjust their own behavior to maintain safety at a constant level, but improve productivity. For example, drivers might drive faster in bad weather, knowing that they have antilock brakes. However, analysis reveals that such homeostasis is not inevitable. In only a few cases is safety actually compromised. In some cases its benefits may not be realized (e.g., driver education), but in others the benefits of safety-related technology are as great, or even greater than were anticipated (Evans, 1991).

Automation, such as cruise control, electronic navigation systems, or headway sensors, is a technology that in some form replaces or simplifies the driving task. While benefits of such techniques are self-evident, there may be two potential costs to safety related to human factors: increased head-down time (attention diversion to the automated devices), and possible *complacency* or *overtrust*, compromising safety should the automation fail to perform as expected.

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Christopher D. Wickens

DRUG ABUSE. People have been using psychoactive drugs in virtually all cultures and across all eras (Siegel, 1991). Concern about psychoactive substance use arises when the behavior is seen as causing or potentially causing adverse consequences for the user or society. The cardinal feature of psychoactive substance use disorders is continued use despite the possibility of negative consequences. While many explanations have been offered (e.g., negative and positive reinforcement), to date, no theory adequately explains compulsive drug use (Institute of Medicine, 1996; Milby, Schumacher, & Stainback, 1997).

Dependence and Tolerance

Two salient features of substance use disorders are tolerance and dependence. Dependence is a pattern of compulsive drug seeking that comes to dominate one's activities and for some drugs can include physiological withdrawal symptoms upon cessation of use (American Psychiatric Association, 1994; Schuckit, 1995). The core symptoms need not occur with the same frequency or intensity within or between drug classes (for some drugs, e.g., hallucinogens or cannabis, withdrawal symptoms are not evident or less salient) and all symptoms need not be present for dependence to be diagnosed (American Psychiatric Association, 1994; Schuckit, 1995). Severity of dependence has been conceptualized as on a continuum (American Psychiatric Association, 1994).

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The second salient feature of substance use disorders is acquired (chronic) tolerance; with repeated use, more of the substance is needed to achieve the same effect(s) (American Psychiatric Association, 1994; Schuckit, 1995). High tolerance levels allow people to consume higher doses of drugs, which increase the likelihood that withdrawal symptoms will occur upon cessation. The time-course and magnitude of the development of tolerance varies across drug classes (for some drugs—cocaine, nicotine—tolerance develops rapidly and for other drugs is slower—cannabis, alcohol).

Diagnosis

An accurate diagnosis is important for an initial understanding of the problem behavior as well as for treatment planning. The fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994) identifies eleven drug classes associated with abuse or dependence: alcohol; amphetamines; caffeine; cannabis; cocaine; hallucinogens; inhalants; nicotine; opioids; phencyclidines; and sedatives, hypnotics or anxiolytics. Substance dependence also can be specified as with or without physiological dependence (i.e., tolerance or withdrawal). The *DSM-IV* criteria for a substance dependence diagnosis requires evidence of a maladaptive pattern of use as manifested by 3 or more of 7 criteria (e.g., substantial tolerance; unsuccessful efforts to cut down) occurring in the same 12-month time period (American Psychiatric Association, 1994, p. 181). A substance abuse diagnosis involves a maladaptive pattern of use that does not meet dependence criteria, but is manifested by one or more of four criteria (e.g., continued use resulting in inability to fulfill obligations) occurring in the same 12-month time period (American Psychiatric Association, 1994, pp. 182–183).

Psychiatric Comorbidity

There is consensus that the prevalence of psychiatric disorders among drug abusers in treatment is high (7–65%) compared to rates in population studies (Institute of Medicine, 1996; Milby, Schumacher, & Stainback, 1997; National Institute on Alcohol Abuse and Alcoholism, 1997; Onken, Blaine, Genser, & Horton, 1997). While studies show that the two most common psychiatric problems associated with drug abuse are affective and personality disorders, anxiety disorders also occur frequently (Institute of Medicine, 1996; Milby et al., 1997; Onken et al., 1997). There are several treatment implications for drug abusers with comorbid diagnosis compared to those with only a drug dependence diagnosis. Generally, they need more intensive or longer treatment, are more disabled and prone to suicide, have higher rates of homelessness and more legal and medical problems and longer hospital stays, and have

higher rates of relapse and poorer treatment outcomes (Institute of Medicine, 1996; National Institute on Alcohol Abuse and Alcoholism, 1997; Onken et al., 1997). Consequently, diagnostic formulations should document the extent and nature of the drug problem and also establish whether other psychiatric disorders are present, and, if so, whether the drug problem is primary or secondary. While there are no empirical guidelines about how to treat comorbid drug abusers, the field is moving toward an integrated approach (i.e., simultaneous mental health and drug services by the same program; Onken et al., 1997) that may produce improved outcomes.

Multiple Drug Abuse

For drug abusers who use or abuse other drugs, it is important to gather a profile of their psychoactive substance use. The following are important when assessing multiple drug use (National Institute on Alcohol Abuse and Alcoholism, 1997; Schuckit, 1995): (a) pharmacological synergism (i.e., multiplicative effect of similarly acting drugs taken concurrently); (b) cross-tolerance (i.e., decreased effect of drugs due to heavy use of pharmacologically similar drugs); (c) drug use patterns may change over treatment (e.g., increased drinking with cessation from opioid use); and (d) more than 80% of drug abusers report smoking cigarettes (Sobell, Tonatto, & Sobell, 1994).

The Development and Course of Drug Abuse

A recent U.S. survey on drug abuse (Substance Abuse and Mental Health Administration, 1997b) revealed that 6% of individuals 12 or more years old used illicit drugs in the month prior to the interview. In 1996, next to cigarettes and alcohol (32% and 65%, respectively), marijuana (8%) was the third most used psychoactive substance in the past year, and the most widely used illicit substance—77% of current drug users used marijuana or hashish (Institute of Medicine, 1996; Substance Abuse and Mental Health Administration, 1997c).

U.S. survey rates of lifetime (that is, ever used) psychoactive substance use (Substance Abuse and Mental Health Administration, 1997b) range from a low for heroin (1%), crack (2%), and PCP (3%) to higher rates for inhalants (6%), hallucinogens (10%), and cocaine (10%), to a third reporting ever using marijuana (33%). Compared to lifetime rates for licit drugs (alcohol, 83%; cigarettes, 72%), these rates are very low (Substance Abuse and Mental Health Administration, 1997b). Thus, except for marijuana, most illicit psychoactive substance use and abuse does not involve a sizable percentage of the population.

Because of differing definitions, the number of individuals who abuse drugs is more difficult to deter-

mine. U.S. surveys have revealed very low rates of heroin use (past month = 0.1%; past year = 0.2%) compared to other illicit drugs (Substance Abuse and Mental Health Administration, 1997a). Among heavier (that is, 12 or more days per year) cocaine and marijuana users, 26% and 41%, respectively, reported 3 or more problems, which is suggestive of dependence (Substance Abuse and Mental Health Administration, 1997a). In contrast to illicit drugs, about 5% reported current heavy alcohol use, and of those 31% reported 3 or more problems (Substance Abuse and Mental Health Administration, 1997a).

In the 1990s, there was a leveling off of illicit drug use over the past decade (Substance Abuse and Mental Health Administration, 1997a; Substance Abuse and Mental Health Administration, 1997c), except for increased marijuana use among 12- to 17-year-olds. Further, while cocaine abuse decreased, heroin abuse increased, suggesting that drug use and abuse rates change as a function of availability, costs, and legal sanctions (Institute of Medicine, 1996; Milby et al., 1997).

Etiology and Genetic Vulnerability

Although a genetic vulnerability to drug dependence has been suggested, for many reasons, "it is difficult to marshal evidence regarding genetic determinants as they relate to drugs other than alcohol" (Lowinson, Ruiz, Millman, & Langrod, 1992, p. 46). Although there is some agreement that genetics is involved in drug abuse, there is no consensus as to what might be inherited (Institute of Medicine, 1996). Further, it appears that the etiology of drug dependence will be multifactorial as "no single variable or set of variables explains drug use by an individual" (Institute of Medicine, 1996, p. 117). A salient factor associated with drug use and abuse, particularly among adolescents, is peer environment (Institute of Medicine, 1996). Socio-cultural factors (e.g., neighborhood crime, availability) have also been linked to drug abuse rates (Milby et al., 1997). Alternatively, two factors (social support, lack of availability) associated with low rates of illicit drug use are also associated with recovery (Institute of Medicine, 1996; Lowinson, Luis, Millman, & Langrod, 1992; Sobell & Sobell, 1998).

Because different drugs have different pharmacological actions and legal sanctions, no single clinical picture of drug dependence can be formed. What can be said is that individuals with drug problems will show impairment from very mild symptoms and no consequences to severe symptoms and serious consequences (Institute of Medicine, 1996).

Other factors comprising a general clinical picture of drug abuse include: (1) a significant incidence of psychiatric comorbidity; a vast majority also smoke cigarettes; (2) most substance abusers never seek treat-

ment; and (3) drug abusers who change without treatment generally have less severe drug histories than those in treatment.

While substance abuse problems can be scaled along a severity continuum, mild substance abuse does not predict the development of more severe problems. Evidence for progressivity is strongest for nicotine where most individuals who smoke only a few cigarettes are likely to progress toward heavier use (Schuckit, 1995). Evidence for progressivity of other drug problems has been studied little.

A considerable amount of illicit drug initiation including cigarette smoking starts in the early teens. Although there has been much speculation and assertion about cigarettes and marijuana being "gateway" drugs to more serious illicit use, evidence for this is lacking (Peele & Brodsky, 1997). Evidence shows that while most individuals who have used heroin, LSD, and cocaine have used marijuana, "most marijuana users never use another illegal drug" (Zimmer & Morgan, 1995, p. 14.). Further, while experimentation with many drugs is the "statistical norm" among young people, most such individuals do not become chronic users (Milby et al., 1997). Lastly, if variables associated with progressivity could be identified, then intervention and prevention strategies associated with those variables could be developed and evaluated.

Substance abuse is a recalcitrant clinical disorder characterized by high relapse rates six months post-treatment (Institute of Medicine, 1996; Lowinson et al., 1992; Milby et al., 1997). Unfortunately, this characterization has given the disorder a reputation as being difficult to treat and seldom "cured." The high likelihood of recurrence has led to the development of relapse prevention procedures (Lowinson et al., 1992; Milby et al., 1997). Not only do men outnumber women in drug use and abuse (Institute of Medicine, 1996; Substance Abuse and Mental Health Administration, 1997c), but use and abuse are inversely related to age (Substance Abuse and Mental Health Administration, 1997a).

Even though epidemiological studies provide information on ethnic and racial differences in relation to drug use and abuse, the methods for categorizing respondents' backgrounds have been rudimentary. Consequently, data on ethnic differences must be interpreted with caution. A few notable findings show that drug use is higher among the unemployed (Institute of Medicine, 1996; Substance Abuse and Mental Health Administration, 1997a). Also, illicit drug use is highly correlated with educational status (Substance Abuse and Mental Health Administration, 1997a). Several studies also show that among those under twenty-five there are no sizable ethnic/racial differences in use rates (Institute of Medicine, 1996; Substance Abuse and Mental Health Administration, 1997c), particularly

when social and environmental conditions are controlled (Milby et al., 1997).

The vast majority of individuals with substance abuse problems do not seek treatment or use self-help groups (Substance Abuse and Mental Health Administration, 1997a). Substance abusers who recover without formal interventions tend to have milder problems compared to those in treatment (Sobell, Cunningham, & Sobell, 1996; Sobell & Sobell). Studies of drug abusers who have changed on their own have found that a large percentage of such recoveries are associated with a cognitive appraisal process (i.e., weighing the pros and cons of changing; Sobell & Sobell). Factors that have helped maintain natural recoveries include social support and moving away from areas where drugs are sold.

Assessment

A careful and continuing assessment is an important part of the treatment process for drug abusers. Good assessments have several clinical benefits: (a) provide a basis for treatment planning and goal setting; (b) help formulate diagnoses; (c) feedback or advice can be given to clients about their past use; such advice can enhance or strengthen motivation for change (Miller & Rollnick, 1991; Sobell et al., 1994); and (d) help evaluate whether treatments are working and if not, what the next step(s) should be (i.e., stepped care; Sobell & Sobell, in press).

Clinicians must rely on their clients' self-reports for most of the assessment and treatment information (Sobell et al., 1994). Contrary to folklore, several studies show that drug abusers' self-reports are generally accurate if they are interviewed when (1) drug and alcohol free, (2) in a clinical or research setting, and (3) given assurances of confidentiality (Milby et al., 1997; Sobell et al., 1994).

The following assessment instruments were selected to (a) be user friendly for clients (e.g., easy, relevant), (b) require minimal time and resources, (c) be psychometrically sound, (d) be free, and (e) if possible, provide meaningful feedback to clients.

Drug Use History. Although no single drug use instrument has been adopted by the drug field, typically a structured interview is used that captures various information (for example, years used, frequency) about different drug classes (Sobell et al., 1994).

Self-Monitoring. Self-monitoring requires clients to record aspects of their drug use or urges (for example, amount, frequency) over treatment. Self-monitoring can (1) be used to identify situations that pose a high-risk of drug use, (2) provide feedback about changes in drug use, and (3) give clients an opportunity to talk about their use with their therapist during treatment (Sobell et al., 1994).

Alcohol and Other Drug Timeline Followback (TLFB) Calendar. The TLFB calendar, originally developed for gathering retrospective estimates of daily alcohol consumption (American Psychiatric Association, in press; Sobell et al., 1994), has been extended to gathering information about frequency of other drug use. The TLFB can be used in treatment as an advice-feedback tool to analyze clients' drug use and to increase their motivation to change (Sobell et al., 1994).

Addiction Severity Index (ASI). The ASI is a structured interview that uses 147 questions to assess problems in seven areas of substance use (American Psychiatric Association, in press). It must be administered by a trained interviewer and takes about 30 to 45 minutes.

Drug Abuse Screening Test (DAST). The DAST is a brief, self-administered measure of drug consequences that occurred in the last year (American Psychiatric Association, in press; Sobell et al., 1994).

Motivation, Treatment, and Prevention

There has been an increasing recognition of the importance of assessing the extent to which clients believe change is necessary (Miller & Rollnick, 1991). Motivation can be conceptualized as a state of readiness to change that may fluctuate over time and can be influenced by several variables (Sobell et al., 1994). Even when clients are convinced of the importance of changing, other factors can interfere with one's intent to change (Milby et al., 1997). The most important issue is that treatment of clients who are not strongly committed to changing their drug use should initially focus on increasing their motivation rather than on methods for changing.

Two major treatment options exist for drug abuse—pharmacotherapy and psychosocial therapy or a combination of these options. The major programs that offer such treatment options include therapeutic communities (TCs), methadone maintenance (MM), drug-free outpatient programs, and chemical dependency (CD) programs (Institute of Medicine, 1996; Lowinson et al., 1992; Milby et al., 1997). The first major drug treatment program in the United States was Synanon, a residential therapeutic community, staffed by ex-addicts and employing confrontation and peer pressure to produce change. Synanon gave rise to other long-term residential programs.

While several pharmacotherapies exist for drug abuse, methadone, an opiate agonist, has received the most attention. Methadone has been embraced as an inexpensive and effective treatment for heroin dependence. Maintenance on an agonist drug (that is, blocks euphoric drug effects) like methadone has several short- and long-term advantages (for example, stabilizes

an abuser's life, reduced drug use; Institute of Medicine, 1996; Schuckit, 1995). Other major pharmacological agents for treating heroin dependence include naltrexone, LAAM, and buprenorphine (Institute of Medicine, 1996; Schuckit, 1995).

In contrast to methadone programs, drug free outpatient programs were developed to treat non-opioid abusers. The treatment objective of these programs is abstinence and initially such programs did not include pharmacotherapy (hence, the label "drug free"). Today, outpatient programs serve most drug abusers, offering counseling and other services. Contingency management has also been used with drug abusers for many years. The objective has been to produce a change in drug use or target behaviors or to structure an environment favorable for new behaviors through the use of contingent reinforcement, for example, methadone (Institute of Medicine, 1996). Lastly, chemical dependency programs are short-term inpatient programs that follow a 12-step model like Narcotics Anonymous.

Several large scale treatment research studies have shown modest effects for drug treatment (Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Institute of Medicine, 1996). Also, although not evaluated in a controlled trial, length of time in treatment has been shown to be an important predictor of successful outcomes (that is, longer stays result in better outcomes; Hubbard et al., 1997; Institute of Medicine, 1996).

Over the past decade there has been increased interest in prevention programs, especially school-based programs (Institute of Medicine, 1996). Although their major goal has been to reduce the incidence and prevalence of drug use, the effectiveness of such programs is questionable with some programs showing no preventative effects on substance use (Institute of Medicine, 1996). For example, programs like D.A.R.E. (Drug Abuse Resistance Education) have repeatedly shown only short-term (1 year or less) effects on use, knowledge, and attitudes (Institute of Medicine, 1996).

While drug prevention programs for adolescents have an intuitive appeal for reducing use, research has not supported these efforts. Although the Institute of Medicine (1996) has recommended additional prevention research efforts, it has emphasized efforts beyond the school (for example, family, media) and interventions aimed at high risk groups.

[See also Addictive Personality; Cocaine; Drugs; Hallucinogens; Marijuana; and Opiates.]

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Linda C. Sobell and Mark B. Sobell

DRUGS. Psychologists are interested in the study of drugs for a variety of reasons. Because some drugs can have profound effects on psychological processes, scientists have considered the possibility that the altered psychological states produced by these drugs might provide a method for analyzing normal psychological processes. The general idea is that different drugs might selectively alter different basic psychological functions, allowing greater insight into what those basic functions consist of and how they interact under normal circumstances. The set of drugs that have significant effects on psychological processes such as thinking, perception, and emotion are referred to as psychoactive drugs. As neuropharmacologists have learned more about the biochemical processes in the brain that are influenced by these drugs, the possibility seems to be just within reach that specific psychological processes such as mood or memory might be linked to specific biochemical processes, thus giving us not only a greater understanding of brain-behavior relationships but opening the door to the development of more effective and more specific drugs for treating mental dysfunctions. We will see, however, that such clear and specific links between basic psychological functions and specific neurochemicals have continued to remain, like a mirage on the desert or the end of the rainbow, just out of our grasp. We do not yet have useful chemical models to understand such problems as psychological depression, ad-

diction, schizophrenia, or memory loss in Alzheimer's disease, in spite of years of extensive research and in contrast to popularly presented "explanations" of these disorders.

Another reason why psychologists are interested in psychoactive drugs is that several types of drugs play a practical role in the management of mental disorders, such as obsessive-compulsive disorder, depression, or schizophrenia. A psychologist who is trying to help someone contend with such a disorder needs to be familiar with the potential benefits of these drugs and also with their limitations. Although most psychologists are not legally able to prescribe these drugs, it is quite common for a patient to be taking psychoactive medications prescribed by a medical doctor while at the same time working with a psychologist who is taking a cognitive, behavioral, or intrapsychic approach to dealing with the same problem. Comparisons between drug therapy and psychotherapy, as well as the effects of combining drug therapy and psychotherapy, have provided a number of interesting opportunities for research. The branch of medicine called psychiatry, once dominated by psychodynamic approaches to psychotherapy, now often seems to be focused on the specialty of psychopharmacology, the study of the uses of psychoactive drugs. In fact, many psychiatrists are concerned that in modern health-care systems they have been relegated to the role of prescribers of medicine, leaving "talk" therapy to less expensive providers, including psychologists or perhaps social workers. Partly due to the shortage of psychiatrists, especially in rural or poor urban settings, a large proportion of the prescriptions for psychoactive medications are written by general practitioners who may have little or no training in dealing with mental disorders. For this and other reasons, some clinical psychologists have been calling for legislation allowing specially trained psychologists to prescribe psychoactive medications.

Since drug-taking behavior sometimes becomes compulsive, excessive, and/or dangerous to the point that serious problems are caused in the user's professional, social, or personal life, understanding such behavior and how to control or eliminate it has become a focus of a great deal of psychological research and a common issue in therapy. Although much of the research and therapy has focused on compulsive use of individual substances, such as alcohol or cocaine, there is also considerable interest in looking for commonalities among compulsive users of any of these substances. The term *addiction* is often applied to compulsive substance use.

Pharmacological concepts that are related to addiction and are significant for many psychoactive drugs include tolerance, physical dependence, and psychological dependence. Tolerance refers to the decreased effect

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Pharmacological concepts that are related to addiction and are significant for many psychoactive drugs include tolerance, physical dependence, and psychological dependence. Tolerance refers to the decreased effect

of a drug resulting from its repeated use. Sometimes it is possible to overcome the effects of tolerance by increasing the dose, but it is important to remember that all drugs produce multiple effects, and tolerance does not occur equally for all the various effects of a drug, so increasing a dose often results in increased unpleasant or dangerous side effects. Physical dependence is defined by the presence of a withdrawal syndrome when the use of a drug is terminated. When this occurs, it is usually after tolerance has developed, and so the two concepts are usually related to each other. As an example, the use of a CNS depressant as a sleeping pill may work well for the first night or two. However, after several nights of repeated use, tolerance may develop to the effects of many types of sleeping pills, which may lead the user to increase the dose and continue using the drug. If the person then tries to stop using the sleeping pills, he or she may experience a strong rebound insomnia on the first night. If the dose has been increased to very high levels and continued for some time, a more dramatic withdrawal syndrome may appear, including hallucinations and delusions, and in some cases *grand mal* seizures.

Psychological dependence is defined in strictly behavioral terms as an increased tendency to use a substance, resulting from experience with it. Dependence is often accompanied by descriptions of craving the substance, and becomes clinically significant when the use becomes so compulsive that obtaining and using the substance interfere with other important functions at home or work, or when use continues in spite of repeated negative consequences. It is important that psychological dependence can become very powerful even in the absence of clear evidence of either tolerance or physical dependence, although often all three occur together. The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*), which describes a wide variety of mental disorders, distinguishes between substance abuse disorder, characterized primarily in terms of psychological dependence (compulsive use, repeated use in spite of negative consequences) and substance dependence disorder, which for most substances includes evidence of tolerance and the appearance of withdrawal symptoms.

Categories of Psychoactive Drugs

Drugs are commonly grouped into large categories defined by their most prominent effects. For example, we distinguish between the central nervous system (CNS) stimulants, which produce wakefulness and enhanced alertness, and the CNS depressants, which produce sedation and drowsiness.

Stimulants. Stimulants are drugs that keep you awake, may make you feel jittery or nervous, and can

increase effort—leading to their widespread use for many years in athletic competitions. The most familiar stimulant, caffeine, produces relatively mild effects compared to other members of this class. Nevertheless, excessive use of caffeine can lead to insomnia, anxiety, and outbursts of anger. Tolerance develops with repeated use, and the withdrawal syndrome includes headaches, drowsiness, and a lack of energy. Caffeine is a natural constituent of coffee and tea, and is also found in many soft drinks and in some over-the-counter medications.

Cocaine is a powerful CNS stimulant. It is produced by the *coca* bush, the leaves of which have been chewed for thousands of years in the Andes mountains. The pure drug has been used medically (it is a local anesthetic) and recreationally for over 100 years, and some users have experienced addiction to it. Cocaine produces a profound sense of energy and well-being, lasting about 30 minutes. Following the brief “high” there may be a rebound effect, including mild psychological depression. With repeated use tolerance develops quickly, and use of higher doses may result in a paranoid psychotic state. Withdrawal after such high-dose use results in profound psychological depression and lack of energy. Cocaine hydrochloride may be converted into “crack” or “rock” cocaine, which may be heated and “smoked” (the cocaine vapors are inhaled). This produces a very rapid effect on the brain.

Ephedrine is derived from a Chinese herbal tea. The pure ingredient has been sold over the counter for many years as a treatment for asthma. Ephedrine is also a CNS stimulant, perhaps slightly more powerful than caffeine, and it is also sold in convenience stores and truck stops as an “alertness” drug. There has been some concern in recent years about overuse and abuse of ephedrine.

Amphetamine is a synthetic drug derived from ephedrine and has a similar chemical structure. Although its original use was in treating asthma, it proved to be a powerful CNS stimulant. It has been used to treat a rare sleep disorder called narcolepsy, as an appetite suppressant, as a short-term treatment for mild depression, and it was the first drug discovered by accident to increase attention and (surprisingly) reduce hyperactivity in attention-deficit/hyperactivity disorder (ADHD). Amphetamine has also been used recreationally and to enhance athletic performance. A slight modification of the amphetamine molecule results in methamphetamine, which is even more potent in its CNS effects than amphetamine. This drug has been abused by users who inject it intravenously, or inhale the vapors (“smoke” it) in a form known on the streets as “ice” or “crystal meth.” Excessive use of this drug produces affects like those of high doses of cocaine, but the effects of methamphetamine last for several hours.

Methylphenidate (brand name Ritalin) is an amphetaminelike stimulant that is widely used to treat ADHD in children. It is considered to be a slightly milder stimulant than amphetamine and appears to work equally well.

Depressants. These drugs produce sedation and drowsiness under many circumstances; at other times they might diminish inhibitions and appear to “release” behavior from its normal controls. Alcohol and several other types of substances are thought of as general depressants of the CNS. Some CNS depressants are prescribed as sedatives, sleeping pills, or to reduce the frequency of epileptic seizures.

Alcohol is one of the most commonly used (and misused) of the psychoactive drugs. Some may ask whether it is appropriate to consider alcohol a drug, since it has so many roles in human societies. When one is discussing whether to serve red or white wine with dinner, we are looking at it as a food or beverage item. But when one is discussing how many glasses of wine one can drink before reaching the minimum blood alcohol concentration (BAC) to be considered legally drunk, then viewing alcohol as a drug that varies in dose and whose effect depends upon dose is more appropriate.

Since alcohol has behavioral effects so similar to the other depressant drugs, it is logical for us to consider it a drug in the current context. At low doses (up to a BAC of about 0.10%), alcohol produces a sense of relaxation and a lessening of inhibitions that may lead to increased social interactions and recklessness. At higher BACs the generalized depressant action of the substance becomes more obvious: slowed reaction times, slurred speech, staggering when walking, and other clear signs of impairment. At still higher doses the user may become unconscious and difficult to arouse, and at BACs of around 0.60 there is a chance that respiration will cease, leading to death. Tolerance of many of these effects develops, and prolonged use of high doses can lead to a withdrawal syndrome that includes restlessness, tremors, hallucinations, and sometimes dangerous *grand mal* seizures. Addiction occurs in some users, and the worldwide problem of alcoholism is well-studied among psychologists interested in why it develops and how it can best be treated.

There is a wide variety of other depressant drugs, including the benzodiazepines, a reference to their common chemical structure. The benzodiazepines include prescription drugs used as sleeping pills, such as Halcion, and others used as antianxiety agents, such as Xanax. The benzodiazepine known as Rohypnol is not legally sold in the United States, but is available in many other countries. Because it has been secretly combined with alcohol to produce a profound state of intoxication, it became known as a “date-rape” drug.

Psychotherapeutic Drugs. Both Ritalin, the stim-

ulant used to treat ADHD, and the benzodiazepine antianxiety agents would be considered psychotherapeutic agents. Two major classes of drugs within this group are the antipsychotics and the antidepressants.

Antipsychotics were once referred to as tranquilizers, but they are not general CNS depressants. Some may produce drowsiness but others do not, and CNS depression is not responsible for their effectiveness in treating schizophrenia and other forms of psychotic behavior. The main thing they do is to decrease the frequency of “crazy talk” and erratic behaviors.

Antidepressants include several basic types, but recently the selective serotonin reuptake inhibitors, such as Prozac, have become by far the most widely used. The antidepressant drugs are able to reduce the severity and duration of major depressive episodes, but they are not a cure for depression.

Lithium is also prescribed fairly widely, as it is the drug of choice for treating bipolar disorder (once known as manic-depressive disorder).

Narcotic Analgesics (Opioids). The classic drug in this group is morphine, derived from the opium poppy. The primary medical use has been for the relief of severe pain, but these drugs also produce a dreamy, relaxed feeling of contentment and well-being. Heroin is a more potent derivative of morphine, and there is a wide variety of synthetic compounds that have opiate-like effects. Although these drugs can induce sleep in higher doses, they are distinguished from the general CNS depressants in that there is no slurring of speech or staggering gait associated with intoxication. The withdrawal syndrome is also different, characterized by diarrhea, muscle cramps, and a runny nose. While very unpleasant, withdrawal from narcotics is much less dangerous than withdrawal from alcohol or the other general CNS depressants. One thing the narcotics do have in common with CNS depressants is the depression of respiration, and accidental overdose deaths often occur as a result of combining narcotics with alcohol.

Nicotine. This is the major psychoactive ingredient in tobacco. It has the properties of a mild CNS stimulant, although cigarette smokers often say that smoking relaxes them. Nicotine does enhance one’s ability to pay attention to a specific task, and one withdrawal sign is drowsiness and fatigue. Powerful addiction to nicotine apparently occurs in a majority or regular tobacco users because attempting to quit tobacco, even in the face of clear health warnings, usually results in relapse within a few days or weeks. Those who keep trying to quit are often successful, but usually only after several attempts.

Hallucinogens. This group includes a wide variety of plant-derived and synthetic substances. Mescaline, derived from a cactus, and LSD, a synthetic, are two well-known examples. These drugs alter perception (es-

pecially visual perception) and enhance emotional responsiveness so that images are distorted in ways that may be interpreted as very interesting or very frightening. Most often the user is aware that the drug-induced experience does not represent "reality," and knows that the experience is due to the drug. They are often able to describe the experience to others, either at the time it is occurring or later. That is less true for another type of hallucinogen, PCP, which often produces distortions of the perception of one's own body and which also is a dissociative anesthetic, meaning that even while a person appears to be awake he or she may not respond to extreme pain. Users of PCP are often uncommunicative during the experience and often cannot remember much at a later time.

Marijuana. This is a common name for smokable material from the *Cannabis* plant. Various preparations of cannabis have been smoked, drunk, or eaten for thousands of years for both medical and recreational purposes. Smoking cannabis produces an initial sense of lightheadedness and euphoria, often accompanied by hilarity. Later the user typically feels relaxed and may be less active. At low doses these effects resemble the effects of low doses of CNS depressants. At very high doses, users often experience hallucinations and the drug is sometimes considered an hallucinogen. At the most commonly used doses withdrawal symptoms are not seen and addiction is less frequent than with nicotine, the CNS stimulants or depressants, or the opiates.

How Psychoactive Drugs Work in the Brain

Much has been learned about the actions of these drugs on neurochemical systems in the brain, and the pace of discovery seems to accelerate with each decade. We know, for example, that within the brain, receptor structures exist that are selectively affected by the opiates, and there are natural opiatelike substances produced in the brain that are presumably the normal activators of those receptors. We are not entirely sure what functions these endorphins normally support in the brain, but one of them is likely to be the psychological control of pain.

For other types of drugs, the method of action on the brain also seems fairly clear, for example, all of the effective antipsychotic drugs block receptors in the brain for a neurotransmitter substance called dopamine. In one region of the brain, we know that dopamine is released by neurons and that the release of dopamine is critical for the maintenance of normal muscle tone. Permanent loss of dopamine from the area results in tremors and rigidity and eventually to paralysis. The dopamine blockers that reduce psychotic behavior can also produce tremors and rigidity in some patients. One word of caution, however. Although we believe that antipsychotic drugs act to reduce psychosis

because of their action at dopamine receptors, we can find little or no consistent evidence of dopamine imbalance or malfunction in psychotic patients. In other words, knowing that these drugs block dopamine receptors does not explain why blocking dopamine receptors diminishes psychotic behavior, nor does it prove that some abnormal dopamine function is responsible for psychosis. Likewise with the selective serotonin reuptake inhibitors. Their grouping name signifies that we know something about the neurochemical effect of these drugs—they selectively block the reuptake into neurons of serotonin that has just been released. However, other antidepressant drugs that work equally well do not selectively block serotonin reuptake. Some selectively block the reuptake of norepinephrine, another of the brain's neurotransmitters. Thus, a conclusion that depression is caused by a serotonin deficiency or imbalance is not warranted by the data.

More remains to be learned about the actions of these and other drugs on the brain's neurotransmitter chemicals and their receptors. At stake are potential improvements in the chemical treatment of depression, bipolar disorder, psychosis, and other disorders, as well as potential chemical treatments for addiction.

[See also Depressants, Sedatives, and Hypnotics; Drug Abuse; and Drugs and Intelligence. Also, many illicit drugs are the subjects of independent entries.]

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Charles Ksir

DRUGS AND INTELLIGENCE. Psychologists define intelligence in many ways. The characteristics of intelligence include the ability to learn from experience, to respond quickly to novel stimuli, and to solve problems. [See Thinking, article on Problem Solving.] Intelligence may also be defined as the highest level of neural integration in the brain that is expressed by the action of knowing, perceiving, and conceiving. Each of these

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characteristics of intelligence can be influenced by drugs that alter brain function. In short, most psychotropic drugs alter one's ability to demonstrate the characteristics of intelligence.

Recent developments have contributed to our interest in the manipulation of intelligence by drugs. One important development has been the untangling of the mystery of the anatomy of the brain and the recognition of the role of its individual elements in intelligence, particularly the neurotransmitter pathways. Neural pathways form the communication lines between different brain regions. It is at their points of communication with each other that nearly all of the important drug-brain interactions occur; these points of communication are called synapses. Within these synapses are specific proteins that act as recognition sites, or receptors, for the different drugs. The brain has many such pathways that communicate by releasing specific chemicals, called neurotransmitters. These neurotransmitters are made by the brain from nutrients in the diet. Indeed, the balance of dietary nutrients, or their imbalance, can influence brain function and intelligence by altering the production of the neurotransmitter molecules. [See Determinants of Intelligence, *article on Nutrition and Intelligence.*] For example, the neurotransmitter serotonin is important for controlling mood. Some recreational drugs, such as amphetamines and cocaine, can temporarily relieve the symptoms of depression because they enhance the release of serotonin as well as other neurotransmitters. In contrast, psychedelic drugs induce hallucinations by interfering with the actions of serotonin neurons.

Hallucinogens

Little reliable information is available on the effects of hallucinogens, such as PCP (phencyclidine piperidine HCl, or angel dust), bufotenin, DMT (N,N-dimethyltryptamine), ecstasy (3,4-methylenedioxy-methamphetamine), LSD (lysergic acid diethylamide), mescaline (from peyote, i.e., the cactus *Lophophora williamsii*) or psilocybin (from the mushroom *Psilocybe mexicana*), on intelligence (Judd, 1987). In most cases, the actions of these drugs on the brain are so profound that normal intellectual processes are significantly impaired until the drugs leave the brain. Therefore, it is very difficult to determine the effects of hallucinogens on intelligence.

The consequences of the long-term use of most hallucinogens has never been completely determined. Scientists believe that prolonged and daily use of PCP can produce short-term memory deficits; in addition, some individuals have reported significant speech difficulties one year later. The permanent pathological effects of the drug ecstasy on the brain are better understood; however, its long-term effects on intelligence are not. In primates, a single low dose of ecstasy irreversibly

destroyed most of the neurons that produce serotonin. Surprisingly, humans and nonhuman primates given ecstasy do not demonstrate significant changes in learning and memory abilities, mood, or sleeping habits, i.e., those brain functions that are thought to require serotonin neurons. The consequences of ecstasy use may only be appreciated as these people become older and their brain's ability to compensate is diminished.

Long-term, daily marijuana use impairs short-term memory, particularly those events that occur during or immediately after its use. However, the ability to retrieve information that is already in long-term memory is not altered by marijuana intoxication. However, marijuana intoxication impairs the consolidation process, i.e., the transformation of short-term memories to long-term storage. This action of marijuana would have a significant impact on most measures of intelligence. Some users often compare the effects of marijuana to those of alcohol (to be discussed later); however, the effects of marijuana on brain function are quite different from those of alcohol intoxication. In contrast to marijuana, which does not depress central nervous system function, alcohol does have this effect and therefore prevents normal information processing of any kind from occurring. Both alcohol and marijuana intoxication can prevent the user from engaging in complicated mental or verbal tasks. The impairment in short-term memory produced by marijuana may also underlie changes in time-sense, which has been reported by recreational users, i.e., the user feels that time is accelerated.

Stimulants

Drugs that stimulate the brain tend to enhance attention, an important aspect of intelligence. The best-studied stimulants are caffeine, amphetamine, cocaine, and nicotine. Caffeine has many beneficial effects. Primarily, it enhances mental clarity and lessens fatigue. Caffeine is most effective in improving performance that has deteriorated due to excessive stress or fatigue. However, it has much less benefit on well-rested individuals. Interestingly, caffeine has a more pronounced benefit on the performance abilities of highly impulsive people as compared to less impulsive people. [See Impulsivity.] It also increases vigilance and prevents the decline in attentional ability, which is frequently seen after meals. Caffeine also enhances the ability of subjects to simultaneously pay attention and respond to two different stimuli. The performance of women engaged in intelligence-related tasks are most enhanced by low doses of caffeine during the first five days of their menstrual cycle, suggesting an interaction with the body's hormones. [See Endocrine Systems.] Overall, caffeine does not actually improve intelligence; it only enhances the ability to focus one's attention.

Amphetamine enhances performance in many different behavioral tasks that require learning and memory or increased vigilance (Judd, 1987). The brain's utilization of its primary energy source, glucose, is greatly increased by amphetamine. In addition, the electrical activity measured at the scalp, one's EEG, is enhanced, and this is correlated with improved performance. Amphetamine's effects on cognitive function may be related to its actions outside the brain that are completely unrelated to its actions within the brain that cause excitation and euphoria. For example, peripheral administration of amphetamine, i.e., taking a pill or receiving an injection, enhances memory. In contrast, injection of amphetamine directly into the brain does not. This may be due to its ability to quickly increase blood glucose levels.

Cocaine is a powerful brain stimulant and enhances the performance of laboratory animals in tasks that require memory or vigilance. In one study on humans, cocaine use disrupted learning; in another, it increased the reaction time of subjects who were sleep deprived but not of those who were well rested. The similarities between the actions of cocaine and amphetamine in the brain may underlie their similar effects on intelligence. It is important to recognize that in these experimental studies very low doses of amphetamine and cocaine, well below the doses typically taken by humans, were given only once or twice to naive rats. Repeated exposure to high doses of either drug actually impairs performance on these same tasks.

Studies on humans have suggested that nicotine influences overall performance by increasing subjects' speed of response in selected tasks, enhancing their ability to focus quickly on relevant visual information, and improving overall attention and information processing, rather than by enhancing any particular memory process within the brain (Heishman et al., 1994). Making a clear determination about the enhancing effects of nicotine on intelligence is problematic, however, because these studies have all assessed performance under abstinence conditions. Therefore, positive effects might simply be due to the amelioration of withdrawal-associated deficits. Indeed, this caveat could potentially apply to the results of many stimulant drugs that enhance intelligence in controlled laboratory studies.

Depressants

In contrast to stimulants, the depressants, drugs that depress the function of the brain, such as opiates (heroin and morphine), alcohol, barbiturates, and the anxiolytics (drugs that reduce anxiety, such as Valium and related drugs), tend to impair performance on intelligence tasks. Opiate use interferes with learning and memory, while drugs that block the actions of opiates in the brain actually improve memory abilities and enhance attention. Overall, higher cognitive functions

have not been affected by low doses of opiates, but they have been impaired at high doses. The timing of the administration of the opiate was also important, i.e., whether it was taken before or after the subject attempted to perform the task.

Alcohol and the barbiturates depress the activity of neurons within the brain. They produce such profound changes in brain function that the determination of intellectual abilities is very difficult. Both types of drugs tend to release behavior that had been previously suppressed by punishment. Assuming that these drugs are not used repeatedly, intellectual ability after their use is usually not permanently impaired. However, following chronic use, disorders of memory and critical cognitive processes that underlie intelligence have been associated with the degeneration of specific brain regions.

Valium (which is Latin for "be strong and well") and its related drugs have a similar major side effect: drowsiness. Their primary effects on intellectual ability are probably related to this drowsiness. Recent studies have found that specific attentional abilities are impaired, such as tracking eye-movements, i.e., the ability to follow the movements of an object with the eyes, particularly when driving a car. This tracking impairment is also seen with alcohol. A typical dose of Valium impairs lane tracking, lane changing, and stopping ability for up to 3.5 hours. These drugs may also impair function in brain regions that are important for learning and memory and produce a temporary amnesia.

Drugs That Influence Creativity

Studies of the effects of drugs on creativity, an important expression of intelligence, are not hampered by problems of generalization to our species from laboratory animals; most of the artistic products judged to have aesthetic value to humans were created by humans. Some drugs may enhance creativity, not through their actions on some unknown brain structure, but through their ability to release the user from the constraints of another problem, either mental or physical, e.g., the relief from physical or mental pain or anguish, anxiety or depression, or severe personal problems. An excellent example of a recreational drug used in this way is alcohol. The creative genius of many artists, such as Thomas Wolfe, Dylan Thomas, and F. Scott Fitzgerald, may have been released by the ability of alcohol to relieve physical and emotional pain and anxiety. Valium and its related drugs have provided immeasurable relief from anxiety for many lesser artists.

Caffeine, chocolate, and amphetamine have probably allowed many businesspeople and artists to remain alert during a period of fatigue so that a specific creative task could be completed. Hallucinogens have often been used to enhance creativity, especially LSD and peyote (Leavitt, 1982). These drugs generate an altered state of consciousness somewhat similar to dreaming

that the users claim may lead to enhanced creative abilities. The following were "invented" while their creators were dreaming: the story of Dr. Jekyll and Mr. Hyde, by Robert Louis Stevenson; the model of the atom, by Bohr; the nature of the benzene ring, by Kekule; the sewing machine, by Howe; and various musical scores, as claimed by Mozart and Robert Schumann. In contrast, a few authors who have claimed benefit from recreational drug use include Alan Watts (*As a Man Thinketh*), Ken Kesey (*One Flew Over the Cuckoo's Nest*), and William Burroughs (*Naked Lunch*). Individuals who choose to live an unconventional life, such as artists, may also choose to try unconventional experiences, such as those produced by hallucinogens (Masters & Houston, 1968).

Conclusions

Any drug that influences brain function must have an effect on some aspect of intelligence. The nature of this effect depends on the particular neurotransmitter system that is affected within the brain. The effects of some drugs are so profound that any attempt to measure intelligence is impossible. In general, although some drugs may temporarily improve performance, most tend to impair, rather than enhance, overall intelligence.

Whether drugs can truly enhance any aspect of intelligence is unknown; indeed, it may not be possible to enhance intelligence. First, the brain may already be functioning at its peak level of performance; it may be impossible to improve on millions of years of evolution by the administration of a single drug. Second, the systems of the brain function in subtle balance with each other; the gross manipulation of any neural systems by a drug usually imbalances the interplay of the systems. Therefore, although a single measure of intelligence may be enhanced by a drug, other cognitive functions that contribute to one's overall intelligence may become severely impaired.

[See also Alcoholism; Amnesia; Attention; Brain; Cocaine; Creativity; Depressants, Sedatives, and Hypnotics; Depression; Drugs; Hallucinations; Hallucinogens; Information Processing Theories; Intelligence; Learning; Marijuana; Memory; Mood; Stimulants; Synapse; and Thinking, article on Problem Solving.]

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Gary L. Wenk

DRUG THERAPY. See Psychopharmacology, article on Pharmacotherapy.

DSM. See Diagnostic and Statistical Manual of Mental Disorders.

DUNCKER, KARL (1903-1940), German American psychologist. An experimental psychologist in the Gestalt tradition, Duncker made lasting contributions to perception, the psychology of problem solving, and other areas in psychology. Born 2 February 1903, in Leipzig, Germany, he studied with Gestalt theorists Wolfgang Köhler and Max Wertheimer at the University of Berlin. He earned his master's degree from Clark University in Worcester, Massachusetts in 1926 with a thesis on productive thinking, and his doctorate from Berlin University in 1929 with a dissertation on the perception of induced motion, then remained at Berlin as Köhler's assistant, conducting further studies of productive thinking, learning, and perception. Dismissed from Berlin by the Nazis, Duncker moved to England and worked in Sir Frederic Bartlett's psychology laboratory at Cambridge. After a stay in Kreuzlingen, Switzerland, at Ludwig Binswanger's clinic, for treatment of a severe depression, Duncker became an instructor

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at Swarthmore College in 1938. He continued scholarly work until his self-inflicted death on 23 February 1940. [See the biographies of Köhler, Wertheimer, and Bartlett.]

Duncker's contributions cover a wide range of areas in psychology, from influential experimental work to articles on theoretical and philosophical psychology. Best known are his works on the psychology of productive thinking and his experiments on apparent motion, but he also published studies on pain, motivation, an effect of past experience on taste perception, and systematic psychology. He also collaborated on two books intended to assist American students in learning to read psychological material in German.

Duncker's works on productive thinking, still frequently cited by cognitive psychologists late in the twentieth century, asked participants to "think aloud" while trying to solve standard problems that Duncker posed to them. The resulting verbal protocols reinforced the Gestalt distinction between what Duncker called "organic" solutions that analyze the problem "from above" and "mechanical" approaches that analyze the problem "from below." The former are meaningful and involve insight and understanding; they qualify as "productive thinking." The latter are senseless and "blind," using rote memorization; they are purely "reproductive" and, while they can occasionally generate solutions, do not really involve "thinking." Still influential in cognitive psychology are Duncker's conceptions of the structure and dynamics of productive problem-solving processes; the use of verbal protocols; his distinction between insightful learning and "simple finding" or automatic retrieval; and "functional fixedness" or the interference (generated by realizing that the item can be used in a particular way in one problem context) in using an item differently in another problem context.

Duncker's work on apparent motion established that when there is relative displacement between an object and its surround, the motion is typically perceptually attributed to the object and not the framework. This "induced motion" extended earlier Gestalt work on the perception of movement.

Other contributions included demonstrating paradoxical relief from one source of pain by intentional exposure to a second source of pain; the influence of social suggestion and prestige on children's food preferences; and the effect of the color of chocolate (white or brown) on its apparent flavor, and theoretical writings that developed the Gestalt position on motivation, epistemology, and phenomenology, and that criticized behaviorism and ethical relativism.

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Michael Wertheimer

DUNLAP, KNIGHT (1875-1949), American psychologist. Dunlap received his bachelor's degree (1899) and master's degree (1900) from the University of California at Berkeley where his mentor was George M. Stratton, an experimental psychologist who had studied with Wilhelm Wundt. Dunlap completed his doctorate in psychology at Harvard University in 1903 under Hugo Münsterberg, whom he admired and whose interest in the practical applications of psychology influenced him. In 1906, following a brief and unhappy experience as an instructor at Berkeley, Dunlap was named an instructor in psychology at Johns Hopkins University, where he eventually rose to the rank of professor of experimental psychology. John B. Watson, the founder of behaviorism, joined Dunlap at Johns Hopkins in 1908. Their relationship was cordial and mutually beneficial. Undoubtedly, Dunlap's reappraisal of introspection had a stimulating effect on Watson and therefore played a role in the creation of behaviorism. Dunlap was appointed chairman in 1920 and became instrumental in resurrecting Hopkins's moribund doctoral psychology program. His philosophy of graduate education combined methodological rigor with training in

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practical skills. Dunlap remained at Johns Hopkins until 1936, when he accepted an offer to develop a graduate psychology program at UCLA, where he remained until his retirement in 1946.

Dunlap's pioneering and highly influential analyses of imagery, consciousness, instinct, and habit assure him an important niche in the history of American psychology. He opposed the use of introspection to categorize consciousness into images or ideas, but he believed that conscious awareness could be studied as an objective response. In his critique of instincts, Dunlap argued that William McDougall's widely cited instinctive explanations of behavior were vitalistic and teleological. However, he did acknowledge that innate, biological factors were important determinants of behavior, and he proposed that the science of psychology be based upon a collaboration between psychology and biology. In this regard, he developed a neuropsychological model that correlated consciousness with integrated patterns or systems of neural-motor circuits. Dunlap's analysis of habit is noteworthy for its anticipation of contemporary interest in the impact that cognitive and motivational factors have on learning. Utilizing his insight that certain habits may be weakened through repetition, he developed the "negative practice" therapeutic technique for eliminating such maladaptive behaviors as stuttering and tics.

After first proposing the term "scientific psychology" to designate his approach, Dunlap ultimately settled on the name "response psychology." Given its emphasis upon practical applications, commitment to the physiological correlates of behavior, and inclusion of both behavioral and cognitive processes, response psychology may be viewed as an evolutionary development of the functionalist school of psychology. Dunlap never systematically tested the postulates of response psychology but instead presented theoretical arguments for his position in books and articles. His experimental research encompassed investigations of word association, psychomotor skills, color vision, reaction time, auditory perception, and the nystagmic reflex. A creative developer of laboratory apparatus, Dunlap's inventions include the Johns Hopkins's chronoscope, the Dunlap tapping table, and the Dunlap chair for vestibular research. He also was among the first to demonstrate practice effects in intelligence testing.

Although frequently portrayed as a proto-behaviorist, Dunlap actually believed that the inherent oversimplifications of behaviorism, especially the denial of cognitive processes, had impeded the progress of scientific psychology. Watson's elimination of mental events and his extreme environmentalism far exceeded Dunlap's proposals for the reconceptualizations of the mental and biological determinants of behavior. Dunlap refused to accept the behavioristic elimination of the mind, and it is this adamant insistence upon taking

mental processes into account that distinguishes him from Watson and demonstrates his relevance for contemporary psychology. It is ironic that Watson's generous but unintentionally misleading statements about Dunlap's contributions to the development of behaviorism may have deflected attention away from the latter's focus on cognitive processes and may have thereby distorted psychologists' perceptions of Dunlap's actual views on the nature of psychology.

Dunlap had an eclectic range of interests. He authored books on physiological psychology, the psychology of religion, social psychology, general psychology, eugenics, and personal adjustment. The first editor of the *Journal of Comparative Psychology*, he also served as an editor of *Comparative Psychology Monographs*, *Mental Measurements Monographs*, and *Child Development*. Dunlap was also an influential leader of such national and regional organizations as the American Psychological Association, the Western Psychological Association, the National Institute for Psychology, and the National Research Council. His 1922 presidential address to the American Psychological Association argued against the then dominant "group mind" concept and proposed that social psychology become an experimental discipline. Dunlap's papers are housed at the Archives of the History of American Psychology, University of Akron, Ohio.

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Alfred D. Kornfeld

DURKHEIM, ÉMILE (1858–1917), French sociologist. Emile Durkheim was one of the founders of sociology as an academic discipline. Born in Epinal, he went to Paris to study philosophy at the École Normale Supérieure. He taught pedagogy, sociology, and philosophy first at the University of Bordeaux (1887–1902) and then at the newly constituted Sorbonne in Paris until his death.

His dissertation, *The Division of Labor in Society* (1893/1984), was his first major work. In it, he drew on historical and comparative studies of law and morality to argue that labor specialization was giving rise to a new, “organic” type of social solidarity in modern societies that was replacing the older, “mechanical” form. He explicated the empirical methods of this and his subsequent sociological works in *The Rules of Sociological Method* (1895/1982), in which he drew a sharp distinction between sociology and psychology. Where psychology studied individual mental representations, he argued, the goal of sociology was to study the collective representations that bind people to their respective societies.

Of all his works, perhaps Durkheim's *Suicide* (1897/1951) had the greatest impact on psychology. In it, he demonstrated the importance of sociological factors, specifically social integration and regulation, to explain suicide rates of social groups. Social integration had to do with moral relationships and regulation with economic relationships. An excess or deficiency of either could lead to higher suicide rates. Thus, there were four types of suicide: First, egoistic suicide, typified by the suicide of lonely old bachelors, was the result of a lack of social integration. Second, altruistic suicide, typified by the sacrifice of a soldier to save his comrades, resulted from an excess of social integration. To the extent that Protestants commit suicide more often than Catholics, and Catholics more often than Jews, Durkheim thought that these different religions offered their

congregations different degrees of social integration. Third, anomic suicide reflected a lack of social regulation and was most prevalent during economic crises. Fourth, fatalistic suicide, at least in Durkheim's time, was relatively rare, as it is due to excessive social regulation characteristic of a high degree of specialization in labor that even industrialized societies had not yet achieved. Mixed forms of suicide were also possible, especially egoistic–anomic suicide. It must be stressed that these categories were meant to explain suicide rates and not individual suicides. These rates, Durkheim argued, could not be explained in terms of a combination of psychological factors, such as rates of mental illness (see Schmaus, 1994, ch. 7, for a more detailed interpretation).

After publishing *Suicide*, Durkheim founded and edited the journal *L'Année sociologique* (1898–1913). His last major work, *The Elementary Forms of Religious Life* (1912/1995), investigated the social causes and functions of religious belief and ritual, especially in so-called primitive societies. The main interest of this work for psychologists is Durkheim's account of the religious, and hence social, origins of our basic categories of thought, including space, time, causality, substance, genus, and personhood. This highly influential work initiated a tradition of anthropological research into the social and cultural aspects of cognition.

[See also Anthropology; Religious Experience; and Suicide.]

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Alfred D. Kornfeld

DURKHEIM, ÉMILE (1858–1917), French sociologist. Emile Durkheim was one of the founders of sociology as an academic discipline. Born in Epinal, he went to Paris to study philosophy at the École Normale Supérieure. He taught pedagogy, sociology, and philosophy first at the University of Bordeaux (1887–1902) and then at the newly constituted Sorbonne in Paris until his death.

His dissertation, *The Division of Labor in Society* (1893/1984), was his first major work. In it, he drew on historical and comparative studies of law and morality to argue that labor specialization was giving rise to a new, “organic” type of social solidarity in modern societies that was replacing the older, “mechanical” form. He explicated the empirical methods of this and his subsequent sociological works in *The Rules of Sociological Method* (1895/1982), in which he drew a sharp distinction between sociology and psychology. Where psychology studied individual mental representations, he argued, the goal of sociology was to study the collective representations that bind people to their respective societies.

Of all his works, perhaps Durkheim's *Suicide* (1897/1951) had the greatest impact on psychology. In it, he demonstrated the importance of sociological factors, specifically social integration and regulation, to explain suicide rates of social groups. Social integration had to do with moral relationships and regulation with economic relationships. An excess or deficiency of either could lead to higher suicide rates. Thus, there were four types of suicide: First, egoistic suicide, typified by the suicide of lonely old bachelors, was the result of a lack of social integration. Second, altruistic suicide, typified by the sacrifice of a soldier to save his comrades, resulted from an excess of social integration. To the extent that Protestants commit suicide more often than Catholics, and Catholics more often than Jews, Durkheim thought that these different religions offered their

congregations different degrees of social integration. Third, anomic suicide reflected a lack of social regulation and was most prevalent during economic crises. Fourth, fatalistic suicide, at least in Durkheim's time, was relatively rare, as it is due to excessive social regulation characteristic of a high degree of specialization in labor that even industrialized societies had not yet achieved. Mixed forms of suicide were also possible, especially egoistic–anomic suicide. It must be stressed that these categories were meant to explain suicide rates and not individual suicides. These rates, Durkheim argued, could not be explained in terms of a combination of psychological factors, such as rates of mental illness (see Schmaus, 1994, ch. 7, for a more detailed interpretation).

After publishing *Suicide*, Durkheim founded and edited the journal *L'Année sociologique* (1898–1913). His last major work, *The Elementary Forms of Religious Life* (1912/1995), investigated the social causes and functions of religious belief and ritual, especially in so-called primitive societies. The main interest of this work for psychologists is Durkheim's account of the religious, and hence social, origins of our basic categories of thought, including space, time, causality, substance, genus, and personhood. This highly influential work initiated a tradition of anthropological research into the social and cultural aspects of cognition.

[See also Anthropology; Religious Experience; and Suicide.]

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Warren Schmaus

DUTY TO REPORT. *See* Mandated Reporting.

DUTY TO WARN. *See* Violence Risk Assessment.

DYSLEXIA. The prevalence of dyslexia, or severe reading disability, is estimated to be 4% of school-aged children in the United States. Lower prevalence figures may be found in other countries where stricter diagnostic criteria are used or the nature of the native language is unique (e.g., phonetically regular/irregular). The prevalence of dyslexia has also been difficult to establish because the number of individuals with dyslexia has been compiled with other learning disorders such as mathematical and written language disorders. Males typically outnumber females by a ratio of 3–5:1. A bias toward identification of males, possibly because of more males than females exhibiting external behaviors associated with academic frustration, may account for at least some of this large gender specific inclination in diagnosis.

Dyslexia is typically not diagnosed until the beginning of formal schooling when reading instruction begins. Some individuals are not diagnosed with dyslexia until adulthood. In children with high IQs, a reading disability may not be recognized in the early grades because their reading achievement is usually average in comparison to their chronological age peers. Identification may occur when education becomes more demanding and independent as in the later middle or high school or even college years, where it is harder to compensate for reading weaknesses.

Early identification of dyslexia is thought to have

the best outcome because early intervention can be implemented. Dyslexia persists throughout life, although with good early intervention some adults are able to compensate using learning strategies for their difficulties with reading. Comorbidity for dyslexia and attention-deficit/hyperactivity disorder (ADHD), mathematics disabilities, spelling and written expression disabilities have been commonly reported.

The diagnosis of dyslexia is typically accomplished through school district evaluations. A discrepancy model is used by most school districts to identify children with reading disabilities as well as other learning disabilities. The model is based on the definition of reading performance that is 1.5–2 standard deviations below their expected performance based on their IQ score, which must be in the average range. A regression formula is also used by some states to diagnose dyslexia. Many of these children are identified during the preschool years as having language delays or attention difficulties that may accompany dyslexia. Children who are identified as learning disabled are required by law (PL 94-142) to be served by the public school systems special education programs. Federal and state funds are provided for these programs, which are available in elementary school through college, and services may continue to be provided through graduate education.

Studies have shown that children with dyslexia progress in reading skills at the same rate as normal readers, but the level of mastery is consistently slower than same age peers and normal readers. Dyslexia is believed to be a language-based disorder in which the ability to engage in phonological processing is impaired thus impacting fluent reading. Often children have difficulty making the orthographic-phonological connections between written letters and their sounds. Remediation for dyslexia is usually focused on improving phonological awareness and increasing reading rate and comprehension. The service delivery model most often in schools is to have the children spend part of their day in a resource room to remediate reading skills, or children may receive these same remedial services in the regular classroom. Direct instruction of phonics, building sight-word vocabulary, and learning strategies are taught to students. Programs may also include study skills, counseling, cognitive-behavioral therapy, and behavior management. Some children with dyslexia are able to compensate for their disability, and they do not require special education for their entire school career. Other students require accommodations through college, and their disability continues to effect them in their jobs. Jobs that require a large amount of reading and writing can be difficult for adults with dyslexia. They may require more time to

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complete the same amount of work as their colleagues.

Neurobiological correlates of dyslexia are being explored through brain structure studies conducted through postmortem examination and the use of neuroimaging and electrophysiological techniques. There is evidence that individuals who have dyslexia are more likely to have symmetry or reversed asymmetry of the left posterior central language area. Language is lateralized (dominant in one hemisphere) to the left hemisphere of the brain in the majority of people, and this asymmetry in function is believed to be linked to the structural asymmetry of the language cortex. Postmortem studies have also provided evidence that leftward asymmetry is found in about 65% of normal brains and that there is greater potential for reversed asymmetry when an individual has dyslexia. The planum temporale, an area of the temporal lobe of the brain, has been implicated in language functions. It has been found in some magnetic resonance imaging (MRI) studies and postmortem studies to be symmetrical or asymmetrical favoring the right side in dyslexic individuals. Galaburda and colleagues (*Annals of Neurology*, 1985, 18, 222-233) found an increased amount of focal dysplasia in dyslexics in the left planum temporale. Other cerebral anomalies have been found in the left hemisphere in dyslexics by Leonard and colleagues (*Archives of Neurology*, 1993, 50, 461-469). Disorganization in subcortical areas related to the lateral geniculate nucleus of the thalamus has also been found in autopsy studies by Livingstone and associates (*Neurobiology*, 1991, 88, 7943-7947).

Studies such as these suggest that there is cerebral reorganization in individuals with dyslexia not found in those without dyslexia. Positron emission tomography (PET), functional magnetic resonance imaging (fMRI), and regional cerebral blood flow (rCBF) studies have shown different patterns of neural activity during reading for normal readers and individuals with dyslexia. Differences in metabolic function have been found in the frontal and temporal regions of the brain's hemispheres. Adults with dyslexia have shown symmetrical activity in the brain favoring the left side. Electrophysiological studies of individuals with dyslexia have shown slower interhemispheric transaction times. Dyslexics also showed a larger number of errors on letter-matching tasks suggesting that the corpus callosum, which may facilitate communication between the hemispheres, may be impaired in dyslexia.

There is indication of a genetic link to dyslexia. Twin studies such as those done by DeFries and Alarcon (1996) have provided evidence that there most likely is a heritable component. Sibling studies of individuals with dyslexia using linkage analysis has allowed researchers to screen for gene loci. Sig-

nificant markers have been found in families with a history of dyslexia on chromosomes 15 and 6 in studies by Pennington (*Journal of Child Neurology*, 1995, 10, S69-S77). These chromosomal markers are now being tested in twin pairs where at least one twin is dyslexic.

There have been many advances made in understanding the neurobiological basis of dyslexia in the last decade. Information of genetics, brain morphology, and brain electrophysiology found in dyslexia may eventually assist in the early identification of individuals with dyslexia so intervention can begin in the early stages of reading instruction. Interventions for reading disabilities have also become more sophisticated and detailed as we learn more about how reading skills are acquired. By uncovering the components that are used in learning to read, testing can become more specific for the different components of reading, and intervention then may become more effective.

[See also Learning Disabilities.]

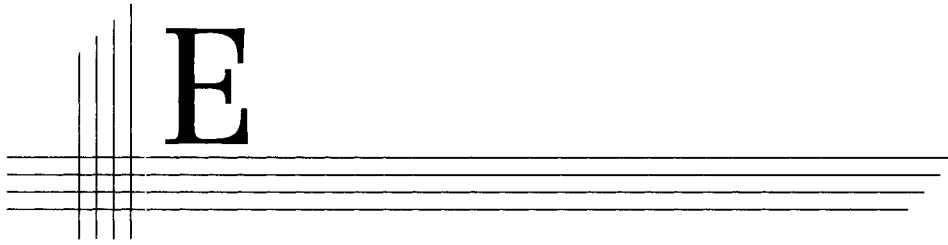
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Kathleen H. Nielsen and George W. Hynd

DYSTHYMIA. See Depression.



EAR. See Hearing.

EARLY CHILDHOOD. [*This entry provides a general survey of the theories, research, and findings that have informed our knowledge about cognitive and mental development during early childhood. For discussions dealing with other stages of development, see Infancy; Middle Childhood; and Adolescence.*]

Twenty years ago Rochel Gelman (*Annual Review of Psychology*, 1978) could accurately claim that our knowledge of children's thinking focused primarily on school-age children. Early childhood—from infancy through the preschool years—represented merely an impoverished ground floor from which the staircase of cognitive development began. In the ensuing years, younger children have been intensively investigated, thereby revealing step upon step of early cognitive achievements. Indeed, the current picture of accumulating early competencies can leave the impression that the achievements of later childhood are more anticlimactic than fundamental. This impression should be resisted; Paul Baltes, a noted life-span psychologist, reminds us that cognitive development is a life-long process filled with crucial gains and losses. Nonetheless, early developments are of legitimate special interest.

Early cognition is fascinating in its own right: How do infants and children, who are so seemingly different from adults, construe the world, think, and learn? Early cognition is crucial developmentally: What conceptions, capacities, and mechanisms constitute the infrastructure on which later knowledge and learning must build? And early abilities raise fundamental questions about human nature: What conceptions and capacities are innate? In what ways are basic

cognitive competencies dependent on individual, social, and cultural experiences?

Piaget's Theory

Jean Piaget's proposals, more than any others, helped shape a "traditional account" of cognitive development. Piaget described two major periods within early childhood (see, for example, Piaget & Inhelder, 1969). First, in the "sensorimotor" period, infants are without representational thoughts, ideas, memories, or symbolic reasoning. They are cognitively active, but their interactions with and learnings about the world are in terms of perceptions and actions. Much as an adult "knows how" to walk without thinking about or conceiving of walking, infants "cognize" in the sense of at first reflexively and then more deliberately acting on the world. They do so initially via sucking, looking, grasping, and reaching; and then somewhat later via locomoting, searching for objects, and even imitating others' actions. The transition from the sensorimotor world of the infant to the "preoperational" period of the toddler and preschooler is marked by the onset of symbolic abilities, evident in part in children's acquisition and use of language. But, according to Piaget, in these early childhood years symbolic thought remains quite limited; it is preoperational rather than operational. Specifically, in this period children's symbols and concepts are centered on, or captured by, their own unique point of view—hence young children's thinking is systematically egocentric. Similarly, young children's thinking is similarly centered on the apparent, surface, perceptual features of objects and events, as opposed to more abstract, deeper qualities. Consequently, preoperational children deem anything that moves as alive, judge amount in terms of the changing length of a row of markers instead of their invariant number, and largely fail to appreciate causal connections between occurrences.

Cognition about Objects and Numbers

Most contemporary researchers no longer subscribe to this deficit view of early childhood, as initially *nonsymbolic* and then later *preoperational*. One area of cognition that has helped reconfigure our views of young children concerns their understanding of physical objects.

Consider the basic understanding that objects exist independent of oneself and thus continue to exist “out there” when out of sight or touch. Piaget concluded that this object concept was acquired late in infancy as an endproduct of sensorimotor developments such as the child’s grasping and reaching for objects. Before that time, when an object is hidden, even if the infant sees it hidden and clearly wants it, he or she will not search for the object. It is as if the object ceases to exist. In the past ten years, the claim that young infants fail to understand object permanence has been systematically overturned, in part due to new findings from research using different methods, such as preferential looking tasks. Given a choice, infants prefer to look at some displays over others and in the right circumstances look longer at novel rather than familiar events. Infants as young as 3 and 4 months systematically look longer at physically anomalous displays than at physically possible ones. For example, they will look longer at a solid panel apparently moving right through a box hidden behind it, than they do when the panel stops on contact with the hidden box. This suggests that young infants are puzzled when the panel does not stop on expected contact with the box and thus believe the box continues to exist even when hidden from view. Extended findings of this sort, especially from the laboratories of Renée Baillargeon and Liz Spelke, show that quite young infants appreciate object existence, object continuity and solidness, as well as certain aspects of objects’ movements (Baillargeon, 1993).

There is much for young children to learn about the physical world, based on but extending beyond initial understandings of objects’ existence, appearances, and movements. For example, what about objects’ material composition or the nature of their insides? Chairs are not only solid objects, they may be wood, or steel, or plastic; the gears inside a watch or muscles inside a frog may be largely unobservable but particularly important for explaining how they function. If asked to report the inside of objects, even 3-year-olds offer systematically different answers for animate and inanimate things (blood, bones, and muscles versus cotton, gears, and wood). Preschoolers judge that nonobvious insides are more essential to an object’s identity and function than are outsides (the white and yolk of an egg versus its shell). Furthermore, young children

know that material objects (for example, a paper cup) that are ground up into tiny bits are no longer the same object (not a cup) but are still the same material (paper).

Regarding numbers, “threeness” or “fourness” is not a property of a single object as would be “red” or “round,” and, indeed, physical features such as color or shape are irrelevant to numerosity. Moreover, the same item can be “three” or “four” or whatever, depending on where and how one counts the set. Yet even infants discriminate numerosities, as demonstrated in studies using habituation tasks. In such studies, infants are given trials viewing different sets of objects. Each set has the same number (for example, two objects) but the objects are constantly varied (for example, a ball and a spoon, then a toy car and pencil). After multiple trials, infants habituate; they look less and less at each succeeding set. But their looking increases significantly if they are now shown a set with a different number (for example, three objects, or one). Dishabituation thus shows attention to number in the preceding trials. A variety of studies demonstrates this early appreciation of object number in 3- and 4-month-olds and even in newborns. More controversial is the proposal that infants add and subtract, that is, that they are sensitive to the exact changes in numerosity that result when an item is added or taken away from an initial set (as argued by Wynn, 1991).

Infant attention to numerosities sets the stage for a considerable early developing competence with number in the toddler and preschool years, at least if number skills are assessed in relation to small sets of objects that the child counts. Number words are often acquired before the age of 2 years (with “two” typically the first acquired). Principled counting—where children use stable strings of number names, attempt to count all objects once and only once, and understand that the last number counted represents the cardinal value of the set—develops quickly and is evident even in the counting of many 2- and 3-year-olds when counting small sets (Gelman, 1993). Young children engage not only in number extraction—typically via counting—but in several forms of number reasoning as well. They can judge that four is more than three, or that if three dolls each have a hat there will be the same number of hats as dolls. Infant discrimination of numerosities thus leads to a preschool counting-based conception of number (Sophian, 1996).

Young children’s attention to and knowledge about numbers, or objects’ insides, help to contradict claims that young children’s concepts are focused on the perceptual, static, and manifest characteristics of phenomena whereas only older children are concerned with conceptual, dynamic, and inferred characteristics. Young children’s conceptions of persons, or their social cognition, contradicts such traditional accounts as well.

Social Cognition

Cognition about the social world includes conceptions about self and other, social roles, social interactions, social groups, and human behavior. It has been proposed that an understanding of the social world relies on an underlying mentalistic construal of persons, or a "theory of mind." Adults, for example, often construe persons' external observable actions and interactions in terms of their internal mental states, their beliefs, desires, intentions, and feelings.

Understanding persons mentalistically is evident in everyday reasoning. For example: Why did Jill go to the gym? She wanted to lose weight and thought that exercise would help. This example illustrates a basic belief-desire reasoning about persons: people engage in actions because they believe those actions will satisfy their desires. By 3 or 4 years, if given information about a person's beliefs and desires, then children can sensibly predict their actions, emotions, or statements. By 3 years, children can distinguish beliefs and desires, as mental entities and states, from physical objects and events. For example, if told about a boy who has a dog and another one who is thinking about a dog, young children correctly judge which dog can be seen, touched, and petted (Wellman, 1990).

Young children do not understand about all mental states equally or all at the same time. In particular, before about four years, they seem to have difficulty with mental states such as beliefs, that are representational. For example, if 4- and 5-year-olds are shown a distinctive candy box that actually contains pencils, they can correctly predict a naïve viewer of the box will believe it contains candy, not pencils. Success on this and other false-belief tasks seems to require the child to know that the target person represents the world as one way when in fact it is different. Younger children, typically 3-year-olds, fail such tasks; they say the naïve person will think the candy box indeed contains pencils, failing to separate beliefs and reality. This developmental difference from 2 to 4 or 5 years is also evident in young children's everyday conversations using such terms as *want*, *think*, and *know*. Thus, many researchers now propose that there is a major reorganization in children's mentalistic construal of persons from ages 2 to 5 as children acquire a representational theory of mind (Astington, 1993).

To be clear, it is not that before 4 or 5 years, children lack appreciation of any mental states—even 2-year-olds understand something of such mental states as desires, emotions, and perceptions. Thus, two-year-olds are able to understand that desires are subjective; for example, they are able to state that while to them a particular cookie is desirable and yummy, someone else could not like it and feel it was "yucky." Similarly, they understand that people can have very different percep-

tual experiences—you see a couch on your side of a closed door but I see a refrigerator on my side. In these ways, young children evidence a mentalistic construal of persons as well as a nonegocentric understanding of others.

Infants evidence initial understandings of persons. In the period from 8 to 14 months, infants are described as newly showing a sense of subjectivity, intentional understanding, or even an implicit theory of mind. Empirically, infants at this age begin to follow others' eye gaze and to direct their attention to objects by showing and pointing. They also engage in social referencing, where they use the mother's emotional expression about an ambiguous situation as a guide to their own evaluation and interaction within that situation. Thus, by about their first birthday, infants come to see persons as organisms who have experiences about the world (see, for example, the review by Moore & Corkum, 1994).

Young children's rapidly developing understanding of certain basic aspects of the physical world and contrasting aspects of the social world contribute to a characterization of cognitive development as domain specific. In certain core domains of understanding but not necessarily in other areas, young children can evidence coherent, systematic conceptions and reasoning. Young children's causal reasoning adds further support to such a view. Early in childhood, children reason about persons and about objects causally but also in very distinctive fashions—people act because of desires, intentions, and reasons; objects move because of contact and mechanical forces.

Causal Reasoning

Belief-desire reasoning (Jill went to the gym because . . .), as already described, is an important form of psychological causal reasoning. Psychological causes are also routinely cited in young children's explanations of human behavior. If preschool children are asked to explain simple human actions (for example, Jane is looking for her kitty), they, like adults, predominantly advance belief-desire explanations (she wants her kitty, she thinks the kitty is missing). Similarly, 3-, 4-, and 5-year-olds often can comprehend the psychological causality depicted in appropriately simple stories, where personified characters want certain goals, possess certain beliefs, use the information in their beliefs to execute plans to overcome obstacles to their goals, and are happy or sad or angry when they have attained or failed to attain these goals.

In contrast, young children reason about physical occurrences in different fashions, in terms of physical mechanisms such as contact and force. For example, Merry Bullock and her colleagues examined physical causal reasoning with a domino-like device (Bullock, Gelman, & Baillargeon, 1982): a stuffed rabbit was

perched on a platform at the end of a line of blocks; a device with a rod preceded the first block; when the rod was pushed it toppled the first block that then toppled the others, eventually knocking the rabbit off. Young children were asked to predict the effect of potential changes to the device. Causally relevant changes included using a rod too short to hit the first block, or removing intermediate blocks. Irrelevant modifications included changing the material of the initial rod (from wood to glass). Three-year-olds were about 80% and four-year-olds about 90% correct at these predictions, demonstrating considerable reasoning about physical causation.

Again, infants display some early appreciations. For example, infants have been shown films or demonstrations of either one object colliding with and launching a second, or contrasting anomalous events such as a first object making contact with a second one that begins to move only after a considerable delay. Patterns of habituation and dishabituation to these displays indicate that infants were attending to the physical causal interactions of the objects by one year or perhaps even 6 months of age. Infants also seem to distinguish the sorts of causal forces that might apply to people versus objects. Within the first year, infants will imitate the actions of persons but not similar activities of mechanical objects. At 7 months, infants appear surprised if objects begin moving without some external force causing them to do so but not if people begin to move spontaneously.

In part, these sorts of findings undermine general stage theories of cognitive development such as Piaget's. At times, young children's thinking can indeed be egocentric, a-causal, and logically insensible. But for some topics and problems—including many central to understanding of people, bounded physical objects, and small counting numbers—young children's understanding and reasoning is notably coherent, causal, and sensible. Consequently, various domain-specific accounts of early cognitive development have been advanced. Some of these accounts invoke more general learning mechanisms that, when applied to people versus objects, yield different sorts of understanding. Other accounts invoke more neurological and modular proposals about cognition. Analogous to Noam Chomsky's proposals that language acquisition is served by a specially dedicated innate language acquisition device, it is possible that special mental modules and innate representations underlie early knowledge and reasoning about physical objects versus intentional human agents (Wellman & Gelman, 1998).

Understanding of people, physical objects, and number are probably not the only core domains of early knowledge. Language competence provides an obvious additional candidate. [See Language.] More controversial is the proposal that young children may rapidly

acquire a naïve biological understanding as well, focused on entities such as plants and animals and phenomena such as growth, illness, and inheritance. At the very least, young children recognize that surface appearances and similarities are less important than underlying, essential ones for plants and animals as well as for persons. For example, in a series of studies Susan Gelman has exploited cases where perceptual appearance and underlying biological identity differ (Gelman & Markman, 1986). In an illustrative task, children see a picture of a pink flamingo and a black bat and hear that the flamingo has a pink heart whereas the bat has a red heart. Then they are asked to judge the heart color of a third animal, a black bird closely resembling the bat in appearance. Even 3-year-olds predict the blackbird would have a pink heart like the flamingo, overriding perceptual similarities and instead reasoning on the basis of nonobvious conceptual features and biological category memberships.

Information Processing

Beyond young children's conceptions and knowledge, the story of early cognitive development must also include their developing capacities and procedures for information processing. Memory is representative here. Young children remember enormous amounts of information. Consider word learning. By first grade, children are estimated to know 10,000 or more words. In the years from 2 to 4, children can acquire as many as 30 to 40 new words a week.

Memory comes in many forms—intentional versus incidental, short-term and long-term, episodic or semantic. [See Memory.] Developmentally, a key distinction concerns recognition memory versus recall. Processes of recognition operate early in life. Habituation procedures—where infants are presented a picture or display repeatedly and their looking gradually decreases as the picture becomes increasingly familiar—demonstrate recognition memory in young infants, even preterm infants. Recognition quickly attains adultlike levels. Three- and four-year-olds, like adults, are often 80 to 100% correct when shown scores, even hundreds, of pictures and then later required to recognize the old ones mixed in with new ones (Bjorklund & Schneider, 1998).

Processing a stimulus to the extent of later recognizing it as familiar indicates a rudimentary but important capacity for attending to and learning about the world. Indeed, habituation offers a measure of overall infant information processing. Beginning at about age four or five years, traditional IQ tests show considerable stability in children's overall cognitive performance. First-graders' IQs predict their IQs at age 16 quite accurately, although of course there is much variability with some children having large increases or decreases as they grow older. However, traditional tests

developed for infants and young children fail to show such stability. Scores on intelligence tests (for example, the Stanford-Binet) or developmental assessments (for example, Bayley scales) at ages 1, 2, or 3 years are essentially unrelated to IQ scores a few years later. But, the rates at which infants habituate to familiar stimuli has proven to be quite predictive of later IQ. Infants who habituate more rapidly to a picture, and dishabituate more when a novel picture is then shown, reliably test higher on IQ tests at 5 and 6 years (Bornstein & Sigman, 1986).

At what age can children not only recognize items but recall them, that is, when can they mentally represent an item or event to themselves after it is perceptually absent? Preschoolers come to do this often, of course, when they verbally recall past experiences. In research using nonverbal methods that rely on delayed imitation, even one-year-olds consistently recall prior experiences. Eleven- and 13-month-olds who are shown a novel sequential action (placing a bar across a support, hanging a bell on the bar, and striking the bell with a mallet) will actively reenact the sequence even a week later, demonstrating recall for the prior event (Bauer, 1996). Some forms of delayed imitation may be evident even earlier in life.

In most conceptual analyses, genuine instances of recall require and manifest representational thought—active mental representation of prior experiences. However, as noted earlier, Piaget claimed that such representational cognition was unavailable in infancy and only appeared at about 18 months with the transition from sensorimotor to symbolic thought. As Jean Mandler (1992) has argued, however, several sorts of new evidence, including delayed imitation recall capacities and object permanence understandings for hidden objects, suggest that representational thought is an early contributor to the infant's ability to know and interact with the world, rather than a later outcome of such interactions. From very early in life infants actively represent the world, not just perceive it and act on it.

Much memory is incidental or automatic—children's everyday perceptions, conversations, actions, and explorations engage their multiple information processes, yielding the storage in memory of various sorts of information (words, life events, associations). But memory can also be more deliberate and strategic, for example, when children set themselves the goal of remembering information and then adopt certain effortful strategies to help themselves do so. Intentional memory strategies, such as rehearsing a list of items or organizing a group of words into larger categories of items to enhance recall, first systematically appear in the early school years at 6 to 8 years of age. That such memory strategies first appear at school age makes sense in that school experiences increase the demands on children to remember deliberately (for ex-

ample, acquiring reading vocabulary, addition facts, and so forth) and such demands may encourage deliberate attempts to memorize and remember. However, younger children's failure to use rehearsal, organization, and the like, does not mean that they are non-strategic. Well before their third birthday, young children evidence deliberate, strategic remembering. Suppose a child sees a doll hidden in one of several locations and has to remember its location over a 3- to 4-minute delay. Toddlers and preschoolers engage in several strategies to help themselves remember, such as deliberately attending to the location during the delay interval, pointing at it periodically, and naming it. They do so more when asked to remember than when asked to simply wait, indicating these activities are generated to specifically aid remembering (DeLoache & Brown, 1983). And of course young children engage in a variety of social remembering strategies as well, asking parents to help find something, asking what a word means, and requesting someone to remind them.

Young children's strategic efforts at remembering clearly evidence problem solving skills as well as various memory processes. According to Piaget, and others since, even 9- to 12-month-old infants solve certain simple problems, for example using one object (such as a stick or cloth) to rake in a target object so that the target can then be grabbed and played with. Developing problem-solving skills are also apparent in young children's attempts to gain needed attention from others, to cooperate with or persuade others to get what one wants, to learn words, to count objects, and to learn to use tools such as spoons, doors, and light switches. Indeed, why do young humans so quickly come to certain understandings about objects, about number, about people, about animals? At least part of the answer must be that this knowledge is achieved in, and is useful for, the acquisition of certain desired goals and outcomes, that is, for solving certain everyday problems of early life. Problem solving evidences and requires burgeoning abilities to deliberately regulate behavior, to plan ahead, to reason about physical and about social situations, causes and constraints.

Conclusions

Increased understanding of early cognitive development has depended on the creation and utilization of ingenious methods to reveal very young children's knowledge, learning, and skill. A typical description of the methodological successes of this research is that investigators have simplified tasks by stripping away unnecessary processing demands, removing complexity, and often utilizing nonverbal or less verbal methods and measures—preferential looking, habituation, imitation, search, and simple judgments tasks. These descriptions are partly correct, but, in addition, investigators have keyed in on young children's domains of special

competence and interest. Beyond simplification in a domain-neutral task-demands sense, investigators have simplified their research in the sense of accommodating more precisely to infants' and children's core understandings.

Young children are often incompetent and ignorant as well. Current theoretical questions of great import thus concern how to characterize early partial knowledge and the extent to which early childhood limitations reveal serious constraints on the nature of the early knowledge that young children possess.

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ing of suffering and illness. In considering the psychological contributions inherent within Asian cultures, it is important to understand that Asian religions do not have a notion of formal religion in the Christian, Jewish, or Islamic sense. In Hinduism and Buddhism, soteriology, or a doctrine of salvation, includes insight through practices such as meditation and personal devotion, as well as, a sense of duty.

In Hinduism, the Veda, the liturgical hymns to the deities, starts with the four Samhitās (“collections”), including the Rgveda Samhita (Veda of Chants), and concluded with the Atharvaveda Samhita. The Atharvaveda is psychologically crucial as the manual of charms to undo evil, counteract illness, and harm enemies. Vedic religion was elaborated into the ritual and sacrificial religion of the Brāhmanas, based on the power inherent in mantra. In the Upanisads Vedic, polytheism was demythologized, and all action was seen to lead to a cycle of reincarnations (*samsāra*).

Buddhism may be classified into three great “vehicles” (*yāna*). The Hinayāna, or “Lesser Vehicle,” emphasized the gradual process of individual salvation (*arāhat*), and included the Theravada and Sarvāstivada schools. The Mahāyāna, or “Great Vehicle,” added new elements. Multiple Buddhas may be worshipped, including Avalokitesvara, “Lord Who Looks Down,” a savior for suffering human beings. There is no clear code of discipline, but the emphasis is on the saving of other human beings. Right conduct became a matter of the spontaneous expression of a person’s awareness. In this sense, the Indian Mahāyāna toned down the Theravada emphasis on renunciation, to emphasize the ethical value on everyday life. The Chinese Mahāyāna, too, emphasized the moral obligations of loyalty to family and state. The Vajrayāna (Diamond Vehicle), or Mantrayāna (Sacred Sounds Vehicle), Esoteric Buddhism, or Tantric Buddhism, began in India. Tibetan Buddhism was introduced from India in the late Mahāyāna and Vajrayāna forms. Salvation could be accomplished quickly, even in the present life, using texts called *tantras*, and written in obscure language. The four divisions include the Yoga Tantra and Anuttarayoga Tantra, in which the person is assigned to one of several Buddha families according to the predominant consciousness (lust, hatred, delusion, or avarice) of the individual’s personality.

One of the Buddha’s contemporaries founded Jainism, which spread to northern and central India. Living substance (*jiva*) permeates animals; and inanimate substance (*ajiva*) includes space, time, and matter. Karma flows into and clogs the *jiva*, causing the bondage of life. Disciplined conduct can stop this inflow and lead to liberation.

Confucianism is a social ethic that exists among Chinese and East Asian societies. There is considerable overlap with Taoism. Orthodox Confucianism focused

on the creation of a system that fashioned society and empire; whereas Taoism represented more personal and metaphysical preoccupations. According to ancient Chinese cosmology, the world was governed by the circulation of the sun and the celestial vault. Tao means the “way” or the “rule of conduct.” Yin is cold, passive, feminine; yang warm, active, masculine. The five elements or “five phases” (water, fire, wood, metal, and earth) represented the main cosmic forces. All phenomena, including the human body and behavior, can be classified under one or another of the five phases. The body is a microcosm, the head round like Heaven, the feet square like the Earth, the 360 joints represented the days of the Chinese year, the eyes the sun and moon, the five viscera (lungs, heart, spleen, liver, and kidneys) the Five Elements and the Five Sacred Mountains. Each person hides within a primordial breath, needed to maintain life.

Zen Buddhism in Japan is derived from the Chinese Ch’an Buddhist School, and was introduced into Japan during the 1100s. The two main influences were the Rinzai and Dogen Kigen schools.

Shinto, introduced in Japan around the sixth century, means “the way of *kami*” (the polytheistic principle of life, mystical, or divine power), as opposed to Buddhism, or Butsuo, “the way of the Buddha.” Later, Shinto *kami* were viewed as protectors of Buddhism and were thought to be incarnations of Buddhas and bodhisattvas.

The Southeast Asian Cross-roads

Southeast Asia has been a crossroads for all the Asian religions. Mainland Southeast Asia was a mixture of Austro-Asiatic, Austronesian, and Tibeto-Burman language families. The tribes of protohistoric Southeast Asia developed “cadastral” cults—the local religions—based on common experience. What people knew best was that the world was inhabited by spirits, and so were they, which was what made them alive. If one of these vital spirits left the body for too long, the person would become ill and die.

Mainland Southeast Asia, especially Burma, Thailand, Cambodia, Laos, and southern Vietnam, was Indianized. Theravada and Mahayana Buddhism and Brahmanism never dislodged the beliefs in spirits. In northern Vietnam, the “triple religion” of Mahāyāna Buddhism, Confucianism, and Taoism was grafted onto proto-Indochinese ancestor cult. Central to the family cult was ancestor worship. In southern Vietnam, the Cham accepted Islam. In insular Southeast Asia, the Sarvāstivadin and Mulasarvāstivadin sects of Theravada Buddhism arrived in Indonesia. This area has been characterized during the twentieth century by Hindu-Buddhist religious movements in colonial Java and Bali, by Christian movements in the Philippines, and by Muslim movements throughout the region.

Dharma

There is no Asian equivalent of the Western term *religion*. The closest one gets is the Hindu term *dharma*, from the Sanskrit *dhr* ("support, uphold"). Dharma means the personal actions that engender or maintain divine law, and which keep the universe from falling into disarray. By the time the *Brāhmanas* were composed around 800 BCE, the priests' rituals were thought to shape the well-being of people, and dharma became linked to karman. Thus, dharma came to mean how a person fits in with the natural and social world.

Body and Mind

Western psychologists sometimes have difficulty coming to grips with Hindu views of body and mind. Sāmkhya and the Upanisads distinguish matter ("prakṛti"), which is the objective world including the impermanent human body and mind, and spirit ("puruṣa"), which is the world without limitations of time or space, and which survives the death of the gross body. This subtle body has the psychological states described by Western philosophy, the sense organs ("indriyas") around which everyday consciousness exists, the inner sense ("manas"), the ego ("ahamkāra"), and awareness, representations and ideas ("buddhi") (Bhat-tacharyya, 1987).

As for Buddhism, the empirical self consists of five categories, or skandhas, analyzed into components, or dharmas. First, bodily processes (rupa) are constituted by the dharmas of ear, eye, nose, tongue, and skin, and the corresponding dharmas of color, sound, odor, flavor, and resistance. Second is the group comprising the processes involved in feeling ("vedana"). Third are the processes constituting perception. Fourth, conscious and unconscious impulses to action ("saṅkharas") reveal the dharmas constituting perception and feeling. These comprise mental activity present in consciousness (such as feeling, perception, will, immediate sensation, desire, understanding, memory, attention, concentration); constituents of virtue (for example, equanimity, nongreed, compassion, and mindfulness); and constituents of vice (doubt, anger, hypocrisy, envy, hatred, and pride). Nowhere is there a self to be found.

In ancient Buddhist metaphysics, the anatomical structures of the body are similar to those used by Cambodian traditional healers today (Eisenbruch, 1992). According to Theravadin Buddhist notions, the body consists of 33 elements, 21 earth elements derived from the father, and 12 water elements from the mother. Earth comes from the father and connotes the solid tissues, such as hair on the outside of the body. Water, the other main element, comes from the mother, and makes up tissues such as the gall bladder.

Self and Soul

Western thought has been influenced by Plato's theory of reality of Forms—that there was a soul, not dissolved like the material body, and which ruled and gave life to it. According to Hindu tradition, rebirth has no effect on the eternal self ("ātman") for, after death, the individual self ("jiva") is the transmigrating entity. Depending on karma from the previous life, the jiva on leaving the body may go the way of the gods, to the heavens, with final liberation. It may go the way of the ancestors, to the moon, with return to earth in the form of rain that attaches to a plant, converted into semen when eaten by an animal, and thus bringing new life to the individual self; or it may be reborn on earth or in hell as an insect, small animal, or plant. Self and consciousness itself is transmigrated. The Buddhist theory of rebirth is clear that there is no enduring entity that moves from one existence to another. At the same time, there is no self ("anātman"). So how can there be cycles of rebirth if there is no self? According to Theravada, there is a chain of discrete events (for example, the transformation of fresh milk into curds).

Having dealt with transmigration, now for the question what is self. A first impression of Theravadin Buddhist doctrine of *anatta* is that there is literally no self. The Abhidhamma teaching showed self to be a transient stream of bits of sensation, consciousness, feeling, activity, impulses, and bodily processes. The fundamental elements, or dhammas, are elemental forces, not substances. The Law of Dependent Origination mandates that there is non self (Koller, 1985). With the evolution of Buddhist schools, the Abhidhamma doctrine of non self changed too. The Mahayana Buddhists noted a connection between the empirical person—in which self was unreal—and an enlightened one, who has achieved *tathata*, which translates more or less as "suchness" or "such as it is." In defining self, little room is left to maneuver when one has to obey the Law of Dependent Origination. In contrast to Indian self through renunciation from society, the Confucian concept of self-development is communal. The self is a developing part of a continuing family lineage, and "reāalized neither in the transcendental ātman of Hindu thought with no earthly ties, nor in an individual ego" (DeVos, Marsella, & Hsu, 1985). Hsu (1985) describes the Chinese distinction between *ta wo* or "greater self," which encompassed the concerns for wider society, from *hsiao wo* or "smaller self," which focuses on concerns about the person and the family. He contrasts the kinship-centered Chinese kinship definition of self, in which all Chinese sons are tied to their first human group, with the Japanese case, in which noninheriting sons must find their human network elsewhere. The Chinese are tied psychologically to their kinship base, while Japanese noninheriting sons cut off their rela-

tionship with their origin, including the obligations to the ancestors.

The Nature of Perception and Consciousness

Nyaya philosophy centers on how people know an object. In ordinary perception, contact is established between the senses and their objects. In extra-ordinary perception, people see things in the past or future, or hidden things, in the course of disciplined meditation. The objects of valid knowledge depend on the relation between a knowing subject and the objects themselves, which include the self, the body, the senses, mental imperfections, suffering, and freedom from suffering (Koller, 1985). To understand the Buddhist approach to perception, one must see how it fits into the wheel of suffering ("dhukka"). Old age and death depend on birth, and clinging to life depends on desire; desires upon perception; perception upon sense perceptions, which would not be possible without the six sense organs. The sense organs depend on the mind and body ("nama-rupa"), which depend on consciousness; consciousness depends upon the impulses for action. All of these phases can belong to the self only upon the presence of ignorance, which in turn depends on the preceding factors in the cycle. Perception sits in the wheel of suffering. In Hindu belief, there are four states of consciousness. *Jāgrat*, the first, is the normal waking consciousness. *Svapna* is the experience of reality as the product of the person's projections rather than as random. *Susupti* is the divine wisdom of the liberated person. *Turiya* is ineffable (Needleman et al., 1987). Buddhist consciousness has three components. *Citta* is the receptive intellectual thinking ("cit"), from the Pali word *citta*, which is defined as both heart and mind. *Mano* is purposive minding and represents the intellectual functioning of the consciousness. *Viññana* is the sensory and perceptive aspects of consciousness. It was used in early Buddhism to mean the part of a person that survived after the death of the body and is more or less equivalent to the Western concept of the soul.

Popular Religion

Popular religion is the key to understanding the psychology of formal religion. Popular Hinduism includes "pure divinities," which are *avatāras* of Visnu and Siva—and "impure divinities" such as lineage, caste, and village deities. Cultic ritual aims to improve the worshiper's life by avoiding illness and maintaining the family and include sacrifice ("yajña"); ancestral ceremonies ("srāddha"); life cycle rituals ("samskāra"); meditational or ascetic practices ("tapas"); worship of deities ("pujā"); pilgrimage ("yātra"); personal vows ("vrata"); healing and exorcism ("cikitsā") (Courtright, 1987). The role of religious healing rituals is most important.

From its beginnings, Buddhism has included rituals that are intended to protect against danger and to exorcise evil. Protective, exorcistic rituals are closely associated with texts called *parittas*. The Tibetan lamas practice Tantric meditation, to the extent of controlling physiological breathing, that is, temporarily interrupting the cycle of life and rebirth. These masters can also perform other magical healing and protective rituals. In Japanese Buddhism, people participate in mass cult Buddhist practices involving folk beliefs. The Buddha's birth, enlightenment, and death are celebrated in Therāvaadin countries on one day, in Mahayana countries on different days.

In Southeast Asia, people often disregard the Buddhist teaching, maintaining that attachment to rituals as a quick fix for the relief of suffering stands in the path of salvation. In real life, people seek relief now. It is striking that the *arahat*, the term denoting one of the most archaic icons of Theravadin Buddhism, also signifies someone with magical powers capable of protecting against illness (Tambiah, 1984). Officially, the Taoist doctrine minimized the role of spirits but, in reality, mass movements of Taoism, such as the Way of the Heavenly Masters, developed and continue to the present. Communal Taoism died out during the Sung dynasty and was replaced by ritual secrecy and esoterism (Lagerwey, 1987). Popular religion, as fusion of the three doctrines, is known as "worshipping the deities" ("pai-shen"). It is loosely structured, focusing on cults of local deities, to promote health and long life; expel evil spirits; and release from suffering. Some anthropomorphic deities ("shen") cure illness (Cohen, 1987).

The worship of ancestors and ancestral spirits is a fulcrum of Asian popular religions. Failure to propitiate leads to suffering and illness. Hindus and Buddhists observe annual rituals with offerings to the ancestors. The Chinese have formal rituals in a lineage cult and a domestic rituals at home. The yin portion of the soul, if not propitiated, can become a demonic apparition ("kuei") and cause illness; the yang portion of the soul, associated with the benevolent spirits of the ancestors ("shen") will protect the descendants and their families (Ahern, 1973). Cambodians believe that violation of the code of conduct of the family or of the Buddhist teachings can provoke an ancestral spirit to withdraw its protection and sometimes induce "ancestral spirit madness" or even physical illnesses such as tuberculosis (Eisenbruch, 1992).

Demons are the next ingredient of popular religion. The Vedas described demons in two groups. In one, the deities, such as *apsaras* live in the sky, and are usually benevolent. In the other, such as *asuras*, they are subterranean, and malevolent. The *pretas* are spirits of the ancestors; *bhutas* are evil spirits associated with the dead; *rāksasas*, *pisācas*, and *yātudhānas* are associated with ghoulish appearance. The Hindu demons were

adopted by Buddhism. The Buddha's doctrine led the person to a mental state where they were no longer prone to the perceptions and threats of the evil spirits. Finally, there is magic. The Veda, especially the Atharvaveda, is replete with magic ("māyā") used to neutralize evil forces ("santi"), and the *āṅgirasah*, employed to attack individuals. In the period after the Veda, magic in Hindu tradition is derived mainly from Siva. *Māyā* gives a person the power to deceive the enemy. The Hindu Yoga Sutras and the Buddhist Tantra provide extensive classification of magical powers. Chinese popular religion includes magic to do with shamanism ("wu-shu"), and with spirits.

Conclusion

For the psychologist, Asian religions are intriguing for they show the importance of soteriology, a doctrine of salvation. People need to be saved morally, which implies that there is some psychological need as well. Indian systems explain the problem as stemming from ignorance (*avidyā*). Whereas in Western religions, salvation occurs in this life, in Hindu and Buddhist tradition it can occur in the next.

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The term *bulimia* was first used in ancient Greece deriving from *buos* meaning ox, and *limos* meaning hunger, denoting a state in which an individual was as hungry as an ox. Case descriptions in the European literature from the 1600s onward describe individuals with voracious appetites, sometimes combined with vomiting, with the patients eating huge amounts of food and often inappropriate items such as cats, dogs, snakes, grass, and dirt. Sometimes the bulimia would be associated with emaciation and sometimes with obesity.

The first well-documented case of what is today known as anorexia nervosa was described by Richard Morton, a British physician, in 1689 in his treatise *Phthisiologia: Sive exercitationes de Phthisi*. He described two cases, one a young woman aged 18 years, and the other a 16-year-old man. In both cases the disorder was judged to have arisen from disturbed emotions, and none of the then known causes of weight loss were present. Morton described severe weight loss in both cases, with amenorrhea in the female who eventually died, while the male apparently made a partial recovery. The term *anorexia nervosa* was first used by Sir William Gull in a paper entitled "Anorexia nervosa" (*Lancet*, 516–517, 1888). Gull first termed the disease *apepsia hysterica* in a lecture on the subject in 1873; however, he then followed the terminology coined by a French physician Lasegue, in a paper published in 1873, namely *anorexia hysterica*. Case reports from this era document the marked weight loss characterizing the disorder, with amenorrhea in the female, often combined with denial of being thin and a feeling of well-being. There is little mention in these reports of the now cardinal feature of the syndrome, namely the pursuit of thinness and fear of becoming fat. Two other elements now seen in more than half of all cases of anorexia nervosa are rarely mentioned, namely binge eating and purging by inducing vomiting.

The modern syndrome of bulimia nervosa first emerged with sporadic reports of binge eating and self-induced vomiting in cases of anorexia nervosa during the first half of the twentieth century. However, it was not until the 1940s that the first cases of bulimia nervosa separate from anorexia nervosa appeared in the medical literature. Among these are the detailed study of Ellen West, a patient with binge eating, self-induced vomiting, and laxative abuse, by German psychiatrist Ludwig Bingswanger (1944). This case appeared in translation as the "Case of Ellen West" in *Existence* (May & Ellenburger, 1958). The emergence of bulimia nervosa as a disorder distinct from anorexia nervosa coincided with an increasing concern about weight and shape in young women, as exemplars of female beauty (e.g., models and beauty contestants) became ever thinner. Clinics throughout the Western world noted an upsurge in the number of patients with bulimia nervosa

during the latter half of the 1970s. The syndrome in its modern form, distinguished from anorexia nervosa, was first described by Russell (1979) in a paper entitled "Bulimia nervosa: An ominous variant of anorexia nervosa" (*Psychological Medicine*, 9, 429–448).

As the study of bulimia nervosa progressed and the elements of the syndrome were refined, it became apparent that a related eating disorder existed in which individuals binged but did not purge. This syndrome at first termed *nonpurging bulimia nervosa*, was eventually termed binge eating disorder. Unlike patients with bulimia nervosa who tend to be of normal weight, those with binge eating disorder tend to be overweight, indeed the frequency of the disorder increases with increasing weight. Although descriptions of binge eating without purging usually associated with obesity had appeared in the medical literature sporadically in the latter half of the twentieth century, the disorder was codified in the fourth edition of *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994)* as a disorder requiring further study.

Causes of the Eating Disorders

In discussing the causes of the eating disorders it must be recognized that there is much that is not known about this subject. Nonetheless, it is generally agreed that both inherited and environmental factors play a part in the etiology of these disorders. In the case of anorexia nervosa, twin studies reveal that an identical twin has eight times the risk of developing the disorder compared to a nonidentical twin if their twin pair has the disorder, strongly suggesting a genetic basis for anorexia nervosa. Twin studies in bulimia nervosa also suggest that inherited factors may account for some half of the variance in the cause of the disorder. The nature of the inheritance in these disorders is debatable, but it seems likely that it differs between anorexia nervosa and bulimia nervosa. The relatively high comorbidity between anorexia nervosa and obsessive-compulsive disorder, together with the many food obsessions and compulsions seen in most cases of anorexia nervosa, has led some to suggest that there may be a commonly inherited factor between these two disorders. Some studies suggest that anorexics have high levels of brain serotonin, a hormone with diverse functions both in the central nervous system and throughout the body, including the control of feeding. High levels of serotonin are associated with behavioral inhibition, as seen in the anorexic inhibition of eating, and general social inhibition. On the other hand, studies suggest that patients with bulimia nervosa have low levels of central nervous system serotonin, which in turn would be associated with impulsivity and a diminished sense of satiety, both characteristic of bulimia nervosa. Hence, it is possible that a neurochemical abnormality affecting central nervous system serotonin

may be involved in both anorexia nervosa and bulimia nervosa, and may form one feature of the inheritance of these disorders. It is also possible, however, that the disturbed eating behavior seen in both anorexia nervosa and bulimia nervosa is responsible for the alterations in serotonin function.

Difficulty in regulating feeling states may also play a part in the genesis of eating disorders. Some 50% of individuals with an eating disorder will develop a serious episode of depression during their lifetime. Family studies suggest that the genetic predisposition to an eating disorder and to depression are inherited separately. Nonetheless, this propensity toward depression may explain why the most frequently reported antecedent to a binge is a negative feeling state often arising from an unsatisfactory interpersonal interaction.

One of the strongest environmental influences contributing to the apparent increase in the number of cases of eating disorder in the last quarter of the twentieth century is the changing attitude concerning ideal weight and body shape, a change that particularly affects women. The shift away from a fuller body shape toward a thinner profile occurred in the mid-1960s sparked by the portrayal of ever thinner models in the media. In addition, since there is evidence that overweight persons are selected against when applying for a job or a promotion, the increase in the number of women joining the workforce may have reinforced the trend toward thinness in women. Concurrent with these trends was an impressive increase in the number of diet articles appearing in women's magazines. It is believed that these trends led to the increase in dieting observed among women, a behavior that appears to set off the chain of events leading to an eating disorder, which would particularly affect the predisposed individual. Longitudinal studies suggest that dieting markedly increases the risk of developing an eating disorder. A reduction in caloric intake leads to hunger and ultimately to loss of control over eating and the consumption of large quantities of food to make up for the physiologic and psychological deprivation. This pattern constitutes binge eating. In the bulimic, purging usually begins a few months after the onset of binge eating. For unknown reasons some individuals do not purge and hence, develop binge eating disorder. The response to dieting is different in the anorexic, since many of these patients lose large amounts of weight without binge eating or purging.

Family influences are also important in the genesis of the eating disorders. It is now believed that such influences are usually directed toward a specific child and not to every child in the family. The most important influence appears to be of mothers on their daughters, particularly during adolescence. Hence, maternal concerns about their daughters' weight and shape, often based on maternal concerns about their own weight

and shape, have been shown in several studies to be an important influence in the development of an eating disorder. Peer influences that involve teasing about weight and shape or rejection because of "fatness" may also play a part in influencing young women to begin strenuous dieting. Mothers with eating disorders may also influence the development of their offspring. Clinical studies suggest that eating disordered mothers have difficulty feeding their offspring, interact more negatively with their offspring over food than noneating disordered mothers, and because of their fears about fatness may underfeed their infant.

The Relationship Between the Disorders

The exact relationship of the three classical eating disorders to one another is uncertain. The three disorders can be regarded as a continuum, from anorexia at one end of the spectrum, to binge eating disorder at the other. Weight varies from low in anorexia nervosa through overweight and obesity in binge eating disorder, with a fairly normal weight distribution in bulimia nervosa. Binge eating also varies along the continuum, with about half of all anorexics binge eating, often with small binges, and all those with bulimia nervosa and binge eating disorder, binge eating. The degree of dietary restriction and weight and shape concerns are highest in anorexia nervosa, somewhat less in bulimia nervosa, and less or nonexistent in binge eating disorder. Finally, anorexia nervosa tends to turn into bulimia nervosa over the years. Nonetheless, the continuum hypothesis is not entirely satisfactory. Anorexia nervosa characterized by extreme dietary restriction and no binge eating, at least in its early stages, seems distinctly different from the other two eating disorders. Some researchers believe that anorexia nervosa is related to obsessive-compulsive disorder, while the remaining eating disorders are not. Hence, frank obsessive-compulsive disorder is seen in a higher percentage of cases of anorexia nervosa than the other eating disorders. Moreover, as indicated earlier, patients with anorexia nervosa demonstrate many obsessions and compulsions regarding food. Finally, recent work suggests that fluoxetine (Prozac) may be helpful to the anorexic in maintaining weight once it is restored. This is important since fluoxetine is useful in the treatment of obsessive-compulsive disorder.

The Course of the Eating Disorders

The eating disorders usually begin in adolescence, although the full-blown disorder is often preceded by many years in which the individual demonstrates low self-esteem, excessive concerns about weight and shape, and attempts to diet. Anorexia nervosa presents as a full-blown syndrome at two peak ages, 14 and 18. Hence, the majority of cases of anorexia nervosa pres-

ent for treatment in adolescence. Anorexia nervosa is the most chronic of all the eating disorders. The disorder often progresses from pure dietary restriction with marked weight loss, to binge eating and purging combined with low weight, and to a slow diminution in the severity of weight loss and frequency of binge eating and purging over many years. Between 5 and 15% of patients with this disorder die from complications, including suicide and various medical complications consequent upon organ damage due to malnutrition. Bulimia nervosa is also considered to be a chronic disorder. The mean age of onset for the full syndrome is 19 years, and the disorder continues with waxing and waning of the symptoms of binge eating and purging over the years. The average age of presentation for treatment is in the mid- to late 20s. The long-term outcome of this disorder is not known at present. Binge eating disorder onsets at the same age as bulimia nervosa. Because there is little compensation for the excess calories consumed in binges, individuals with this disorder tend to gain weight over the years, usually presenting for treatment in their forties in the context of a weight loss program. These individuals are at risk to develop the disorders associated with obesity, including: high blood pressure, diabetes, high cholesterol levels, heart disease, gall bladder disease, osteoarthritis, some cancers, sleep apnea, and the psychological consequences of societal discrimination. All the eating disorders are associated with other psychological disorders at frequencies higher than those found in noneating disordered individuals. Among these problems are depression, anxiety disorders including social phobia, and drug and alcohol abuse and dependence.

In addition to the full-blown syndromes of anorexia nervosa, bulimia nervosa, and binge eating disorder, many individuals demonstrate less severe forms of these disorders. Epidemiological studies suggest that the major syndromes of anorexia nervosa, bulimia nervosa, and binge eating disorder probably occur in some 2 to 3% of the population, while a further 3 to 4% suffer from a less severe form of these syndromes.

Rumination Disorder and Pica

These two disorders appear to have little in common with the classical eating disorders described above, nor are they related to one another. The cause of the disorders is also unclear.

Rumination Disorder. Rumination spans the life cycle from infancy to old age. The syndrome consists of regurgitating food and either chewing and swallowing it, or spitting it out. The disorder is most frequently seen in the mentally retarded, with some surveys suggesting that between 6 and 8% of severely retarded individuals in institutions ruminate. The disorder is also seen, although less frequently, in infancy. The etiology

of the disorder is unknown, although environments which offer little stimulation, e.g., institutions, or infants relatively neglected by their mothers, appear conducive to the development of the disorder, which appears to be inherently reinforcing. Infants, for example, curl their tongues back to regurgitate milk already swallowed, hence prolonging the taste of milk in their mouth. Rumination disorder may lead to death both in the mentally retarded due to aspiration of food, and in infancy due to starvation. Other complications of rumination in the adult include dental decay, aspiration pneumonia, anemia, and increased susceptibility to infection due to malnutrition.

The most frequently used treatment for rumination disorder is aversive therapy, although in infancy, very high levels of attention have been reported in uncontrolled studies to produce positive effects. The first controlled studies of rumination in infancy used electric shock contingent on abdominal movements preceding the infant spitting up milk with rapid cessation of the problem. Such therapy should be used only in situations which pose evident danger to the patient, and should be supervised by a committee with representation from outside the institution in which the treatment is taking place. A less aversive procedure, using a drop of lemon juice placed on the infant's tongue contingent on the mouthing movements preceding regurgitation, was also demonstrated to rapidly eliminate the problem. Such treatment may be life saving in infancy. Similar treatment approaches have been used in the mentally retarded with success, including less aversive procedures such as having the individual brush his or her teeth for two minutes with an antiseptic solution, following each episode of rumination. Other types of therapy such as increased attention to the individual or enriching institutional environments may hold promise in the treatment of this disorder.

Pica. Pica is a relatively rare eating disorder in which nonnutritive substances such as clay, chalk, or starch, are consumed, and appears to be diminishing in prevalence. The etiology is unknown, although various theories ranging from deficiencies in iron or zinc, through a lack of a stimulating environment have been suggested. Pica is associated with iron deficiency. It is not clear, however, whether pica causes the deficiency or is caused by it. Some of the substances ingested in pica may bind to iron preventing its absorption, and the ingested substances may substitute for food, leading to a deficiency in iron intake. Pica is particularly prevalent in pregnant women and children. Like rumination, the disorder is not uncommon in the institutionalized mentally retarded. The ingestion of starch or clay during pregnancy particularly affects rural Blacks, a culture in which such practices may be more acceptable than in other cultures. Complications of pica in-

clude: swallowing foreign objects sometimes necessitating surgical removal, lead poisoning from ingesting paint, and infections due to malnutrition.

Treatment for the disorder falls into two classes. In cases in which a nutritional deficiency, such as iron, is found, supplementation with the deficient mineral has been demonstrated to lead to either diminution or cessation of the behavior. In mentally retarded individuals with no such nutritional deficiency, aversive therapy similar to that used in rumination disorder may be useful.

Overview

The earliest eating disorder to be described in a recognizable manner was anorexia nervosa, although the characteristic drive for thinness seen in most cases today, was either lacking or overlooked. Hence, cultural changes over time may influence the presentation of the disorder. Bulimia nervosa was only separated from anorexia nervosa as a distinct entity in 1979 as the disorder became more prevalent with the rising concern about weight and shape, leading women to extreme forms of dieting. Binge eating disorder was then separated from bulimia nervosa, although the syndrome was only tentatively recognized in the late 1990s. Inherited factors—possibly deficient neurochemical systems—interact with environmental factors, particularly societal views concerning the ideal shape for women, and familial and peer influences, leading to the development of weight and shape concerns in adolescents. This in turn may lead to excessive dieting and eventually to the full-blown development of one or other of the eating disorders. These eating disorders are common problems in our society and appeared to have increased in prevalence over the last quarter of the twentieth century. Fortunately, a number of relatively successful treatments have been developed over the same period of time providing hope to the large number of individuals afflicted with these disorders.

[See also Anorexia; Bulimia; and Dieting.]

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W. Stewart Agras

EBBINGHAUS, HERMANN (1850–1909), German experimental psychologist. Although he is most famous for his pioneering research on human memory, Her-

clude: swallowing foreign objects sometimes necessitating surgical removal, lead poisoning from ingesting paint, and infections due to malnutrition.

Treatment for the disorder falls into two classes. In cases in which a nutritional deficiency, such as iron, is found, supplementation with the deficient mineral has been demonstrated to lead to either diminution or cessation of the behavior. In mentally retarded individuals with no such nutritional deficiency, aversive therapy similar to that used in rumination disorder may be useful.

Overview

The earliest eating disorder to be described in a recognizable manner was anorexia nervosa, although the characteristic drive for thinness seen in most cases today, was either lacking or overlooked. Hence, cultural changes over time may influence the presentation of the disorder. Bulimia nervosa was only separated from anorexia nervosa as a distinct entity in 1979 as the disorder became more prevalent with the rising concern about weight and shape, leading women to extreme forms of dieting. Binge eating disorder was then separated from bulimia nervosa, although the syndrome was only tentatively recognized in the late 1990s. Inherited factors—possibly deficient neurochemical systems—interact with environmental factors, particularly societal views concerning the ideal shape for women, and familial and peer influences, leading to the development of weight and shape concerns in adolescents. This in turn may lead to excessive dieting and eventually to the full-blown development of one or other of the eating disorders. These eating disorders are common problems in our society and appeared to have increased in prevalence over the last quarter of the twentieth century. Fortunately, a number of relatively successful treatments have been developed over the same period of time providing hope to the large number of individuals afflicted with these disorders.

[See also Anorexia; Bulimia; and Dieting.]

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man Ebbinghaus's accomplishments also include his painstaking work as the founding editor of a major research journal, his development of an original method for assessing intelligence, and his highly readable German and English textbooks on general psychology. His memory research was especially significant because it demonstrated that it was indeed possible to apply experimental research methods to issues concerning higher mental functions—an idea rejected by much of the conventional wisdom of his day (Rodi, 1987). His work on memory also stands as a model for excellence, ingenuity, and dedication to psychological research.

Traditional German and English biographies of Ebbinghaus are readily available (Jaensch, 1908; Shakow, 1930; Woodworth, 1909); however, since the 1985 centennial of Ebbinghaus's classic book *On Memory* (Über das Gedächtnis), a series of archival studies on his life has been published. These have focused on his formative childhood and school years (Abresch, 1987), his travels to France and England (Bringmann & Bringmann, 1986a), the details of his memory research (Schuster-Tyroller, 1987), the work of his laboratory (Gundlach, 1986a), his academic career at Berlin University (Sprung & Sprung, 1987), and his plans to accept a professorship in the United States (Bringmann & Bringmann, 1986b).

According to Gundlach (1986b), Ebbinghaus's publication record includes 7 books or monographs, 12 research articles, 103 short book reviews, 11 letters to the editor, and a number of obituaries and conference reports—all for a total of 3,874 pages. Ebbinghaus's private papers are housed at the Institute for the History of Modern Psychology at Passau University in Germany. A smaller collection from his scientific estate is preserved at Graz University in Austria. Finally, a video about the life and work of Ebbinghaus is available from the Institute for Modern Film in Göttingen, Germany (Bringmann, Schuster-Tyroller, & Kalkofen, 1986).

Eugen Hermann Ludwig Ebbinghaus was born on 24 January 1850, into a respected and well-to-do family in Barmen, which was a prosperous manufacturing center near Bonn in the Rhine province of the kingdom of Prussia. After completing his basic education at the Gymnasium (German high school) in his hometown, he spent six years at the Prussian universities of Bonn, Halle, and Berlin studying ancient history, classical philology, archeology, and Greek philosophy. During the Franco-Prussian War of 1870–1871, he volunteered to serve on active duty as a trooper with a regiment of lancers. Afterward he completed his formal education at Bonn University where he received his doctorate in philosophy on 16 August 1873. During these two years, from 1871 to 1873, he studied psychology and anthropology under Neo-Kantian philosopher Jurgen Bona Meyer (1829–1897). An examination of his academic transcripts suggests that Ebbinghaus may well have

planned to become a classics teacher at the high school level.

The Memory Project

Ebbinghaus's initial interests in memory can be traced to his first doctoral dissertation (his theoretical dissertation), on Hartmann's philosophy of the unconscious (1873), which was directed by his only psychology teacher. During an extended stay in England from 1875 to 1877, Ebbinghaus broadened his knowledge of modern psychology by immersing himself in second-hand copies of the classic books available on psychophysics, physiological psychology, and the nascent field of experimental psychology. More important, Ebbinghaus carried out his first memory studies while working as a teacher, first at a "Gentleman's Academy" in Seaford, a small community in Sussex on the southeast channel coast of England, and then later at the Royal Grammar School in Guildford near London. His first memory project involved a 14-year-old boy at Seaford whose digit span Ebbinghaus studied for about 2 months. For his second investigation, Ebbinghaus used himself as his only research subject, studying the process of rote memorization using English poems and prose. As a result of this work Ebbinghaus concluded that the *meaning* of the subject matter he was rote memorizing affected his success.

After spending nearly 2 years in English, where he perfected his knowledge of English, Ebbinghaus lived from 1877 to 1878 in Paris, where he acquired almost native fluency in French. He supported himself by giving German lessons to the children of the aristocracy and made use of the rich library resources in Paris to further expand his psychological horizons. It was also in Paris that he became familiar with Greek and Roman writings on memory techniques. Ebbinghaus returned to Germany in the fall of 1878 to serve as French tutor to Prince Waldemar at the German Imperial Court. This prestigious appointment ended in the spring of 1879, when the young prince suddenly died from diphtheria.

Ebbinghaus began his formal memory research in the spring of 1879, with an investigation of the effects of repetition on rote memorization. To reduce the distracting effect of semantic meaning, he developed his own series of "meaningless syllables." Specifically, these "artificial words" (often referred to as "nonsense syllables") were constructed by placing a vowel or diphthong between two consonants of the German alphabet. After generating a large pool of these items, Ebbinghaus randomly created lists of these new "words," which he then memorized, all the while carefully recording the number of repetitions through a list that was necessary to enable perfect recall. In the spring of 1880, Ebbinghaus submitted a handwritten report of his method and statistical results as his second dissertation (his research dissertation) to the Philosophical Faculty of Ber-

lin University. His manuscript was evaluated by Hermann von Helmholtz (1821–1894) and Eduard Zeller (1814–1908), an eminent historian of philosophy. Helmholtz primarily focused on the methodological contributions of the work, while Zeller gave the project a “satisfactory” grade but suggested that Ebbinghaus needed to publish more in order to have a successful academic career.

Between 1883 and 1885, Ebbinghaus replicated and expanded his memory project somewhat before publishing it as a small book titled *On Memory* in the fall of 1885. Although the psychology textbooks he later wrote did, of course, contain a great deal of information about the topic of memory, he did not continue his memory research; and, apart from a brief letter to an English journal protesting inappropriate conclusions drawn from his work, he did not publish any subsequent articles on memory. In Germany, the Ebbinghaus tradition of memory research was followed up primarily by Georg Elias Müller (1850–1934) and some of Müller's early assistants and students.

Following an enthusiastic review of Ebbinghaus's memory book by William James (1842–1910), American psychologists became fascinated with the topic of memory. Following Ebbinghaus's lead, American research focused on learning individual nonsense syllables or a series of nonsense syllables and also included the construction of mechanical, and then later electrical, equipment for the presentation of the items to be committed to memory (McPherson, 1987). More recently, however, this approach to the study of memory has increasingly come under attack by cognitive psychologists who argue for the relevance of context and meaning to memory. For example, Neisser has argued that “orthodox psychology” in the tradition of Ebbinghaus has produced few useful results after more than a hundred years of empirical memory studies. Neisser also noted that the same group of scholars has consistently avoided the “naturalistic study of memory,” which appears to have far more important applications than the traditional laboratory studies of memory found in the Ebbinghaus tradition (1982, p. 3).

Professional Career

The acceptance of his second dissertation qualified Ebbinghaus for appointment to an untenured and unsalaried position as instructor of philosophy at Berlin University. After the 1885 publication of his memory book, Ebbinghaus was promoted to a salaried professorship but remained untenured. In the fall of 1894, he received an appointment as a full professor at Breslau University in provincial Silesia, which was located close to the Russian-Polish border. Ebbinghaus remained at Breslau until 1910 when he moved to Halle-Wittenberg University, which was about midway

between Leipzig and Berlin. There he taught for the remaining years of his life as a full professor. An examination of his teaching record shows that Ebbinghaus founded and equipped experimental laboratories wherever he taught. These facilities, however, were primarily used for teaching and demonstration purposes and were rarely used by Ebbinghaus and his few doctoral students for the production of publishable research. Ebbinghaus was clearly an expert classroom teacher who taught a heavy load of philosophy and psychology courses to thousands of undergraduates, but only to a relatively small number of advanced students.

Ebbinghaus's major accomplishment during his later Berlin period was the 1892 establishment, with Arthur König, of the *Journal for Psychology and Sensory Physiology* (*Zeitschrift für Psychologie und Physiologie der Sinnesorgane*), which he edited for a total of 16 years. His coeditors for the journal were the most eminent contributors to German psychology outside the Wundtian school and included Sigmund Exner, Herman von Helmholtz, William T. Preyer, Johannes von Kries, Georg E. Müller, Carl G. Stumpf, and others. Ebbinghaus was a very demanding editor who readily rejected weaker manuscripts by eminent scholars.

Shortly after beginning his work at Breslau University, Ebbinghaus became involved in an ambitious project concerned with the influence of fatigue on school achievement (McPherson, 1987). Ebbinghaus proposed to measure the effect of fatigue with his famous completion test that required school children to supply omitted words in prose texts. This procedure was later adapted for use by Binet and then by Terman for inclusion in their respective intelligence scales.

Although Ebbinghaus published relatively little, he kept himself fully informed about current developments in psychology and related subjects through his extensive multilingual reading. He accumulated a vast collection of reprints, which he read, annotated, and excerpted. A major consequence of these efforts was his popular lectures on psychology, which he also offered to public school teachers in Breslau. During his years in Breslau, Ebbinghaus published the first half of his *Principles of Psychology* (*Grundzüge der Psychologie*, 1897). The second volume of this work, which was published in 1902, contains Ebbinghaus's later reflections about the nature of human memory and forgetting. A shorter version of this textbook was published in 1908 in German and in English under the title *Psychology: An Elementary Textbook* (*Abriß der Psychologie*). Both textbooks were impressive successes in Germany and abroad, in part because of their clear and readable style.

As a person, Ebbinghaus was a self-confident and assertive individual who enjoyed his academic status

and the privileges accorded to a tenured university professor. His friends in Berlin included many of the younger intellectuals and faculty members such as Lou Andreas-Salomé (1861–1937), who was to become a well-known psychoanalyst; the sociologist Ferdinand Tönnies (1855–1936); Hermann Diels (1848–1922), a scholar of pre-Socratic philosophy; the Indologist Paul Deussen (1845–1919); the philosopher Paul Rée (1849–1901); the Danish literary historian Georg Brandes (1842–1947); and the younger military historian Hans Delbrück (1848–1929).

Ebbinghaus was a good son to his father, and throughout his life he was concerned with the well-being of his brother, his two sisters, and a paternal aunt who helped finance his rather expensive education far more generously than his ultrareligious and parsimonious mother.

In scientific controversies, Ebbinghaus did not suffer fools gladly, and he also found it difficult to forgive or forget old disagreements. His few doctoral students report that he was demanding, especially in his seminar courses in experimental psychology. He acknowledged that this new science was a difficult and sometimes even a boring subject but insisted that only serious and ambitious students be admitted to his laboratory courses. In addition to being a gifted classroom professor, he was an exceptional public speaker who enjoyed participating in the discussions held at psychology meetings in Germany and abroad.

Ebbinghaus was only 59 years old when he died from pneumonia on 26 February 1909, while serving at the University of Halle. Because of his creative and tenacious methodical research on memory, Ebbinghaus is traditionally regarded by psychology's historians as one of the giants in the field. While his methodology has survived more than 100 years in psychology, his other achievements, while noteworthy, are mainly of interest to historians.

When Ebbinghaus was invited to join the faculty at Cornell University in New York, he declined the position for personal reasons, including his commitment to his family in Germany. The position instead went to Edward B. Titchener, who developed structuralism, one of psychology's earliest classical schools of thought. It is interesting to speculate on what might have happened if Ebbinghaus had followed the invitation and gone to Cornell instead of Titchener (who counted E. G. Boring, the famous historian of psychology, as one of his students). It seems possible that Ebbinghaus, who by 1894 was thoroughly bored with the rote memorization of meaningless syllables, might instead have encouraged a more applied psychology than either Titchener or Boring, and the development of American psychology could easily have been quite different.

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Wolfgang G. Bringmann and Charles E. Early

ECLECTIC PSYCHOTHERAPY. All psychotherapies are eclectic in a very broad sense. They all build on prior theory and research and, at least at the time of their inception, are innovative amalgamations of old and new principles. However, eclectic psychotherapy has also evolved as a separate and identifiable approach to treatment that embodies its own unique perspectives and identity.

Frederick C. Thorne (1967) was among the first and most vocal advocates of establishing eclecticism as a formal approach to psychotherapy. Thorne expressed concern that the treatment typically provided was more often a reflection of the theory in which the therapist had been schooled than of the client's need. In turn, each theory advocated the use of some procedures and

proscribed against the use of many that were advocated by other approaches. Thorne asserted that the techniques associated with most psychotherapy theories worked with some, but not all, people and observed that, like any skilled technician, a psychotherapist should have available the widest array of tools and procedures possible in order to address the specific and unique needs of each individual. He advocated understanding the effects and applying the procedures of treatment independently of their founding theories, and suggested that a structured and systematic eclectic practitioner would be advantaged because of the ability to use any and all of those procedures that might be helpful in a particular circumstance.

Lazarus (1967) is credited with distinguishing among various types of eclecticism. His distinction between technical and theoretical eclecticism has been widely adopted in the field. In his framework, technical eclectics are those who combine the procedures and techniques from different treatment models without regard to their spawning theories, whereas theoretical eclectics are those who attempt to integrate two or more theories at a conceptual level. Lazarus favored a technical eclectic approach, applying procedures in a systematic manner that is governed by empirically derived decision rules. His multimodal therapy is an example of this type of eclecticism.

Norcross (1986) offered an even finer distinction of eclectic models than Lazarus, with many categories incorporated as defining terms in the field. He observed that although most practicing clinicians see themselves as eclectic, the preponderance of them are unsystematic and inconsistent in their approach. These haphazard eclectics alter their treatment methods based upon their private inclinations of the moment, following no identifiable or consistent principles or guidelines. Their stance may vacillate between theoretical and technical eclecticism, and the rules that guide treatment application are neither articulated nor replicable.

Others follow a form of common factors eclecticism in which they believe that there is a core set of procedures and concepts that account for change in all psychotherapies; the specific and unique interventions posed by these different theories are seen as superfluous. Those who use these latter models differ from the technical and theoretical eclectics by the relative lack of systematic and explicit rules of application. The healing powers are in the qualities of the helping relationship. Norcross suggested that such applications are usually unreplicable and observed that they may become excuses for practice rather than guides for it.

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Some writers have taken a slightly different perspective, attempting to integrate among treatment models at multiple levels simultaneously. Some, for example, propose a model of integration that bridges various ap-

proaches at both the level of specific techniques and the level of using theory-relevant strategies. Transtheoretical therapy, for example, emphasizes the importance of fitting the stage of client readiness to the aims and strategies used. Similarly, systematic treatment selection emphasizes that effective treatments must match an array of initial client states and traits with variables that characterize both treatment types and therapists. This latter model proposes that a client's initial problems, circumstances, and personal qualities may each serve as indicators or contraindicators for matching with a specific dimension of treatment. These treatment dimensions include: the treatment setting, modality, and format; the particular qualities of the clinician-client relationship that best enhance change (e.g., common relationship factors, client-therapist matching factors, etc.); and the specific strategies and techniques to be used.

Collectively, these and other eclectic approaches reflect differences in the level of organization and abstraction at which integration is advocated. Some models integrate approaches at the level of theory; others integrate treatment at the level of a superordinant treatment strategy; and still others advocate for integration at the level of specific techniques and procedures. The advocates of these various approaches remain united in their emphasis on the importance of treatments that are not constrained by the narrow range of interventions prescribed and proscribed by any one theory or treatment model. They also are united in their desire to expand the theoretical and practical armamentarium of the clinician by extracting and using useful interventions, irrespective of where they are found.

The field of eclectic psychotherapy is still a work in progress; at the end of the twentieth century none of the methods of integrating the different treatment models has emerged as superior or more efficient than any other. However, research has largely been confined to understanding the influence of specific client-treatment or client-therapist matching dimensions on effective treatment processes and outcomes. This aptitude-treatment interaction (ATI) research has confirmed the central assumption that particular families of interventions are differentially effective as a function of client standing on a number of (largely) nondiagnostic qualities.

There remain a number of issues facing this field of study that must be addressed in future research. The principle and greatest obstacles to defining the most productive matches between clients and interventions are the large samples and complex research designs required to test the many possible permutations of client, therapist, therapy model, and problem that might constitute effective matches. Among the less oppressive problems that must be addressed in future research are

a variety of issues related to the selection and training of psychotherapists to increase the range of their effectiveness, and to encourage them to think beyond the limits of narrow theories.

[See also Attitudes; Cognitive Styles; Integrative Psychotherapy; Multimodal Therapy; Psychotherapy, *article on Approaches*; Training; Treatment; and Working Alliance.]

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Larry E. Beutler

ECOLOGICAL SYSTEMS THEORY. Ecological models encompass an evolving body of theory and research concerned with the processes and conditions that govern the course of human development in the actual environments in which human beings live. Since its first comprehensive statement by Bronfenbrenner in 1979, ecological theory has itself undergone substantial new development both in the evolution of basic constructs and of corresponding research designs. Whereas the original formulation was devoted primarily to a more differentiated conceptualization of the environment as a context of development in terms of successively nested systems ranging from *micro-* to *macro-* (Bronfenbrenner, 1979), the present, still evolving paradigm, now referred to as the *bioecological model*, accords equal importance to the role in development of the biopsychological characteristics of the individual person. The primary focus of the new formulation, however, is on what Bronfenbrenner calls *proximal processes*, defined both conceptually and operationally as the mechanisms that produce development.

Finally, whereas the original model dealt almost ex-

proaches at both the level of specific techniques and the level of using theory-relevant strategies. Trans-theoretical therapy, for example, emphasizes the importance of fitting the stage of client readiness to the aims and strategies used. Similarly, systematic treatment selection emphasizes that effective treatments must match an array of initial client states and traits with variables that characterize both treatment types and therapists. This latter model proposes that a client's initial problems, circumstances, and personal qualities may each serve as indicators or contraindicators for matching with a specific dimension of treatment. These treatment dimensions include: the treatment setting, modality, and format; the particular qualities of the clinician-client relationship that best enhance change (e.g., common relationship factors, client-therapist matching factors, etc.); and the specific strategies and techniques to be used.

Collectively, these and other eclectic approaches reflect differences in the level of organization and abstraction at which integration is advocated. Some models integrate approaches at the level of theory; others integrate treatment at the level of a superordinant treatment strategy; and still others advocate for integration at the level of specific techniques and procedures. The advocates of these various approaches remain united in their emphasis on the importance of treatments that are not constrained by the narrow range of interventions prescribed and proscribed by any one theory or treatment model. They also are united in their desire to expand the theoretical and practical armamentarium of the clinician by extracting and using useful interventions, irrespective of where they are found.

The field of eclectic psychotherapy is still a work in progress; at the end of the twentieth century none of the methods of integrating the different treatment models has emerged as superior or more efficient than any other. However, research has largely been confined to understanding the influence of specific client-treatment or client-therapist matching dimensions on effective treatment processes and outcomes. This aptitude-treatment interaction (ATI) research has confirmed the central assumption that particular families of interventions are differentially effective as a function of client standing on a number of (largely) nondiagnostic qualities.

There remain a number of issues facing this field of study that must be addressed in future research. The principle and greatest obstacles to defining the most productive matches between clients and interventions are the large samples and complex research designs required to test the many possible permutations of client, therapist, therapy model, and problem that might constitute effective matches. Among the less oppressive problems that must be addressed in future research are

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Finally, whereas the original model dealt almost ex-

clusively with the formative years, the bioecological model treats development as a process that continues both through the life course and across successive generations, thus according importance to historical continuity and change as forces indirectly affecting human development through their impact on proximal processes.

The Defining Properties of the Bioecological Model

These are stated in the form of two propositions:

Proposition I. Human development takes place throughout life through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of *time*. Such enduring forms of interaction in the immediate environment are referred to as *proximal processes*. (Bronfenbrenner & Morris, 1998, p. 996)

Examples of proximal processes are found in such ongoing behaviors as feeding or comforting an infant, playing with a young child, child-child activities, group or solitary play, reading, problem solving, caring for others, acquiring new knowledge and know-how, or planning or engaging in other intellectual, physical, social, or artistic activities that become increasingly complex over time. In sum, proximal processes are posited as the primary engines of development.

A second defining property identifies the fourfold source of these dynamic forces.

Proposition II. The form, power, content, and direction of the proximal processes effecting development vary systematically as a joint function of the characteristics of the developing *person*; the *environment*—both immediate and more remote—in which the processes are taking place; the nature of the *developmental outcomes* under consideration; and the social continuities and changes occurring over *time* through the life course and the historical period during which the person has lived.

Propositions I and II are theoretically interdependent and subject to empirical test. An operational research design that permits their simultaneous investigation is referred to as a *Process-Person-Context-Time model* (PPCT).

Note that characteristics of the person actually appear twice in the bioecological model: first as one of the four elements influencing the “form, power, content, and direction of the proximal process,” and then again as *developmental outcomes*. The last are qualities of the developing person that emerge over time as the result of the joint, interactive, mutually reinforcing effects of the four principal antecedent components of

the model. In short, in the bioecological model, the characteristics of the person function both as an indirect producer and as a product of development.

Proposition I also has a corollary that pertains to proximal processes involving other persons.

Corollary 1. The developmental power of proximal processes is substantially enhanced when they occur within the context of a relationship between persons who have developed a strong emotional attachment to each other.

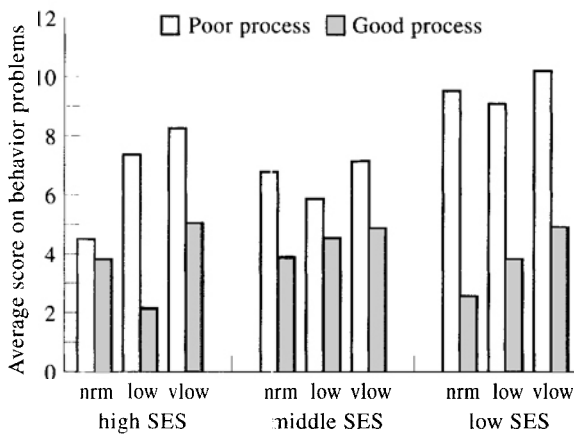
The establishment of a close affectional tie between parent and child during the formative years is especially critical. It enables parents better to withstand the inevitable stresses and strains involved in child rearing while at the same time leading them to be more responsive to the child's needs and bids for attention, thereby initiating and sustaining mutually rewarding interactions. As a result of such participation in proximal processes over time, the young develop the capacity for self-control, and the ability to defer immediate gratification in the interest of pursuing and achieving longer-range goals. The process through which this transition is achieved is called *internalization*.

The Model Applied. Given the recency of the foregoing theoretical formulations, full-scale implementations of the PPCT design are hardly to be expected. Nevertheless, a close approximation appeared in a research monograph published more than three decades ago. The author, Cecil Mary Drillien (1964), was a physician and professor of child life and health at the University of Edinburgh Medical School. The work is the product of what Bronfenbrenner calls a “latent paradigm”; that is, a theoretical model that is not explicitly stated, but is implicit in the research design used for analyzing the data.

Figure 1 depicts both the model and the research findings. The data are drawn from Drillien's longitudinal study of factors affecting the development of children of low birth weight compared to those of normal weight. The figure shows the impact of the quality of mother-infant interaction at age 2 on the number of observed problem behaviors at age 4 as a joint function of birth weight and social class. Mother-infant interaction was assessed in terms of the extent to which, over time, the mother was responsive to the state and behavior of the infant. The graph does not appear in Drillien's monograph, but was constructed from data reported in various tables in that volume.

As can be seen, a *proximal process*, in this instance maternal responsiveness across time, emerges as the most powerful predictor of developmental outcome. In all instances, the proximal process appears to reduce substantially the degree of behavioral disturbance exhibited by the child.

Herein lies the main justification for distinguishing



nrm = normal birthweight; low = between normal and 5.5 lbs; vlow = 5.5 lbs or less

ECOLOGICAL SYSTEMS THEORY. Figure 1. Effect of mother's responsiveness on problem behavior at age 4 by birthweight and social class.

between proximal processes and the environments in which they occur; namely, the former turn out to be the more potent force in furthering developmental growth. Furthermore, as stipulated in Proposition II, the power of the *Process* varies systematically as a function of the environmental *Context* (in this instance, social class) and of the characteristics of the *Person* (in this case, weight at birth). The *Process* appears to have made its greatest impact on young children growing up in the most disadvantaged environment (the lowest socioeconomic level); but, within that environment, it is those who at birth were of normal weight who benefited most. Moreover, it was in this same disadvantaged *Context* that, under high levels of maternal responsiveness, birth weight showed its most consistent and strongest effect, with the number of behavior problems steadily rising as birth weight fell. Finally, across the board, maternal responsiveness had the general effect of decreasing or buffering against environmental differences in developmental outcome. Thus, at high levels of maternal responsiveness, social class differences in problem behavior became much smaller.

It is noteworthy that application of the same PPCT design, using as the outcome measure the number of problem behaviors when the infants were only two years old, revealed a somewhat similar but much more attenuated pattern. This finding is nicely consistent with the stipulation of Proposition I that to be effective proximal processes must occur "over extended periods of time."

The approximation of the bioecological model reflected in the research design employed by Drillien over three decades ago falls short of today's explicitly stated theoretical formulation. For example, whereas Propo-

sition I defines proximal processes as bidirectional, Drillien's measure of process was based only on the mother's responsiveness to changes in the state and behavior of the infant. No data were reported that would permit calculating a complementary measure of the infant's responsiveness to changes in the state and behavior of the mother. This means that the operational measure available in Drillien's research tapped only one side of the contemporary definition of proximal process. For that reason, it appears likely that, to the extent the infant's contribution to reciprocal interaction does carry weight (as stipulated in Proposition I), Drillien's results may represent an underestimate of the true power of proximal processes as drivers of human development.

Developmental Science in the Discovery Mode

The obtained findings also illustrate an important distinguishing characteristic of research designs appropriate to the bioecological model. Their main purpose is not the usual one of testing for statistical significance. Rather, the design must provide for carrying out an equally essential and necessarily prior stage of the scientific process: hypotheses of sufficient explanatory power and precision must be developed to warrant their being subjected to empirical test. In short, we are dealing with science in the *discovery mode* rather than in the *mode of verification*. From its very beginnings, the bioecological model, through its successive reformulations, represents a sustained effort to meet this scientific need.

Given its stated purpose, an appropriate design strategy for developmental science in the discovery mode is one that involves a series of progressively more differentiated formulations and corresponding data analyses, with the results at each successive step setting the stage for the next round. In short, the research designs employed must be primarily generative rather than confirmatory versus disconfirming. In this generative process, implications derived from the theoretical model play a more prominent role than those drawn from research findings, but the latter are also critical. Their importance is best conveyed by specifying a key feature of the corresponding research design; namely, it must provide a structured framework for displaying the emergent research findings in a way that reveals more precisely the pattern of the interdependencies that in fact obtain among the available measures for the constructs involved.

Of primary scientific interest are not results already anticipated in the existing conceptual model, but those features that point to more differentiated and precise theoretical formulations. These can then be evaluated in light of the newly obtained information, and, if deemed scientifically promising, can be incorporated in the research design for a next step. In sum, the pro-

posed strategy for developmental investigations in the discovery mode involves an iterative process of successive confrontations between theory and data leading toward the ultimate goal of being able to formulate hypotheses that both merit and are susceptible to scientific assessment in the verification mode.

Some Concrete Examples. To be sure, the process here described, or something like it, is what scientists have always done. Where the bioecological model goes further is to define that process explicitly, in the belief that doing so will result in progressively more powerful and precise research designs that, in turn, will advance scientific theory and knowledge. For example, employing the sequential procedure described above ultimately led to the following working hypothesis:

The greater developmental impact of proximal processes on children growing up in disadvantaged or disorganized environments is to be expected mainly for outcomes reflecting developmental *dysfunction*. By contrast, for outcomes reflecting developmental *competence*, proximal processes are posited as likely to have greater impact in more advantaged and stable environments.

For the successive reformulations, research designs, and findings leading to this working hypothesis see Bronfenbrenner and Morris (1998, pp. 1001–1005). The term “dysfunction” refers to the recurrent manifestation of difficulties on the part of the developing person in maintaining control and integration of behavior across a variety of situations, whereas “competence” is defined as the further development of abilities—whether intellectual, physical, socioemotional, or combinations of them. For instance, acquiring the ability to care for a young infant involves all three.

By treating the above working hypothesis as a point of departure, Bronfenbrenner and Ceci (1994) pursued the strategy of the discovery mode to the next stage by suggesting a new theoretical model, and corresponding research designs, for analyzing the interactive contribution of genetics and environment in human development.

A Bioecological Model of the Nature/Nurture Concept

The theoretical argument is set forth in a series of working hypotheses (Bronfenbrenner & Ceci, 1994).

Hypothesis 1. Proximal processes raise levels of effective developmental functioning, and thereby increase the proportion of individual differences attributable to actualized genetic potential for such outcomes. This means that heritability (h^2) will be higher when proximal processes are strong and lower when such processes are weak. (p. 572)

Hypothesis 2. Proximal processes actualize genetic potentials both for enhancing functional competence and for reducing degrees of dysfunction. Operationally, this

means that as the level of proximal process is increased, indexes of competence will rise, those of dysfunction will fall, and the value of h^2 will become greater in both instances.

a. The power of proximal processes to actualize genetic potentials for developmental competence (as assessed by an increase in h^2) will be greater in advantaged and stable environments than in those that are disadvantaged and disorganized.

b. The power of proximal processes to buffer genetic potentials for developmental dysfunction will be greater in disadvantaged and disorganized environments than in those that are advantaged and stable. (p. 578)

Hypothesis 3. If persons are exposed over extended periods of time to settings that provide developmental resources and encourage engagement in proximal processes to a degree not experienced in the other settings in their lives, then the power of proximal processes to actualize genetic potentials for developmental competence will be greater for those living in more disadvantaged and disorganized environments. (p. 579)

In a literature review, Bronfenbrenner and Ceci found indirect evidence consistent with these tentative formulations. For example, both Scarr-Salapatek (1971) and Fischbein (1980) report results in accord with the expectation, based on the bioecological model, that values of h^2 for IQ would be highest in the most advantaged social-class groups and lowest in the most disadvantaged. Also, a number of investigations permit an indirect test of the hypothesized reverse pattern for outcomes of developmental dysfunction (Jenkins & Smith, 1990; Rutter & Rutter, 1992).

From Research to Policy and Practice

In addition to proposing possible new answers for old questions, bioecological theory and research have provided models for analyzing the nature and sources of major social problems in ways that provide a basis for designing programs and social policies for addressing these problems. For example, in their early form, ecological models played an important role in the conceptualization and design of Head Start by expanding the primary focus of intervention beyond the child to encompass the child's family (Zigler & Valentine, 1979). More recently, Bronfenbrenner and his colleagues (Bronfenbrenner, McClelland, Wethington, Moen, & Ceci, 1996) have documented convergent social changes taking place in economically developed nations, and especially in the United States, that are progressively undermining the development of competence and character in successive generations. A summary of the findings appears in Table 1. Concurrently, several research articles based on the bioecological model trace the origin of these trends, analyze their

ECOLOGICAL SYSTEMS THEORY. Table 1. Summary of selected findings.

1. Annual surveys over the past two decades reveal growing cynicism and disillusionment among American youth, reflected in a loss of faith in others, in their government, in the basic institutions of their society, and in themselves.
2. In the United States far greater percentages of youth and women are victims of homicide, with rates more than ten times as high as those for any other developed country.
3. The young are not only likely to be the victims of murder, they are also more likely to commit it. Youth and young adults (ages 18–25) now account for the majority of those arrested for homicide.
4. The percentage of Americans in prison is four times higher than in other developed countries, and the number is rising rapidly.
5. Despite recent gains made by youth from Black families, American high school students are still far behind those from other developed countries in academic achievement. This includes the top 10% of students in each nation. The trend already threatens our productivity and capacity to compete economically in the future.
6. The United States stands in first place in the percentage of children growing up in single-parent families, which now includes over a quarter of all America's children under 6 years of age.
7. Families with children under 6, particularly single-parent mothers, are those who most seek—and desperately need—a job. But they also have the highest unemployment rates. The proportion of Black mothers working full time is much higher than that for White mothers (in 1994, 76 vs. 29%).
8. The percentage of U.S. children living in poverty today is twice as high as that for any other developed nation.
9. Among developed nations, the incomes of rich versus poor families are farthest apart in the United States. We are rapidly becoming a two-class society.
10. Two thirds of children in poverty live in families with a working adult. Less than one third of poor families with a young child rely solely on welfare.

From Bronfenbrenner et al., (1996), *The State of Americans: This Generation and the Next*. New York: The Free Press.

We are indebted to our colleagues who, as coauthors of chapters of the volume *The State of Americans: This Generation and the Next*, provided these findings. They include Steven J. Ceci, Helen Hembrooke, Peter McClelland, Phyllis Moen, Elaine Wethington, and Tara L. White.

implications for the future, and suggest basic principles for designing practices and policies that could reduce, and ultimately reverse, the prevailing course. The general thrust of this ongoing work is perhaps best conveyed in the following excerpt from a chapter in the fifth edition of the *Handbook of Child Psychology* (Bronfenbrenner & Morris, 1998).

At a more general level, the research evidence reveals growing chaos in the lives of families, in child care settings, schools, peer groups, youth programs, neighborhoods, workplaces, and other everyday environments in which human beings live their lives. Such chaos, in turn, interrupts and undermines the formation and stability of relationships and activities that are

essential for psychological growth. Moreover, many of the conditions leading to that chaos are often the unforeseen products of policy decisions made both in the private and in the public sector. Today, in both of these arenas, we are considering profound economic and social changes, some of which threaten to raise the degree of chaos to even higher and less psychologically tolerable levels. The most likely and earliest observed consequences of such a rise would be reflected in still higher levels of youth crime and violence, teenage pregnancy, and single parenthood, as well as in reduced school achievement, and, ultimately, a decline in the quality of our nation's human capital.

Thus, we have arrived at a point where the concerns of basic developmental science are converging with the most critical problems we face as a nation. That convergence confronts us, both as scientists and as citizens, with new challenges and opportunities. (Bronfenbrenner & Morris, 1998, p. 1022).

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Urie Bronfenbrenner

ECSTASY. See *Mysticism; Peak Experiences; and Religious Experience, article on Religious Experiences and Practices.*

ECT. See Electroconvulsive Therapy; and Elementary Cognitive Tasks.

ECUADOR. As in other Latin American countries, psychology in Ecuador was influenced by philosophy, medicine, and education. In Ecuador, education was especially important and has continued to remain so. Ecuador is one of the Andean nations and has been isolated from many of the international influences that were significant in other Latin American countries such as Argentina, Mexico, Brazil, and Chile.

There are a number of universities that have developed faculties of psychology. The principal ones are the Central University of Ecuador and the Catholic University in Quito; the University of Guayaquil, the Catholic University of Santiago, and the University of Vicente Rocafuerte in Guayaquil; the University of Cuenca in Cuenca; and the University of Loja in Loja. The formation of the professional psychologists is either in the area of educational or clinical psychology and the faculties tend to specialize in one or the other, although in some faculties industrial organizational psychology, and sport psychology have developed. In the last few years there has been a move to internationalize the approach to psychology with the adoption of new methods of professional development. The 6 years of study that train the student at pregraduate level in educational or clinical psychology is changing to one which is similar to other Latin American countries.

In terms of the theoretical bases, the concepts of classical conditioning as developed by Pavlov have been of considerable importance, leading to a number of research projects and the publication of several books. A second influence has been Freudian psychoanalysis, which has been strongly associated with psychological assessment, including projective techniques such as the Rorschach Inkblot Test.

The influence of the dualism and the Thomist school of philosophy, which dominated much of the nineteenth and twentieth centuries, gave rise to the emphasis on psychometric testing in psychology. These were always very important in Ecuador and continue to be so today. They are relevant in the psychological diagnosis as is applied to clinical treatment, which in Ecuador has traditionally been through the application of projective techniques. The work of three of the pioneers of Ecuadorian psychology, Julio Endera, Jorge Escudero, and Agustín Cueva, was important in the development of these techniques of psychological diagnosis, and the general progress of psychology from the 1930s.

There are few journals of psychology published in Ecuador. The oldest is the *Archivos de Criminología, Neuropsiquiatría y Disciplinas Conexas* [Archives of Crimi-

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There is a great interest in applied psychology, especially in the areas of clinical and psychotherapy, in addition to the established areas of education and counseling.

Rubén Ardila

EDUCATIONAL COUNSELING enjoys a long tradition in psychology. As a method of enhancing human development, educational counseling shares a common philosophical base with vocational counseling and other school- or college-based psychoeducational interventions. At a broad level, each of these interventions is aimed at maximizing students' options for achieving personal and vocational success in life and for contributing productively to society. They may best be viewed as complementary methods that differ in their specific goals and processes. Educational counseling, in particular, focuses on helping students to surmount obstacles (for example, attitudinal, affective, or skill-based problems) that impede their academic progress. The goals of educational counseling, however, are not only remedial; they also include prevention of academic problems and optimal development of scholastic potential and educational/life planning skills, even in currently well-functioning students.

Like other forms of counseling, educational counseling typically involves individualized or small-group activities, administered by a counselor or psychologist. Such activities have also been adapted for delivery in larger group, classroom, and community-level outreach settings. Among the psychological specialties, counseling psychologists have been the primary purveyors of educational counseling at the college level, and educational and counseling psychologists have been the major contributors to the knowledge base on academic development and adjustment from which educational counseling methods derive. School counselors offer educational counseling services in school settings. University-based psychologists who are housed in colleges of education often assist in the training of school counselors. Additionally, school psychologists offer counseling-related services (for example, educational assessment) in school settings.

History

The impetus for educational counseling grew partly from the vocational guidance movement of the early

ECT. See Electroconvulsive Therapy; and Elementary Cognitive Tasks.

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Rubén Ardila

EDUCATIONAL COUNSELING enjoys a long tradition in psychology. As a method of enhancing human development, educational counseling shares a common philosophical base with vocational counseling and other school- or college-based psychoeducational interventions. At a broad level, each of these interventions is aimed at maximizing students' options for achieving personal and vocational success in life and for contributing productively to society. They may best be viewed as complementary methods that differ in their specific goals and processes. Educational counseling, in particular, focuses on helping students to surmount obstacles (for example, attitudinal, affective, or skill-based problems) that impede their academic progress. The goals of educational counseling, however, are not only remedial; they also include prevention of academic problems and optimal development of scholastic potential and educational/life planning skills, even in currently well-functioning students.

Like other forms of counseling, educational counseling typically involves individualized or small-group activities, administered by a counselor or psychologist. Such activities have also been adapted for delivery in larger group, classroom, and community-level outreach settings. Among the psychological specialties, counseling psychologists have been the primary purveyors of educational counseling at the college level, and educational and counseling psychologists have been the major contributors to the knowledge base on academic development and adjustment from which educational counseling methods derive. School counselors offer educational counseling services in school settings. University-based psychologists who are housed in colleges of education often assist in the training of school counselors. Additionally, school psychologists offer counseling-related services (for example, educational assessment) in school settings.

History

The impetus for educational counseling grew partly from the vocational guidance movement of the early

1900s, when social reformers in the United States, such as Frank Parsons, sought to assist students and workers to identify and plan for appropriate vocational options. Other key influences on the early development of educational and vocational counseling included advances in the psychometric movement and the study of individual differences as well as the economic depression of the 1930s and the later return of veterans from World War II, which dramatically increased the demand for educational/vocational guidance and counseling services (Whiteley, 1984). Educational counseling has continued to expand and develop as a form of counseling, owing partly to advances in the study of academic, career, and cognitive development; refinement and testing of specific intervention methods; and economic and political concerns about the role of schools in preparing students to enter the workplace.

A great many psychologists have contributed, directly or indirectly, to progress in educational counseling. To cite a few key developments and innovators: Francis Robinson, in *Effective Study* (New York, 1970), developed an influential study method, termed SQ3R, in the 1940s. E. G. Williamson and Edward Bordin (1941) offered an early discussion of methodological issues in educational-vocational research, describing various criteria by which the outcomes of educational counseling might be assessed (for example, academic achievement, educational choice). They also admonished evaluation researchers to discover "what counseling techniques (and conditions) will produce what types of results with what types of students?" (This differential outcome question predated a similar methodological shift by psychotherapy researchers in the 1960s.) Several vocational theorists, such as John Holland, have included educational development themes within their theories, and practical applications of these theories have subsequently been made to problems of educational choice and achievement. A spate of researchers have also designed, and explored the effects of, specific counseling techniques aimed, for example, at improving decisional skills, reducing test anxiety, or enhancing study habits (for example, see reviews by Myers, 1986; Russell & Petrie, 1992).

Central Techniques and Practices

Counseling psychologists have, historically, embraced an "educational-developmental" role as part of their mission (Gelso & Fretz, 1992), including efforts to assist students to adjust to academic demands and to relate their studies to future vocational goals. The tendency has been to view education as a part of the larger career development process inasmuch as the development of students' talents, interests, and values during the school years is likely to affect their later range of vocational options, as well as their success in pursuing

preferred options. This interface between educational and career development helps explain why the goals and methods of educational counseling overlap with those of vocational/career counseling.

Broadly speaking, both educational and career counseling focus on issues of decision making and "role effectiveness" (Myers, 1986). In the case of educational counseling, this entails helping students to plan their studies, to develop effective decision-making skills, and to maximize use of their academic skills. In career counseling, the thrust is on assisting persons to decide on potentially satisfying vocational options and to adjust successfully to the work environment. Naturally, given the differences between students' and workers' roles, contexts, and life experiences, educational and career counseling differ in their specific targets and techniques. For instance, educational counseling deals with problems, such as test anxiety or study skill deficits, that pertain to role effectiveness in scholastic settings, whereas career counseling may involve analogous issues that impair the role effectiveness of adult workers, such as job-related stress or sub-par work skills.

Research Findings

Psychologists have studied a wide range of factors relating to academic adjustment, motivation, and success, a partial list of which includes aptitude and ability, study and time management skills, test anxiety, self-efficacy (for example, beliefs about one's scholastic capabilities), social support, family dynamics, and performance attributions, or beliefs about the causes of one's academic successes and failures (Russell & Petrie, 1992; Spielberger & Vagg, 1995). A number of theories have been developed, helping to organize research findings, identify key determinants of academic choices and attainments, and suggest potentially useful counseling or instructional strategies (Bandura, 1993; Eccles, 1987; Lent, Brown, & Hackett, 1994). There has also been a wealth of studies examining the effectiveness of a variety of specific educational counseling methods.

Reviews of the educational counseling literature suggest several general conclusions (Myers, 1986; Russell & Petrie, 1992). First, the preponderance of evidence lends overall support to the practice of educational counseling. Second, the technical adequacy of research on educational counseling has improved dramatically in recent years. Third, there is a decided preference in the current literature for employing cognitive and behaviorally based methods, that is, techniques that are directed at changing maladaptive beliefs or behaviors, and for studying the effects of structured, skills-focused interventions in a group or class format.

While it is useful to know that educational counseling has generally been found to be effective, psycholo-

gists are much more concerned with the sorts of differential effectiveness questions posed by Williamson and Bordin (1941). Thus, much research has examined such issues as which specific techniques are most helpful for certain types of educational problems and individuals, and how their effects are achieved. Some selected findings will be summarized briefly here. Cognitive-behavioral methods have been shown to reduce reliably test anxiety, a condition that inhibits exam performance for many students. Systematic desensitization has been the most frequently studied of the cognitive-behavioral methods for anxiety reduction, though a number of other treatment variants have also proved useful.

Apart from test anxiety, many students express concerns about their abilities to study efficiently, manage their time, or earn satisfactory grades. Study counseling programs, designed to address such problems, are frequently employed by school counselors, counseling psychologists, and other student personnel workers. A variety of these programs, administered either individually or in group or classroom formats, have been found to enhance students' study habits and attitudes. In instances where test anxiety coexists with deficient study skills, multicomponent counseling programs that treat both problems are generally more effective in improving students' grades than are programs that treat only test anxiety or study skills alone.

Substandard scholastic performance may also stem from a variety of factors—such as limitations in students' subject-specific skills or cognitive processing capabilities, or in the quality of the educational experiences to which students have been exposed—that are not always tractable via short-term counseling methods. Thus, depending on the extent and origin of students' performance deficits, more extensive remedial experiences, such as academic tutoring or special education placements, may be necessary in addition to (or apart from) counseling interventions.

Finally, counseling for educational choice and decision making draws largely from the same pool of methods used in vocational counseling, which have been shown to be effective in individual, group, and classroom formats (Swanson, 1995). Psychologists have at their disposal a variety of procedures and measures, derived from several theoretical positions, that are aimed at imparting effective decisional skills and assisting students to explore educational choice options in relation to their interests, skills, and other self-attributes.

Future Directions

Future innovations in educational counseling seem likely to emerge from several current lines of research and theory on academic choice, interest, and perfor-

mance processes, such as inquiry on performance attributions, parental expectations, gender role socialization, goal setting, ability conceptions, and sources of self-efficacy (Bandura, 1993; Eccles, 1987; Lent, Brown, & Hackett, 1994). Particularly promising are analyses that sketch the theoretical mechanisms responsible for academic choice and performance, and that suggest new intervention ingredients or means for restructuring commonly offered ingredients. Some of this work offers intriguing possibilities for enhancing school performance or decision making, though it has not as yet made the transition from the laboratory to the counseling office. Research is especially necessary to build more effective preventive or remedial programs for particular groups of students, such as those who are at risk for academic failure or dropout, students with learning disabilities, and children from lower socioeconomic strata.

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Robert W. Lent

EDUCATIONAL PSYCHOLOGY. [*This entry surveys assessment methods in education, including assessments of students, teachers, and administrators. It will not cover general intelligence, aptitude, and motivation. It considers methods and purposes as well as changes from preschool to college, concluding with issues of endurance and value.*]

Student Assessment

Educational psychologists have been major players in the measurement of student performance, virtually defining a national achievement curriculum. The keystone is the standardized test. Alternatives have appeared under labels like authentic or performance-based assessment, along with packages for placement in special programs (learning handicapped, emotionally distressed, gifted, English-language learners).

Linking these assessments are criteria and methods to establish validity and reliability and an overarching system of constructs and standards. Validity assures that an assessment measures a well-defined construct. For example, a reading test should test “reading.” Reliability refers to the trustworthiness of an instrument. Groups of judges rating student compositions must agree among themselves.

Several tensions trouble the field of student assessment, reflecting the importance of schooling for the individual and the society. Most significant is locus of control, pitting the classroom teacher against more distant authorities (the school district, the state, or even the federal government). In developed countries, centralized testing often determines admission to secondary and postsecondary schooling. Local control of U.S. schools is a long-standing tradition. This tradition has been challenged, however, as states and the federal government provide increased funding for public education and concomitant demands for accountability. Some teachers have resisted pressure to “teach to the test,” offering alternative methods of their own devising.

Multiple-Choice Methods

The standardized achievement test is, without doubt, the most important creation of educational psychologists. It impacts most individuals throughout their life.

From kindergartners’ school readiness to examinations for entry to graduate programs, individuals are judged by marks on an answer sheet.

Test development begins with construct definition, typically in terms of behavioral objectives. For example, identify the topic sentence in a paragraph or calculate the sum of four 2-digit numbers in column format. Writing and revising items is the next step. The item stem poses the question, and the choices provide answers. One is correct and the others reflect degrees of wrongness. Plausible alternatives increase item difficulty. Scripted instructions determine test administration, including time allocations, scoring information, and interpretation. Publishers conduct extensive trial runs, ensuring users of test reliability and providing normative data like averages and percentiles. They also offer scoring services. The teacher does little more than distribute booklets, read instructions, and package booklets for shipment.

Test development is only part of a larger enterprise. Test theorists and publishers rely on psychometric methods to transform scores from “percentage correct” to normative indicators like grade level equivalent, percentile, and normal curve equivalent. These indicators provide test users with general measures that compare individuals with a larger population. Classical psychometrics began with the normal “bell-shaped” curve but now employ a wide range of techniques, including factor analysis, item-response theory, generalizability design and analysis.

Criterion-referenced methods appeared in the 1950s as an alternative to normative indicators, the focus on whether students meet absolute and predefined standards. Standard setting begins with professional judgment about performance levels, or what constitutes adequate and exceptional achievement. Tests remain the same, but scores are interpreted differently.

Standardized tests serve various purposes in schools. They compare students and schools. For example, students with high test scores are admitted to prestigious universities or may be identified in third grade as gifted. Parents search out schools with high achievement scores. School improvement and program effectiveness are gauged by standardized measures; a few points up or down can leave educators celebrating or depressed.

Tests influence other facets of schooling. In the elementary grades, teachers monitor reading and mathematics achievement by curriculum-embedded, end-of-unit tests that mirror standardized instruments. Test batteries accompany high school and college textbooks, allowing instructors the convenience of cut-and-paste examinations, and publishers provide do-it-yourself manuals for constructing tests.

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Performance-Based Assessment

Standardized tests have had critics from the outset. Criticisms are that tests are low-level, and differences due to socioeconomic status, ethnicity, and language background signify test bias. Not until the 1970s did alternatives emerge. Movements like whole language, hands-on math, and discovery-based science militated against standardization and externally mandated tests, stressing instead the teacher's role in adapting instruction to student needs, and the validity of portfolios, exhibitions, and projects.

Performance is the distinctive feature that sets these methods apart from multiple-choice tests. The techniques span a wide range. At one end are on-demand writing tests; students have an hour or less to write a composition on a predetermined prompt, with no resources, no questions, no chance to revise. At the other extreme are free-form portfolios, collections assembled over weeks or months to demonstrate learning. Individual students decide what to put in the folder and may even judge the quality of the collection.

How are performance samples evaluated? Olympic games like diving and gymnastics serve as metaphors. Judges confer about the characteristics of a quality performance and then evaluate each participant on rating scales or rubrics for specific performance (analytic ratings) and for overall quality (holistic ratings). Psychometric techniques apply to some of these judgments; interrater agreement provides an index of consistency, for instance. Performance-based methods possess considerable face validity; students must directly "do" what they have learned, rather than simply select a correct answer. Trustworthiness is more problematic. Although raters can learn to make consistent judgments, students may look very different depending on the task.

Performance-based methods sprang from practice rather than policy, from classrooms rather than state houses, from teachers rather than publishers. They require human judgment and are expensive. Nonetheless, substantial efforts are underway to adapt these methods for large-scale assessment. On-demand writing tests are now commonplace. Several states complement multiple-choice tests with projects and portfolios, and Vermont relies entirely on these approaches. The demand for high standards provides continuing impetus for the use of performance assessment, the argument being that there is no substitute for demonstrating competence in complex and demanding tasks. For teachers, the connection to classroom practice is compelling, as is the opportunity to gauge student interest and motivation.

Current assessment practice varies from the primary grades through graduate school. Young students are

just learning the school game, and standardized tests reflect early home preparation more than individual potential; performance assessments, therefore, are more appropriate. From the late elementary grades through entrance to postsecondary education, multiple-choice tests reach a peak. Afterward, performance samples, such as application letters, thesis papers, and dissertations, become critical.

Assessment for Categorical Placement

This topic does not fit under the previous headings but has become increasingly important because of government funding of categorical programs like special education. Regulations govern assessment practices, but psychologists play important roles in setting local policy and actual implementation. Government funding for disadvantaged students depends on family characteristics like poverty more than achievement. Assessment is important as part of the debate about program effectiveness accountability, that is, whether the investment is justified by student learning.

Categorical programs depend heavily on assessment for selection of students, determination of appropriate services, and exit to regular education. For these assessments, professionals (often psychologists) employ regulated (and expensive) clinical methods, combining teacher recommendations, standardized instruments, interviews and observations, and family consultations.

Teacher Assessment

Only in recent decades has the evaluation of teachers emerged as a significant research topic. Assessment methods vary within levels of teacher development: admission to preservice programs, initial licensure, and induction leading to tenure. The trend is to use standardized procedures for entry-level decisions (e.g., admission to training programs) and performance-based methods for professional advancement decisions (e.g., tenure).

Because of concerns about applicant quality, college students planning to enter teaching must now demonstrate basic skills in many states. The multiple-choice tests resemble those given to high school students, with the same advantages and limitations. High failure rates by underrepresented minorities mean that many potential teacher candidates are denied access to the field. The tests have been challenged as biased and unrelated to teaching potential; the counterargument is that every teacher should possess a minimum level of competence.

Following preservice preparation and during the first few years of service, teachers are in turn licensed and then inducted into tenure positions. During these steps, which most states regulate heavily, candidates undergo serious and sustained evaluation. Prior to 1990, the National Teacher Examination (NTE), a multiple-choice

test covering teaching practices and content knowledge, often served for licensure. The NTE was criticized as lacking validity because it did not assess "real teaching." In the late 1980s, Educational Testing Service introduced Praxis, a combination of computer-based tests of basic skills, paper-pencil exercises of subject-matter knowledge, and performance-based observations. Praxis has greater face validity and appears more closely linked to practice.

Professional preparation in teaching is "thin" compared with other fields. You can track the progress of doctors, nurses, lawyers, and accountants by certificates on office walls. Once a teacher has acquired tenure, however, opportunities for professional development are scarce and go unrecognized. In 1987, the National Board for Professional Teaching Standards was formed to develop and promote methods for assessing excellent teaching. Teachers desiring to move beyond initial licensure can now apply for an intensive experience composed of ten performance exercises; the teacher prepares six at the local school, and four are administered during a one-day session in an assessment center. The classroom exercises include instructional videotapes and student work samples, which the candidate must analyze and interpret. At the assessment center, the candidate reviews prescribed lesson materials and designs sample lessons. Panels of expert teachers rate each portfolio and award certificates of accomplishment. The standards are high, and pass rates have been modest. Some states now give certificated teachers pay incentives, but the movement has yet to catch on.

Two final issues warrant brief mention. The first is reliance on student achievement as an indicator of teaching effectiveness. Teacher associations like the National Education Association and the American Federation of Teachers oppose this policy, arguing that student scores reflect many factors the teacher cannot control. States increasingly hold schools responsible for achievement standards. Although the focus is the school, teachers share incentive payments for exceptional schoolwide performance and must deal with the consequences of low scores.

The second issue centers around teacher knowledge of assessment procedures. Externally mandated tests receive most attention, but teachers also rely on their own observations and classroom assessments to judge student learning. How trustworthy are teacher judgments? How knowledgeable are they about standardized tests? Surveys show that teachers receive little preparation in assessment concepts and methods and typically rely on intuition and prepackaged methods. Some educators have proposed the concept of "assessment as inquiry" to support classroom-based methods like portfolios and exhibitions, but with little effect on practice thus far.

Administrator Assessment

Teacher evaluation has not captured the same attention as student assessment but even less attention has been given to assessment of principals and superintendents. One might think that school leaders should be required to demonstrate their knowledge and skill, both to enter their positions and as part of continuing professional development. In fact, work in this area is sparse, with few contributions by psychologists. The research foundations are limited but are emerging around leadership concepts and practical needs.

Administrators typically attend more to budgets and personnel matters than to teaching and student learning, except when schools stand out as exceptional or in dire straits. Research suggests that effective schools are correlated with strong administrative leadership; unfortunately, less is known about how to assess or support leadership. The criterion for effectiveness has typically been standardized student performance. Analogous to an assembly-line model, the administrator's task is to increase the output. Newer models stress human relations and organizational integrity but much remains to be done.

What Has Endured and What Is Valuable?

Standardized multiple-choice tests will remain most likely primary indicators of student achievement. Performance-based methods for large-scale accountability, a closer link between classroom assessment and local reporting of student achievement, and clinical strategies like the best of those found in categorical programs all offer alternative assessment models for the future. The new methods have stimulated public debate about the outcomes of schooling and about the trustworthiness of methods for judging the quality of educational programs. Equity issues are a significant element in these debates. Assessment data show that U.S. schools are doing reasonably well for students in affluent neighborhoods but are failing families in the inner cities and poor rural areas. Indicators can serve to blame victims or to guide improvements. We have much yet to learn about methods for supporting the second strategy.

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Robert C. Calfee

EDUCATIONAL TESTING SERVICE. The world's largest private measurement institution, and a leader in educational research, Educational Testing Service (ETS) and its for-profit subsidiary, Chauncey Group International, develop and administer achievement, occupational, and admission tests for clients in education, government, and business. ETS annually administers more than 9 million tests in the United States and 180 countries, including the Scholastic Aptitude Test (SAT), the Graduate Record Examinations (GRE), the Graduate Management Admission Test (GMAT), the Test of English as a Foreign Language (TOEFL), and the National Assessment of Educational Progress (NAEP).

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Robert C. Calfee

EDUCATIONAL TESTING SERVICE. The world's largest private measurement institution, and a leader in educational research, Educational Testing Service (ETS) and its for-profit subsidiary, Chauncey Group International, develop and administer achievement, occupational, and admission tests for clients in education, government, and business. ETS annually administers more than 9 million tests in the United States and 180 countries, including the Scholastic Aptitude Test (SAT), the Graduate Record Examinations (GRE), the Graduate Management Admission Test (GMAT), the Test of English as a Foreign Language (TOEFL), and the National Assessment of Educational Progress (NAEP).

The American Council on Education, the Carnegie Foundation for the Advancement of Teaching, and the College Board created ETS in December 1947 by con-

solidating their testing operations. The founding organizations believed that this restructuring would facilitate research and development.

The ETS's Board of Trustees held its first meeting on 20 December 1947 and elected James B. Conant chair, and appointed Henry Chauncey, director of the College Board, president of ETS. Business operations began 1 January 1948, with a staff complement of 233 employees.

Some of ETS's early contributions to the field include Ledyard Tucker's improved equating models in 1948; Norman Frederiksen and Ben Schrader's 1951 comparative study of the progress of veterans and nonveterans in college, *Adjustment to College*; and Robert Abelson's 1952 study, *Sex Differences in Predictability of College Grades*, which examined high school grades and standardized tests as predictors of college grades for men and women. In 1954, ETS initiated a series of studies for the U.S. Navy on the relationship between test scores and performance on mechanical jobs for both men and women. In 1955, William Mollenkopf conducted an early ETS study with sociological implications entitled *Relationships of School, Parent and Community Characteristics to Performance on Aptitude and Achievement Tests*.

In 1960, Glen Stice conducted ETS's first study of factors leading high school students to drop out, *Talent Losses Before High School Graduation*. ETS researchers, led by Al Beaton, also developed survey instruments and conducted the statistical analysis for James Coleman's influential 1965 report, *Equality of Educational Opportunity*. In 1968, T. Anne Cleary and Thomas Hilton presented a method for investigating bias on individual test items, focusing on Black and White students in *An Investigation of Item Bias*. In 1969, Sam Ball and Gerry Bogatz led a team of ETS researchers to confirm the educational effectiveness of PBS's *Sesame Street* television programs.

During the 1970s, some of ETS's contributions included: Walter Emmerich and Virginia Shipman's 1971 study, *Disadvantaged Children and Their First School Experiences*, which examined child development based on data from ETS's Head Start study; William Angoff's 1972 delta-plot method for determining bias in test items; and in 1976, Garlie Forehand and Marjorie Ragosta's U.S. Department of Health, Education, and Welfare guide to help formerly segregated schools integrate effectively, entitled *A Handbook for Integrated Schooling*.

In 1980, Frederic Lord published his seminal work on item response theory, *Applications of Item Response Theory to Practical Testing Problems*. In 1981, Samuel Messick expanded the concept of validity to include the social consequences of testing in his report, *Evidence and Ethics in the Evaluation of Tests*. In 1982, ETS researchers led by Neil Dorans and Paul Holland began

to develop differential item functioning (DIF) procedures; by 1987 all ETS test questions were screened for DIF. Warren Willingham and other ETS researchers examined the comparability of scores achieved under special conditions in their 1988 report, *Testing Handicapped People*.

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ETS headquarters are in Princeton, New Jersey. Approximately 2,400 people comprise the permanent ETS staff, which includes more than 1,000 professionals. Professional training and expertise are concentrated in education, psychology, statistics, and psychometrics. The Educational Testing Service Network (ETS Net) is a World Wide Web (<http://www.ets.org>) gateway to information about college and graduate school admissions and placement tests, with links to AP, GRE, GMAT, SAT, The Praxis Series, and TOEFL sites, as well as other educational resources. ETS Net provides sample test questions, test preparation, and test registration. It also contains information on ETS research initiatives, teacher certification, college planning, financial aid, and links to college and university sites.

[See also Testing.]

Elizabeth Blasco

EDWARDS, JONATHAN (1703–1757), empiricist, Puritan divine, and early psychologist of religion. Edwards was born in East Windsor, Connecticut, the only son of 11 children. His father and maternal grandfather were Congregationalist ministers. A child prodigy, he entered Yale University in 1716 at the age of 13, where his Christian faith was both challenged and tempered by encounters with the ideas of John Locke and Sir Isaac Newton. From Locke he understood that nothing is in the mind that was not first in the senses. This made him a thoroughgoing empiricist, as he came to believe that God could be known

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After receiving a master's degree in 1820, Edwards entered a period of reflection that led to an intense religious experience in which he believed that he talked to Christ and realized that religion was an affair of the heart. At 20 he was called to a series of parishes in New York and Connecticut, before returning to Yale as a tutor. He was soon called to his grandfather's church in Northampton, Massachusetts, as assistant pastor in 1729, a position he held for the next 23 years and one that eventually cast him as the most important spiritual and political influence in western Massachusetts. He also married Sarah Pierrepont, whom he had known at Yale, and they subsequently produced 12 children.

By the early 1730s, Edwards emerged as the New England leader of the Great Awakening, a charismatic wave of religious enthusiasm that swept through the colonies and west to the Mississippi, beginning in the 1720s. Combining reason and sensation with revivalism, he gave vivid, rational descriptions of the fires of hell to his parishioners, but delivered in an unadorned monotone. Such sermons led to various conditions of dissociation in his audience, members of which would faint, shriek, jerk in the aisles, speak in tongues, and engage in the laying on of hands. An epidemic of spontaneous trance states soon spread beyond the church to surrounding towns. Edwards published his observations of these phenomena in *A Faithful Narrative of the Surprising Work of God* (1737), the first systematic treatise in the New World that used a rational and empirical approach to the delineation of different states of religious consciousness.

In 1741, Edwards published *The Distinguishing Marks of a Work of the Spirit of God*, in which he outlined the various signs that confirmed whether such experiences were genuine or counterfeit. In the more extensive *Treatise on Religious Affections* (1746), he elaborated on the development of the spiritual side of the human personality and enumerated a series of signs by which spiritual experiences could be recognized as genuine because of their enduring fruits.

In 1750, after 23 years of leading his congregation, a bitter struggle broke out over interpretation of doctrine and he was summarily dismissed. He retired with his family to the wilderness village of Stockbridge, where he was charged with bringing Christianity to Native Americans. Under these conditions he worked as a solitary scholar for 7 years. His most enduring work from this period was *The Freedom of the Will* (1754), a

tract that appropriated the powers of the will under the faculty of reason.

In 1757, Edwards became president of the College of New Jersey, later renamed Princeton University. In 1758, ever a believer in the new science, Edwards submitted to the new treatment of inoculation against smallpox, but died from the procedure after having held his new office for only 2 months.

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Eugene Taylor

EFFECT SIZE ELIMINATION. See Data Analysis.

EGO. The concept of ego, and the associated ego psychology framework, represent important perspectives within psychoanalytic theory. Ego psychology theories extend classical psychoanalytic drive theory by combining a biological and psychological view of individual development with concepts referring to the complex influences of sociocultural dimensions on individual functioning. The scope of psychoanalysis is thereby broadened from the study of unconscious events and psychopathology to explorations of adaptive processes within a matrix of interpersonal, familial, and sociocultural forces. (Hauser & Safyer, 1995) As used in contemporary psychoanalytic theoretical and clinical discussions, the concept of ego includes cognitive processes (e.g., synthetic functions), defenses (e.g., suppresion, sublimation, anticipation), and various executive functions (e.g., planning, reflecting about self and others).

Freud's conceptualization of the ego can be understood in terms of the three phases through which his definition evolved (Rappaport, 1959). In the first phase, the ego was defined with the least precision, as the term was used interchangeably with one's own person or the self. Despite this ambiguity, one aspect of ego processes was already apparent—the defensive functions of the

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ego. In this first phase, the ego was conceptualized as preventing painful memories from entering awareness. In the second phase, Freud's interest in ego functions transiently receded, as he now more fully addressed drives, their vicissitudes, and various manifestations of drives (derivatives; Freud, 1915a, 1915b). Nonetheless, Freud distinguished the central aspects of ego functioning: secondary process, (conscious rational ideas and beliefs) reality principle, and repression. The final phase began with Freud's introduction of the structural model, delineating the ego as a coherent system, which—together with the id (impulse, nonrational ideas), and superego (conscience) systems—is a component of the tripartite personality organization. In this most comprehensive formulation, ego processes refer to many connections among current perceptions, ideals, moral principles, and conflicts engendered by impulses. The work of the ego is now understood as being dedicated to fostering and sustaining harmonious relations between ego functions and the two other major psychic structures (the id and the superego). In this third model of the ego, Freud laid the groundwork for the current recognition of the ego representing the individual as an active agent with his or her own independent interests, rather than passively responding to other psychological forces (e.g., conflicts, moral precepts, responses to others) (Rappaport, 1959).

Significant later theoretical, empirical, and clinical writings incorporate and clarify several concepts derived from these earlier models of ego functioning. Their additions to the ego construct have led to contemporary ego psychology advancing from mechanistic ideas, with limited recognition of context, to incorporating major new knowledge about such important issues as attachment, interpersonal relationships, mastery, resilience, coherence, and identity. Meaningful links from ego psychology to current ideas about adolescence, adult development, and adaptation can now be conceptualized.

Measuring Ego and Ego Development

Given the richness of the ego construct, and the multiplicity of phenomena referred to by this term and by ego development, generating meaningful operational definitions of these concepts for systematic empirical studies is a daunting challenge. Fortunately, several researchers have undertaken programs of research devoted to investigating specific questions and hypotheses regarding ego functions and ego development. Clearly, the domain of ego psychology is too vast to be studied through any single program of empirical studies. Selected constructs relevant to ego psychology, personality theory, and developmental psychology are the target of continuing empirical research.

Ego Development. Ego defenses and ego develop-

ment are related, yet the many complex facets of this relationship have not yet been fully articulated (Hauser, 1993). An illustration of the interplay between these two realms is through two prevailing models of ego development. One view focuses on the ego as representing the collection of ego mechanisms, while the other calls attention to the centrality of a single ego-process, comprising integrative activities (e.g., of thoughts and feelings, of past and present ideas) in its definition of ego development (Hauser, 1979).

Bellak and his colleagues (1973) contributed empirical studies assuming the "collection" model. Viewed in this way, ego development refers to the unfolding of multiple functions, including adaptive strengths, cognitive processes, defenses, and perceptions of others, linked with self-representations (object relations) (Hauser & Daffner, 1980). The second model of ego development points to integrative processes and the individual's overall frame of reference. This view has been elaborated, together with a closely linked assessment technique, by Loevinger and her colleagues (e.g., Loevinger, 1976; Hy & Loevinger, 1996). For over 20 years a series of studies have applied this theoretical approach and psychometrically rigorous assessment technique to investigate ego development in children, adolescents, and adults, and with respect to psychological and sociocultural variables (e.g., Cohn, 1991; Westenberg, Blasi, & Cohn, 1998; Hauser, 1976, 1993; Loevinger, 1979a, 1979b). Our increasing knowledge of connections among individual behavior, individual experience, and ego development based on these research program invaluable adds to diagnostic and longitudinal studies of varied psychopathology and development arrests (Hauser & Safyer, 1995; Hauser, 1991, 1999). An example of such studies are the ongoing longitudinal investigations of adolescent and adult development (repeated measurement over 20 years), which clarify links among family processes, attachment, and ego development (see Hauser, 1991; Hauser, 1999; Hauser, Gerber, & Allen, 1998).

Loevinger's model of ego development assumes that each person has a customary orientation to the self and the world and that there is a continuum (ego development) along which these frames of reference can be arrayed. "In general, ego development is marked by a more differentiated perception of one's self, of the social world, and the relations of one's feelings and thoughts to those of others" (Candee, 1974, p. 621). In this assessment of ego development, specific ego processes (e.g., defense mechanisms and aspects of cognition) cannot be distinguished from one another since they are considered aspects of one integrated structure of the developing ego (Loevinger, 1979b). Loevinger conceives of the ego as a relatively stable structure, maintaining its coherence through initially screening out information that would disrupt homeostasis. Yet

this definition does not assume that the ego is without periods of disequilibrium. Qualitative changes gradually occur in ego development as the individual continues to confront phenomena incompatible with his or her current framework of meaning. Consequently, inconsistencies in experience have the potential to trigger periods of disequilibrium, thereby facilitating possible shifts to higher levels of ego development (Loevinger, 1976; Loevinger & Wessler, 1970).

Future Perspective

Arguably, we are witnessing major advances in more precise conceptualizations and empirical research on ego processes and ego development. Two overarching principles are relevant for a future agenda targeting a better understanding of theoretical and empirical connections between ego psychology and the field of general psychology. First, ego constructs—inspired by psychoanalytic data and theory—must be even more explicitly integrated with the insights, theories, and empirical approaches of neighboring disciplines (Holzman & Aronson, 1992). These disciplines include those investigating stress, contextual dimensions (e.g., family, school, and neighborhood), coping, and individual development. The second principle is that to promote even fuller understandings of the interface between ego psychology and other areas of personality and developmental psychology, we must continue to launch theoretically driven, systematic empirical programs of research.

[See also Id; Psychoanalysis, article on Theories; and Superego.]

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Stuart T. Hauser

EGO PSYCHOLOGY THEORY was the final model of the mind in Sigmund Freud's evolving thought. Two overarching themes define this theory: (1) conflict between three intrapsychic agencies, the id, the ego, and the superego, and (2) adaptation to the realities of the environment. The ego, the id, and the superego are viewed as the principal structures of the mind, so the term *structural theory* is often used in association with ego psychology. In this model, aggression and sexuality

this definition does not assume that the ego is without periods of disequilibrium. Qualitative changes gradually occur in ego development as the individual continues to confront phenomena incompatible with his or her current framework of meaning. Consequently, inconsistencies in experience have the potential to trigger periods of disequilibrium, thereby facilitating possible shifts to higher levels of ego development (Loevinger, 1976; Loevinger & Wessler, 1970).

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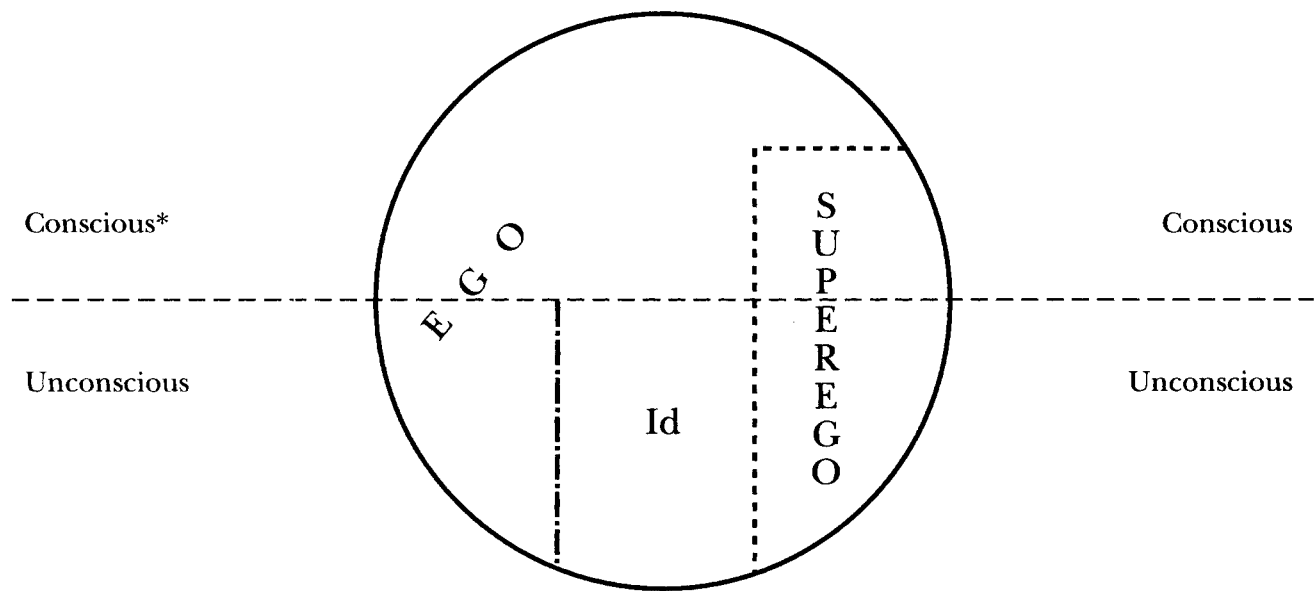
[See also Id; Psychoanalysis, article on Theories; and Superego.]

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Stuart T. Hauser

EGO PSYCHOLOGY THEORY was the final model of the mind in Sigmund Freud's evolving thought. Two overarching themes define this theory: (1) conflict between three intrapsychic agencies, the id, the ego, and the superego, and (2) adaptation to the realities of the environment. The ego, the id, and the superego are viewed as the principal structures of the mind, so the term *structural theory* is often used in association with ego psychology. In this model, aggression and sexuality



EGO PSYCHOLOGY THEORY. Figure 1. Illustration of the relationship between the ego, id, and superego and Freud's earlier topographic model of consciousness versus unconsciousness. The preconscious has been deleted for the sake of simplicity. (From Gabbard, 1994, p. 31. Copyright 1994 by American Psychiatric Press.)

are striving for expression and discharge. The three agencies battle among themselves to control these drives, and the conflict produces anxiety. This anxiety was referred to as signal anxiety by Freud (1926) because it signals the ego that a defense mechanism is required. The defensive response is instrumental in neurotic symptom formation, in that the defense leads to a compromise between two or more intrapsychic agencies. Neurotic symptoms are regarded as compromise formations that both defend against a wish arising from the id and gratify that wish in some disguised form.

Figure 1 illustrates the relationship between the ego, id, and superego and Freud's earlier topographic model of consciousness versus unconsciousness. The ego is the executive organ of the psyche and is responsible for a variety of functions, such as the capacity to distinguish the real from the unreal, judgment, impulse control, and cognitive processes. It is also the domain of the defense mechanisms, most of which are unconscious. Unlike the ego, the id is entirely unconscious and seeks to discharge tension arising from the drives of sexuality and aggression. The superego, like the ego, is partly conscious and partly unconscious. It is the agency involving moral conscience, ideals, and values.

The ego ideal is generally considered a component of the superego that prescribes what one should do and how one should behave. By contrast, the superego prescribes certain behaviors, thoughts, and feelings that are regarded as unacceptable.

Freud's tripartite structural theory evolved out of his concerns over the failures of the topographic model in the clinical setting. His attempts at directly accessing repressed unconscious memories met with formidable resistances by his patients. He soon recognized that the defense mechanisms responsible for the resistance were themselves unconscious. When he shifted to a more ego-psychological frame of reference in his classic paper "The Ego and the Id" (1923), he was acknowledging that he had been mistaken when he thought that repression caused anxiety. Instead, he was postulating that an unconscious wish that was threatening to the individual signaled a danger to the ego, which in turn creates anxiety. The danger could be related to the body (castration anxiety), one's moral values (guilt), the loss of a significant person (separation anxiety), or simply the loss of love from a meaningful person. The anxiety signals the ego to initiate a defense that allows compromised expression of the drive.

Inherent in the shift from the topographic to the structural model was an emphasis in clinical practice on analysis of the ego rather than the id. In other words, unconscious mental content took a backseat to a focus on analyzing conflict and defense. Instrumental in this shift was *The Ego and the Mechanisms of Defence* (1946) by Freud's daughter Anna. In her view, the analysis of a patient's characteristic defense mechanisms revealed much about the patient's character.

In recent years a vast literature on defense mechanisms has developed (Vaillant, 1992). Specific defense mechanisms have been associated with particular disorders, and extensive empirical research has supported the validity of defense as a basic ego-psychological construct. Defense mechanisms have been placed on a hierarchy, from immature defenses like projection and denial, to mature defenses like sublimation and humor. Positive associations between the maturity of defenses and mental health have been validated in prospective longitudinal studies (Vaillant, 1992). This linkage is independent of gender, social class, and education.

Ego psychology is also defined by its orientation toward the environment and adaptation. Hartmann (1939) was a key figure in this transition from a purely intrapsychic psychology to one that included adaptation to the environment. In his view, human behavior was not entirely explainable by intrapsychic conflict and fantasy. He noted that each child is born with certain primary autonomous ego functions, such as perception, memory, thought, and motility (motor behavior), that are in the conflict-free sphere of the ego. Environmental responses from family members and others act in concert with those structures to shape the individual. Another component of Hartmann's theory was a revision of the concept of motivation so that it was broader than simply lust and destructiveness. He argued for the concept of neutralization, which provided a model of energy that supported certain aspects of the ego that were independent of drive pressures. Thus, a "neutralized libido" leads to modifications of aspects of the sexual drive, such as friendliness and affection. Similarly, self-assertion and healthy competitiveness are regarded as forms of neutralized aggression.

Hartmann also suggested that certain defenses originally arising as the outgrowth of conflict might become secondarily autonomous through the neutralization of the sexual and aggressive energies associated with them. He and other ego psychologists were influential in the broadening of psychoanalysis beyond the study of psychopathology to a general theory of personality.

Erik Erikson (1956) also played a role in extending ego psychology to include social themes, adding identity concerns to the ego-psychological lexicon. In addition, to complement Freud's psychosexual stages based on libidinal zones (e.g., oral, anal, and phallic), he constructed a series of well-known developmental struggles,

such as basic trust versus mistrust in infancy, and autonomy versus shame and doubt in the toddler years.

Modern structural theory has increasingly evolved beyond ego psychology so that it is now less dependent on Freud's model of conflict among the three psychic agencies. The id has been increasingly deemphasized, and theorists such as Arlow and Brenner (1964) have stressed that certain aspects of Freud's conceptual model are not necessary to understand conflict as it appears in the clinical setting. Instead, they have emphasized the importance of unconscious fantasy and compromise formation.

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Glen O. Gabbard

EHRENFELS, CHRISTIAN VON (1859-1932), Austrian philosopher. In 1890 von Ehrenfels published an influential paper on Gestalt qualities that has come to be viewed as a precursor to the later Gestalt school of psychology. Born in Rodaun, near Vienna, to a family of Austrian nobility, he studied philosophy with Franz Brentano at the University of Vienna and with Alexius von Meinong at the University of Graz, obtaining his doctorate in philosophy from Graz in 1885, with a dissertation on size relations of numbers. He completed a *habilitation* thesis on feeling and willing in 1888 at the University of Vi-

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enna, and taught there as a lecturer from 1889 to 1896. Called to Prague as an associate professor in 1896, he became full professor there in 1900, retired in 1930, and died 7 September 1932. Max Wertheimer, a founder of Gestalt psychology, took several courses from von Ehrenfels around the turn of the century.

His more than one hundred publications dealt with a broad range of topics: monism and dualism, ethics, esthetics, epistemology, theory of values, eugenics, sexuality, religion, Darwinism, Kant, music, the theory of prime numbers, philosophy of mathematics, and what he called *cosmogony*. His 1890 paper on Gestalt qualities (properties that later Gestalt theorists called "Ehrenfels qualities") had a major impact on subsequent psychology. When the paper was published, there was widespread dissatisfaction with the piecemeal elementism of the dominant theoretical perspectives in psychology. Wilhelm Wundt had proposed a principle of "creative synthesis" to explain why psychological wholes may have properties that are not discernible in their constituent parts in isolation. In 1886 Ernst Mach, in his influential book *Analysis of Sensations and the Relation of the Physical to the Psychological* (Jena, Germany) argued that sensations are the basis of all science, and that these sensations include "space forms" and "time forms" that are not dependent upon the quality of their constituent elements. A circle can be altered in size or color without losing its circularity, and a melody can be transposed into a different key so that all the notes in it are different without the form of the melody being lost. Von Ehrenfels took the next step: these form qualities are not simply combinations of summed elemental qualities, but are new elements in their own right, over and above the qualities of the parts that make up the whole. Such Gestalt qualities are ubiquitous in all perception. A square, for example, has as elements four equally long straight lines plus four right angles—but also its "squareness." This squareness is an immediately experienced additional element. Von Ehrenfels proposed a criterion for Gestalt qualities: an independent one must exist if it remains unchanged when qualities of the whole's constituent elements are changed.

Meinong, Hans Cornelius, Stephan Witasek, and Vittorio Benussi soon published variants of von Ehrenfels's theory. But the next major step occurred two decades later, when the Gestalt school argued that the Ehrenfels qualities are not added elements but are primary, and that properties of constituent parts are determined by their place, role, and function within the whole of which they are parts.

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Michael Wertheimer

EIDETIC IMAGERY. Theorists of visual perception have been grappling for centuries to understand the different kinds of visual images human beings experience. At one extreme is the perception we have of a scene now before our eyes; at the other are pure fantasies that we have constructed from imagination alone. Between these extremes are perceptions that outlast the termination of stimulation, and memories of scenes we once saw. The boundaries between self-produced cognitions and percepts arising from current stimulation are often blurry, and the boundaries among the different forms of imagery, memory, and fantasy are even blurrier.

One form of visual imagery, termed *eidetic imagery* by the earlier researchers working in Germany late in the nineteenth century, has occupied an unusual place in this listing, partly because it has been confused with all of these other cognitions at one time or another, and partly because only a small number of people have it. However, research since 1960 has provided a consistent and distinctive description of its properties. Eidetic imagery is defined by the reports of some children (and a very few adults) who say they *can continue to see a visual representation of prior, but no longer present, visual stimulation* (such as a picture). In most cases, people with eidetic imagery report that the image is in front of them, usually where the stimulus picture had been that gave rise to it. They continue to see the picture, even though they know it is no longer there. When reporting eidetic images, all eidetic children use the present tense

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(e.g., "I see a tree"); after their image fades, if they continue to describe the picture, they switch to past tenses. In contrast, when non-eidetic individuals are asked to describe the stimulus after it is removed, they invariably use a past tense (e.g., "I saw a tree," or "There was a tree"). Furthermore, reports of the content of eidetic images are made fluently, as if the child is looking at something while describing it. The fluency of the report lasts as long as the child says the image is visible. In contrast, reports from memory (whether from non-eidetic children, or eidetic children after their images have faded) may start out fluently, but then hesitations arise, consistent with fluency of retrieval from nonvisual memory. Most children and adults with eidetic imagery can maintain their images for a minute or two, with some holding them for many minutes. All children and adults with eidetic imagery indicate that an eidetic image ends by its different parts fading away one by one, rather than all at once. Children say they can terminate their images at will by blinking, or by trying to move them to another surface. If a second picture is presented while an eidetic child is still reporting the presence of an image of a first picture, most eidetic children report that the two images are superimposed. They can usually tell which is which (as long as the two pictures are each coherent and different from each other), but they see both together. For specially constructed stimuli that create a cohesive pattern when two pictures are superimposed that is not predictable from independent viewing of either stimulus alone, some, but not all, eidetic children report the new image in their superimposed eidetic image. Some eidetic children report reversals of Necker cubes in their image of the two-dimensional stimulus, indicating that eidetic images can be three dimensional if the stimulus is appropriate. Most eidetic children report eidetic images in one eye alone after looking at the stimulus with that eye. All such children can do this with either eye. However, transferring an eidetic image from one eye to the other (e.g., examining the stimulus with one eye and then viewing the now empty surface with the other eye) can only be done sporadically, presumably because of the inevitable opening and closing of eyes that routinely terminates eidetic images. Eidetic children fail to form eidetic images under two conditions: (a) insufficient time to examine parts of the picture, and (b) if they name parts of the picture while it is still on view.

Eidetic imagery is not a photographic memory. It is now well known that even when we are looking at a scene in front of our eyes, our perception of the scene is not photographic: it is not simply a reproduction of the energy patterns at the receptor surfaces. While what we perceive may be closely related to the stimulus structure, as perceivers we select and organize among the components of stimulation to achieve our percepts. Similarly, eidetic imagery is not photographic. Rather, like all per-

ception and memory, eidetic images are constructed and organized selectively based on experience. Specifically, when eidetic and non-eidetic children describe the same picture from memory, no difference in accuracy is found. This finding obtains whether the eidetic child can still "see" the eidetic image, or is reporting from memory. The reports of the images of eidetic children are as likely to omit present elements as are the reports of memories of the same stimulus. Similarly, if the picture is likely to be described from memory with an added element, based on normal expectancies, the same addition is likely to be found in the eidetic reports.

The type of imagery most similar to eidetic imagery is after-images, which nearly everyone experiences: we can continue to see a relatively intense stimulus after its termination. After-images have been extensively investigated. They result from differential adaptation of retinal receptor cells along the boundaries of the stimulus, so that when the retina is then exposed to a neutral surface, the "mirror" image of the previous stimulus pattern is perceived. A stimulus will produce an after-image only if there are no eye movements during the exposure: If the eye moves, there is no differential adaptation and no after-image.

The easiest test to differentiate eidetic images from after-images involves eye movements. To get an eidetic image of a stimulus, the person's eyes must scan it. In contrast, any scanning of the stimulus prevents an after-image from forming. Whereas most eidetic children also experience after-images, they do so only if they do not scan their eyes during stimulus exposure.

A description of the standard elicitation procedures for eidetic imagery can be found in Haber and Haber (1988). Experimental procedures to demonstrate the nature and properties of eidetic imagery, and to differentiate eidetic imagery from other forms of cognitions, are described in detail in Leask, Haber, and Haber (1969) and Haber (1979a, 1979b).

Eidetic imagery has been identified in 2 to 10% of children between the ages of 6 and 12. In contrast, nearly all studies fail to find younger children or adults with eidetic imagery. These results are based on a sampling of over 10,000 individuals by 15 independent laboratories in the United States, Europe, and in a number of countries in which children of these ages are not taught to read.

All attempts to find cognitive, intellectual, emotional, schooling, or experience correlates of eidetic imagery have failed, especially attempts to show that eidetic imagery is a more concrete and less abstract way to represent stimulation. Although only a small number of children possess eidetic imagery, those children are not intellectually slower (or faster) than non-eidetic children, they are not different in their emotional or social maturity, and they do not differ in their exposure to literacy training.

To summarize, eidetic imagery is well defined and well documented, but not at all well understood. Why, like perfect pitch, is it found in such a small segment of people? Why, unlike perfect pitch, does the ability appear primarily in children but only very rarely in adults? On the other hand, unlike many forms of visual imagery that occur independently from concurrent stimulation, eidetic imagery has been uniquely defined using rigorous and replicable experimental procedures. [See also *Imagination*.]

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Ralph Norman Haber and Lyn Haber

ELDER ABUSE AND NEGLECT. First identified as a social problem by the British in 1975, and within a year or so by Americans and Canadians, elder abuse has become recognized as a worldwide phenomenon. Although still "underreported, underresearched, and little understood" (Bennett et al., 1997), mistreatment of older people in domestic settings has gained international attention as countries grapple with issues of human rights, gender equality, domestic violence, and population aging.

Theories and Definitions

After 20 years of study, elder abuse emerges as a multifaceted concept that cannot be described in a single statement or encompassed by one theory. As with other forms of family violence, the phenomenon can be viewed from many perspectives: psychological, situational, ecological, and political, and according to various theories, including symbolic interactionism, social exchange, social learning, and feminist models. Although the psychological basis for explaining child and spouse abuse was renounced early on in favor of sociopsychological and sociocultural factors, studies now show that among perpetrators who are the most aggressive, the percentage of men who have alcohol prob-

lems and/or personality disorders is much higher than that found in the general or maritally discordant populations (O'Leary, 1993). So too, it is difficult to dismiss the relatively large proportion of elders' abusers who have histories of mental illness and/or substance abuse. Until more information is available, an intraindividual explanation for physical and psychological mistreatment in particular appears to be reasonable.

Problems of defining elder abuse have plagued researchers and policymakers alike. Hudson's taxonomy (1991) is helpful in understanding the complexity of the concept. Beginning with "violence involving older adults" as the overarching theme, the schema classifies the concept in terms of the relationship between victim and perpetrator: self-mistreatment, elder mistreatment, and crime by strangers. Elder mistreatment can involve either a personal/social or professional/business relationship. It can be an act of commission (abuse) or omission (neglect), intentional or unintentional, and involve several types of behavior. While many manifestations and symptoms are associated with elder mistreatment (e.g., hitting, burning, humiliating, and threatening), the generally agreed-on basic types are physical abuse, psychological abuse (also known as emotional abuse or verbal aggression), financial abuse or exploitation, and neglect.

Some researchers are now questioning the utility of the legal and professional definitions, suggesting that the older person's perception of the particular behavior may be the salient factor for identification and intervention. Others have noted the importance of cultural values, attitudes, and traditions in defining what is acceptable or unacceptable behavior within the family.

Demographic Incidence

Scientific literature reports few prevalence studies on elder abuse. Although carried out in different countries with diverse methodologies, the results are surprisingly similar. Pillemer and Finkelhor surveyed over 2,000 noninstitutionalized elders (65 years and older) in the metropolitan Boston area using an approach adapted from national domestic violence surveys (1988). They found that 3.2% had experienced physical abuse, verbal aggression, and/or neglect since they had reached 65 years of age. Partner abuse was more prevalent (58%) than abuse by adult children (24%); the proportion of victims was roughly equally divided between males and females; and economic status and age were not related to the risk of abuse.

The Pillemer and Finkelhor survey, to which financial abuse was added, was repeated in Canada with a nationally representative sample of persons who could respond on the telephone (Podnieks, 1992). Four percent of elder Canadians were abused; most prevalent was financial abuse (2.5%), then verbal, physical, and neglect. A Finnish team (Kivelä, Köngäs-Saviaro, Kesti,

To summarize, eidetic imagery is well defined and well documented, but not at all well understood. Why, like perfect pitch, is it found in such a small segment of people? Why, unlike perfect pitch, does the ability appear primarily in children but only very rarely in adults? On the other hand, unlike many forms of visual imagery that occur independently from concurrent stimulation, eidetic imagery has been uniquely defined using rigorous and replicable experimental procedures. [See also *Imagination*.]

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Pahkala, & Ijäs, 1992) distributed questionnaires, part of a larger mental health study, to all elderly residents of a semiindustrialized town, which included a question on physical, psychological, economic, and sexual abuse and neglect. Almost 6% (5.7%) acknowledged being mistreated in one or more ways since their retirement. A fourth study, conducted as part of a larger omnibus survey in Great Britain, revealed that 5% of elders had been verbally abused and 20% physically and/or financially abused (Ogg & Bennett, 1992). Finally, using definitions similar to the Pillemer and Finkelhor survey, a Netherlands team (Comijs et al., 1998) assessed a population-based sample of 1,797 older people living independently in Amsterdam and found a one-year prevalence rate of 5.6%.

So far, the United States is the only country to have a fully developed system for receiving incident reports of abuse, neglect, and exploitation. Adult protective services agencies are operated by individual states; however, there is little consistency in definitions, eligibility criteria, or administrative structures. In 1986, an estimated 117,000 reports were made to state agencies. By 1996, the number reached 290,000, an increase of 147.9%. The prototypical victim was a woman, 76 years of age, poor, and suffering from physical and/or mental impairment. Like other forms of domestic abuse that show higher rates of reporting for non-Whites than Whites, attributed to bias in the reporting systems, elder African Americans and Hispanics are overrepresented in the report data.

Risk Factors

Causal factors remain equivocal, but characteristics associated with elder abuse cases are victim-perpetrator dependency, perpetrator deviance, victim disability, and poor victim-perpetrator relationship. Substance abuse and social isolation are also contributing features. Poverty, job status, loss of family support, and the intergenerational transmission of violence, which are closely associated with child and partner abuse, do not appear to be important risk factors for elder abuse; neither is caregiver stress.

An analysis of abuse cases by type of mistreatment showed different characteristics were associated with each type (Wolf & Pillemer, 1989). The perpetrators of physical and psychological abuse were apt to have a history of psychopathology and to be dependent on the victim for financial resources. The victims were likely to be in poor emotional health but relatively independent in their activities of daily living. Since this type of abuse involved family members who were most intimately related and emotionally connected, the violence may be attributed to long-standing, pathological family dynamics or interpersonal relationships that became more highly charged because of illness or financial need. Victims of neglect tended to be widowed, very old,

cognitively and physically impaired, and with few social contacts.

In sharp contrast to the cases of physical and/or psychological abuse, those involving neglect appeared to be very much related to the dependency needs of the victim. Neither psychological problems nor financial dependency were significant factors in the lives of these perpetrators. For them, the victims were a source of stress. Financial abuse presented still another profile. Factors related to the physical and mental states of the victims seemed to be relatively unimportant. However, victims were generally unmarried with few social contacts. Rather than interpersonal pathology or victim dependency, the risk factors appeared to be perpetrator greed and victim loneliness.

Consequences

Because of the difficulties in trying to separate the impact of the abuse and/or neglect on the elder victim's health from the effects of aging and disease processes, researchers have shied away from examining the issue. However, one team matched a sample of elders from one of the National Institute on Aging's EPESE sites (Established Populations for Epidemiologic Studies of the Elderly) with adult protective services agency reports of abuse over a multiyear period (Lachs et al., 1998). The mortality rates of three groups within the sample were tracked: those who had been physically abused and/or neglected; those who had been investigated for self-neglect; and the remainder of the cohort. In the first few years, no difference in mortality rates was found. At the end of the 13-year follow-up period from cohort inception, only 9% of the group who had been seen for elder mistreatment were still alive, compared to 17% of the self-neglect group and 40% of the noninvestigated group.

Although clinical experience and case reports have documented the severe emotional distress experienced by older persons as a result of mistreatment, again, few empirical studies have been reported. Exceptions are several case comparison investigations that found depression in higher proportions among abused elders than nonabused elders. Because these studies were cross-sectional, it cannot be said with certainty that the depression resulted from the mistreatment. Other psychological states, such as loss of self-esteem, learned helplessness, alienation, guilt, shame, fear, and denial have all been proposed as effects of mistreatment, but no research can be cited. Some suggest that the withdrawal, vigilance, distrust, and dysphoria of elder abuse victims may be symptoms of posttraumatic stress disorder.

Except for the work on care-giver stress, the consequences of aggressive behavior on the perpetrator have been unexplored. Increased levels of depression, anxiety, helplessness, hopelessness, emotional exhaustion,

low morale, distress, feelings of isolation, guilt, and anger have been associated with providing care to dependent, frail older people. Research on violence in care-giving relationships with Alzheimer's disease patients has shown that depression distinguishes between nonabusive and abusive caregivers. Once again, however, the studies are cross-sectional and unable to explain the pathway that leads from the care recipient's aggressive behavior to care-giver burden, depression, and abuse.

A high level of tolerance for aggressive behavior has been identified in families in which the abusers are adult children who suffer from emotional distress, mental illness, or alcoholism. One author found an "undeniable sense of parental protectiveness [that] overshadowed interactions between these parents and their adult children" (Greenberg, McKibben, & Raymond, 1990, p. 81). Anetzberger reports that "prolonged and profound intimacy between the abusive adult offspring and their elder" (1987, p. 94) is characteristic of these relationships. The consequences of these behaviors may be the entrapment of the parent and child (victim and abuser) in a "web of interdependency."

Service Delivery

As noted above, the United States has a network of state adult protective services agencies. These public agencies or their private designates are charged with the responsibility of receiving reports of suspected cases of elder mistreatment, screening for their potential seriousness, conducting a comprehensive assessment if indicated, and developing a care plan. As soon as the immediate situation is addressed, the case is generally turned over to other community agencies for ongoing case management and service delivery.

When elder abuse was thought to be primarily a result of care-giver stress, reducing the dependency of the victim on the care giver was the primary goal of treatment. Skilled home nursing, personal care, homemaker and chore services, respite care, Meals on Wheels, day care, friendly visitors, and emergency shelter have been offered to assist the care giver. The realization that the financial and emotional dependency of the perpetrator on the victim is an important risk factor, especially in cases of physical and psychological abuse, has suggested another set of interventions: mental health services, alcohol and drug treatment, vocational counseling, job placement, housing assistance, and financial support for the perpetrator.

Response by Psychologists

The emotional issues, psychopathology, and poor family dynamics associated with cases of elder mistreatment call out to psychologists for intervention. As mental health professionals, psychologists can help victims and perpetrators around care-giving issues, alcohol and

drug related problems, depression, codependency, and matters of power and control. However, adult protective services agencies have not only had difficulty in accessing mental health services, but perpetrators are generally unwilling to accept help or absent themselves from the situation. Very few cases reach the courts, most often because the victims do not want to press charges. Even victims refuse services; for example, in almost one fourth of Massachusetts cases, victims declined offers of assistance.

A broader role for psychology in this aspect of family violence is needed. Psychologists, like physicians, social workers, and others caring for older persons, must be familiar with the state adult protective services and elder abuse legislation, the procedure for reporting, and community resources. Through mental health consultation to elder abuse case workers and treatment for families, substance abuse counseling, assertiveness training for victims, and support groups for care givers, psychologists can play an important role in prevention and treatment. Moreover, as researchers of the causes and consequences of abuse and neglect and as designers and evaluators of treatment and preventive modalities, psychologists can make a profound contribution to the field.

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Rosalie S. Wolf

ELDER CARE. The dramatic increase in the proportion of older people in the population in the twentieth century poses a major challenge to society for providing elder care. In 1900, only 4% of the population of the United States was 65 years of age or older. Currently, 13.5% of the population is over 65, and that figure is projected to increase to 22% by the year 2030. While most older people live independently, a significant minority (about 16% of people 65 or older) require regular and ongoing assistance with activities of daily living. The need for care increases with advancing age, so that by age 85, 45% of people living in the community need some assistance with activities of daily living (ADLs). This trend is particularly important because people age 85 and older are increasing at a faster rate than other age groups in the population. The result is unprecedented numbers of people needing help but without adequate resources available to address these needs.

A guiding principle of old-age care is to help people stay in their own homes as long as possible or in the least restrictive alternative. This principle has grown from a concern with the negative consequences associated with institutional life, particularly the loss of personal control and increased dependency. Home care is also promoted at a policy level because of the belief that it can be arranged more cheaply than institutional care, although a definitive empirical test of the costs of alternative approaches remains to be conducted. Although institutional care is typically uninspired and, on occasion, tragically deficient, innovative models are being developed that provide new strategies for dealing with care. A major obstacle to developing and sustaining better models of elder care in the United States is that Medicare does not reimburse for chronic care needs in community or institutional settings. As a result, older people and their families often have to struggle to get adequate help to stay out of an institution, while institutionalization is associated with costs that are catastrophic for all but the wealthiest. The result is a paradoxical system that delays institutionalization by making it too expensive for many people, yet which provides little of the help that might prolong continued residence in the community.

Family Care

Families remain the main source of assistance to their older relatives, but they often have diminished resources for providing care. Smaller family size combined with women's increasing involvement in the workplace and lower economic resources of younger generations make it increasingly difficult for some families to provide assistance to their older relatives on a sustained basis.

When an older person needs care, usually one family member assumes primary responsibility for providing assistance. Strong social norms govern who assumes the role. If the care recipient is married, his or her spouse will almost always take on the main care giving role. If no spouse is available, adult children, especially daughters, will assume responsibility. If there are no children, or children are unavailable, then siblings, grandchildren, or even nonrelatives will help out. Using data from a national survey identified through Medicare records, Stone, Cafferata, and Sangl (1987) found the following proportions of primary care givers: 31% wives, 18% husbands, 29% daughters, 6% sons, and 17% other relationships (including nonrelatives). Adult children are frequently secondary care givers, that is, they provide some help to a parent or sibling but do not take on the main responsibility (Stone, Cafferata, & Sangl, 1987). Adult children who provide care are typically older themselves. Stone and her colleagues report that 13% of care giving daughters and 9% of sons are over 65 themselves. Despite media attention to the problems of the "sandwich generation," the number of middle-age children who find themselves occupying multiple roles of parent and caregiver to their own parents is relatively small.

Research on family caregiving has generally been guided by stress theory (e.g., Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995), although family-systems approaches have also been used (e.g., Niederehe & Frugé, 1984). It has generally been found that care givers' experiences of strain and emotional distress are associated with exposure to higher levels of primary (disability-related) and secondary (spillover effects) stressors, but there are also considerable individual differences in the psychological impact of stressors (Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995). Caring for someone with dementia or mental illness is generally more stressful than assisting a physically disabled but otherwise intact elder. Care givers' health may also suffer, although reports of health effects are less consistent than for psychological distress.

Several factors mediate the relationship of stressors and psychological outcomes, including the use of active and cognitive coping strategies (e.g., Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995) and receiving social support (Aneshensel, Pearlin, Mullan, Zarit, & Whi-

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tlach, 1995). The amount of help families receive from either formal or informal sources is often small, and so the beneficial effects of social support are sometimes not found (Pruchno, Kleban, Michaels, & Dempsey, 1990). Families sometimes disagree over care arrangements, resulting in greater emotional distress for the primary care giver.

Although placement in a nursing home or other long-term care facility is often viewed as the termination of care giving, families continue to be involved with their relative and to experience strains related to institutional care (Zarit & Whitlatch, 1992). Strains are associated with visiting and helping relatives with ADLs, as well as concerns about the quality of care and the continued ability to pay for care. An added factor is that spouse caregivers find themselves in an ambiguous role, not widowed yet having lost the social and emotional benefits associated with marriage. A significant minority of caregivers still experience pronounced feelings of emotional distress as long as 4 years after placement (Aneshensel Pearlin, Mullan, Zarit, & Whitlatch, 1995).

A variety of clinical strategies have been proposed for working with distressed family care givers. Individual treatment has generally been found to be more effective than support groups and no-treatment control conditions (Knight, Lutzky, & Macofsky-Urban, 1993). A particular promising approach combines therapy with the primary care giver and one or more sessions with the extended family. This treatment reduces the primary care giver's feelings of distress and may also delay nursing home placement (Whitlatch, Zarit, Goodwin, & von Eye, 1995).

Community Service Programs

A network of age-based community service programs has been developed to support older people to remain in their homes and to supplement the efforts provided by families and provide relief to them. Many services are authorized under provisions of the Older Americans Act. Costs are paid from a variety of sources, including federal, state, and local government funds, charitable donations, and by older people or their families.

Senior centers and nutrition programs target the well-elderly, that is, people living independently and requiring little or no help. Senior centers typically provide social and recreational activities for older people and usually do not have sufficient staff to accommodate people with significant disabilities. Like senior centers, nutrition programs are designed for people who are at least partly independent and can travel to a communal meals site, though homebound elders can obtain home-delivered meals. Transportation services for medical and mental health appointments as well as for other services is generally available, but coverage is often limited in rural areas.

For people who need assistance with everyday tasks, home health programs provide nurses to assist with health care in the home or nursing assistants to help with the activities of daily living, such as dressing or bathing. One of the major sources of assistance to family care givers is respite services, such as in-home respite, adult day services, and overnight respite. Adult day-service programs may be organized on a medical or social model. Some programs provide specialized care for dementia patients, while others integrate cognitively impaired and intact people into the same program, or exclude cognitively impaired people altogether. Families often prefer hiring a home health aid to care for a relative at home, but aids are sometimes poorly trained or unreliable, and services are sometimes provided in a rigid and overly bureaucratic manner (MaloneBeach, Zarit, & Spore, 1992). Overnight respite remains relatively rare in the United States, although in the United Kingdom it has long been a cornerstone of efforts to support elders and their families.

Controlled trials of respite have had varying effects in lowering stress on family care givers, in part because the amount of help provided has been relatively small (e.g., Lawton, Brody, & Saperstein, 1989). When adequate amounts of help are provided on a regular basis, care givers' subjective appraisals of stress and depressive symptoms decrease (Zarit, Stephens, Townsend, & Greene, 1998).

The availability of services as well as funding mechanisms vary considerably from one community to another. To deal with these complexities, programs have been developed to help older people and their families identify and obtain the services they need. Called case management, care management, or similar terms, these programs assess an older client's needs and eligibility for a variety of services. Evaluation of case management programs suggest that they are moderately successful in increasing the appropriate use of services, and may be able to delay or decrease nursing-home placement in at least some cases (Greene, Lovely, Miller, & Ondrich, 1995). Funding remains a major issue, with most of the costs of community care for a chronically disabled person likely to be paid privately.

A major concern to policy makers is how to increase help to families without allowing formal services to replace informal care altogether. Noelker and Bass (1989) have described four patterns of care: (1) family only; (2) formal help that complements (i.e., gives help with different tasks than) the family; (3) formal help that supplements (i.e., gives help with the same tasks as) the family; and (4) formal help only. Little is known about the implications of these different patterns or under what circumstances formal help replaces family assistance.

Specialized Housing for Older People

Many different housing options are available for older people. Some types, such as retirement communities, are designed to enhance the lives of well-elderly or people who require little or no regular assistance. These settings do not usually provide care to older residents who become disabled while living there. The exception is Continuing Care Retirement Communities (CCRCs), which provide a full range of housing, from independent living to nursing home care. CCRCs require a large entrance fee, although subsequent care needs are covered by a monthly fee.

A wide range of settings provide care for people with chronic physical, cognitive, and emotional disabilities, including retirement homes, board and care homes, personal care, and assisted living. Most facilities have congregate meals available, as well as social activities. Some provide assistance with the activities of daily living as well as therapeutic services.

For people with significant disabilities, nursing homes remain the most widely available option. Nursing homes are chronically underfunded and are periodically subjected to intense scrutiny by the government or media because of reports of abuse or neglect. Fortunately, most nursing-home care meets the basic requirements for health and well-being. The model of care, however, emphasizes dependency rather than supporting areas of competence. Organized on a medical model as mini-hospitals, nursing homes treat residents as helpless and dependent. Care routines are organized according to what Parmelee and Lawton (1990) call the "autonomy-security dialectic," that is, stressing safety and security over promoting autonomous behavior by residents. Interactions between staff and patients often reinforce dependent behavior while ignoring or even punishing competent performance, a pattern that Baltes (1996) has called "dependency-support scripts."

Despite high rates of mental health problems among residents, most patients receive little or no mental health treatment. Clinical interventions, including assessment, treatment, and consultation with staff and families, can reduce problems associated with institutional care.

Alternative models have been proposed to create settings that support autonomy and independence. Assisted living facilities attempt to normalize the relationship of staff and residents by providing care in home-like settings and utilizing a variety of social, therapeutic, and environmental strategies for supporting the maintenance of remaining abilities. Within nursing homes, special care units (SCUs) are designed specifically for people with dementia. SCUs combine therapeutic goals to support independent functioning and environmental design to control wandering and other

problem behaviors. To date, evaluations of the effectiveness of assisted living and SCUs are limited.

Conclusions

The continued growth of the older population will place increasing pressure on families and on the formal care system to provide adequate assistance. Promising interventions have been developed that lower stress on families and which support the optimal functioning of elders. More work is needed, however, to extend the limited knowledge base for optimal approaches for assisting elders and their families, or for structuring specialized housing that maximizes remaining abilities rather than contributing to residents' dependencies.

[See also Retirement.]

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Steven H. Zarit

ELECTROCONVULSIVE THERAPY. The Hungarian psychiatrist L. J. Meduna (Meduna & Friedman, *Journal of the American Medical Association*, 1939, 112, 501-506) first proposed, in 1935, the use of induced convulsive seizures in the treatment of schizophrenia, based on a venerable but erroneous observation that epilepsy and schizophrenia were mutually incompatible disorders. He reasoned, somewhat loosely, that epileptic seizures somehow prevented the development of schizophrenia, and hence that artificially produced convulsive seizures might have therapeutic effects for schizophrenic patients.

The earliest attempts to induce convulsive seizures in this group of patients employed injections into the bloodstream of toxic chemicals, such as camphor in oil or a synthetic version thereof known in the United States as Metrazol, and the inhalation of an etherlike substance called Indoklon. Various difficulties were encountered with these methods of seizure induction, not the least being that some patients did not lose consciousness prior to onset of the seizure and experienced feelings of impending death, leading to extreme reluctance to submit to a second treatment (Kalinowski, in S. Arieti [Ed.], New York, 1959).

The preferred and now standard mode of achieving seizure was introduced by the Italian physicians Ugo Cerletti and Lucio Bini in 1938 (*American Journal of Psychiatry*, 1938, 94, Suppl., 107-113). Their standard technique, the basics of which remain in use today, was to apply, via electrodes placed in the temporal region of both sides of the head, "wall socket" alternating current (AC) at between 70 and 150 volts for 0.1 to 1.0 seconds. Electrical energy is thus transmitted through the brain, causing massive firing of the brain's circuitry.

Meanwhile, and pointing up the serendipitous nature of the discovery of electroconvulsive therapy (ECT), it was gradually learned that ECT was far more effective in producing recovery from severe mood disorder episodes than as an intervention for schizophrenia. The maximally effective therapeutic range thus includes major depression, especially where psychotic features are present, and bipolar disorder, including manic as well as depressive episodes. Occasionally, other types of mental disorder are also observed to be responsive. The mechanism of therapeutic action has never been adequately determined. Today, ECT tends to be employed only after other measures, for example, drugs, have failed, or where a suicidal emergency precludes the use of slower acting methods.

The more elaborate versions of contemporary ECT delivery machines permit deliberate presetting for virtually all pertinent parameters of the electrical stimulus, including duration, AC waveform, graduated intensity buildup, pulsating versus constant flow, and so on. The most important modification, perhaps, has been the now common use of a low-energy stimulus in the range of 5 to 40 joules of electrical energy. The consequent reduction of current density is believed to minimize the usually short-term, posttreatment cognitive disturbances that are frequently upsetting to patients and their families. Normally, ECT is given three times weekly.

It is also believed by many practitioners that non-dominant side (that is, right for right-handed persons) unilateral placement of the electrodes—in contrast to the standard bilateral placement—further reduces the likelihood of memory and other cognitive disruptions, without diminished therapeutic effectiveness. Available research does seem to indicate lessened cognitive dysfunction with unilateral placement, but is more equivocal on the question of relative therapeutic efficacy (Janick et al., Baltimore, 1993).

Another important modification of earlier practice is that of premedicating patients who are about to undergo ECT. Two types of brief-acting premedication are generally used, a barbiturate to induce sedation, and a curarelike drug (succinylcholine) to block violent muscle activation in response to nervous system seizure. The latter measure has virtually eliminated the injuries, such as vertebral fractures, that were once a fairly common consequence of ECT. Unfortunately, both these types of medication can enhance other risks, such as cardiac arrest, during ECT administration. Accordingly, the presence of adequate resuscitation resources, including anesthesia personnel and oxygenation equipment, are now widely considered to be essential aspects of the procedure. The contemporary mortality rate per course (usually under ten treatments) of ECT is approximately 1 in 10,000 and compares favorably with

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the mortality rates of untreated patients having diagnoses comparable to those considered highly responsive to ECT.

Despite the apparent relative safety of modern ECT, it continues to evoke aversive reactions among many members of the public, including many members of the mental health professions. In November 1982 the citizens of Berkeley, California voted to ban the use of ECT within that city, an action that was later judicially overturned. In fact, there remains some concern about possible long-term cognitive impairment in some patients treated with ECT (Breggin, New York, 1979). In 1985, a Consensus Development Conference on the use of ECT sponsored by the National Institute of Mental Health (NIMH) essentially concluded that the benefits of ECT far outweighed its risks (NIMH, Bethesda, MD, 1985).

Most practitioners do not consider ECT a "cure" for the underlying depressive or bipolar disorder. It is employed primarily as a means of interrupting the current episode of mood derangement, and there is some evidence that its employment reduces the interval between the present and the next episode, relative to episodes that terminate spontaneously. Accordingly, ECT is usually followed up by the prophylactic administration of mood-regulating drugs.

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Robert C. Carson

ELECTROPHYSIOLOGY. See Cognitive Electrophysiology.

ELEMENTARY COGNITIVE TASKS. Successful performance on conventional psychometric tests of mental ability, such as an IQ test, typically involves various cog-

nitive processes, which include attention, discrimination, learning, memory, recall, recognition, generalization, judgment, inference, inductive and deductive reasoning, and verbal, spatial, and numerical problem solving. An individual's total score on a complex test, which results from the combined action of a number of such processes, does not reveal which particular ones were involved or to what extent various ones may account for individual differences in test scores. To research these theoretically important questions analytically, cognitive psychologists have used elementary cognitive tasks (ECTs).

ECTs are a class of cognitive tasks, each of which is intended to measure some much smaller number of cognitive processes than is involved in typical psychometric tests. The simple performance requirements of the ECT are explained to the subject and practice trials insure that subjects understand and can execute the task requirements. The ECT is usually so simple that all subjects can perform the task with few, if any, errors. Typically, errors are counted but do not enter into the principal score. The measure of interest is not the correctness of response (since everyone can perform the task), but the response time in performing the test averaged over a large number of trials. Most ECTs are so simple that the response times, measured in milliseconds (ms), are typically less than 2,000 ms and often less than 1,000. Modern research on ECTs uses microcomputers. The subject views a monitor screen; following a "ready" signal, the reaction stimulus appears and the subject responds by pressing a key on a keyboard or a specially devised response console. The response time is the time interval between the onset of the reaction stimulus and the subject's response (e.g., pressing a key).

The ECTs most frequently used in research are:

- Simple response time to the onset of a single visual (or auditory) stimulus to measure the speed of the stimulus apprehension
- Choice or discrimination response time, when there are two or more alternative responses, only one of which is cued
- The oddity problem, responding to the "odd-man-out" among three or more alternatives
- Identifying whether a pair of letters (or words) are either physically or semantically the same or different, to measure speed of access to verbal codes in long-term memory
- A visual scan of a series of letters (or numbers) in search of a previously targeted letter (or number)
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With a sufficient number of trials, each of these ECTs yields highly reliable measures of speed of information processing. The various ECTs are moderately correlated with each other and, taken singly, are also correlated with conventional estimates of psychometric g , such as IQ, mostly in the range of $-.20$ to $-.40$. The size of the correlation is generally a positive function of the complexity of the particular ECT. Composite scores based on a number of different ECTs have considerably larger correlations with IQ, but seldom larger than about $-.60$. ECTs and mental chronometry are recommended not as a replacement for standard psychometric tests, but as analytic tools for studying the nature of individual differences in information processing.

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Arthur R. Jensen

ELEMENTARY EDUCATION. Over the twentieth century, psychology has had a varied influence on American education both in the areas of measurement and learning. Some of the major areas for which the psychology of learning has had an impact on American education are teacher training, curricula, and instructional innovations. Historical developments in the marriage of psychology and elementary education are described as part of an ongoing attempt to apply theory

and research to the important and challenging issues of educating young children.

Early Applications of Psychology

Psychology in America often starts with a discussion of William James, and so too does the application of psychology to elementary education. James's impact on education is for the most part indirect, through his text *Principles of Psychology*, which influenced educational psychologists like Edward L. Thorndike and John Dewey. James more directly focused on education in his *Talks with Teachers* in 1891. He believed that psychology was relevant to education but often doubted there were sufficient data to support its direct application. In spite of his doubts, James suggested that psychological ideas about memory and associations supported more recitation and hands-on learning, both major shifts from the didactic instruction common in elementary education at the time. Joseph Mayer Rice and Dewey later reiterated this call for more active learning. James, however, was no champion of teachers and his interest in making applications of psychology to education was shallow. He had little respect for teachers and typically did not enjoy his contact with them (Berliner, 1993).

Joseph Mayer Rice, a physician turned journalist, was the first to conduct applied research in classrooms. Rice visited schools across the country and what he described was often memorization and boredom. Although he did describe good schools with inspiring teachers, he felt they developed in spite of the system, which supported didactic instruction. In an observational study of spelling instruction in 1895, Rice found no correlation between mindless drill instruction in spelling and math and students' achievement on tests of spelling and math (Rice, 1914). As a result, Rice severely questioned educational practices of the day and promoted applying empirical classroom research to identify effective instructional practice. Rice, however, was at least 20 years ahead of his time, and school administrators' belief in faculty psychology (the grounding for mindless drill) caused his ideas to fall on deaf ears.

During this same time, G. Stanley Hall began his studies of children and what they knew, ultimately giving rise to developmental psychology and the study of individual differences. Both fields later had a variety of effects on elementary education. Perhaps one of the most profound effects Hall had was on the students he trained, including Louis Terman, Raymond Cattell, and John Dewey. Terman and Cattell were central to studying human abilities, particularly intelligence. Dewey, on the other hand, focused on the educational process.

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dren's minds are empty vessels to be filled with information. He believed that it was important for students to respond and participate actively in learning activities; in particular, he felt that knowledge was useful only to the degree the learner was able to use it in solving problems (Dewey, 1929). Dewey also argued that knowledge was interpreted depending on the context, and, therefore, learning needed to be contextualized in naturalistic problems (Berliner, 1993).

Dewey was a strong believer in the use of the scientific method to develop pedagogy and study its impact on children. He believed it was necessary to study psychology in the classroom because the complexity of classroom instruction could mitigate or alter the findings of psychology (Dewey, 1929). Like Rice before him, Dewey called for an applied scientific study of teaching. He started a school to further this goal of empirical research on teaching and promote his more active and engaging curricula and pedagogy. Through this study, Dewey became interested in the effects of students' interest and motivation in learning activities (Berliner, 1993), perhaps the earliest recognition of task value and intrinsic motivation in classroom research.

Dewey did not engage in extensive study of any of these topics but, instead, evolved into more of a philosopher than a psychologist. He challenged both education and psychology to consider education within a broader context. Teachers, he believed, lived at the crossroads of psychology, politics, and social practice. To address educational issues, it was necessary to consider the social, political, and policy issues imbedded in them (Dewey, 1929). At the same time, he challenged the reformers as well, criticizing the progressive education movement for not evaluating the impact of their principles on students. Without such scientific self-evaluation, Dewey felt the progressives were just as dogmatic and anti-intellectual as traditional educators (Smith & Smith, 1994). Although his career was primarily known for his philosophy, Dewey continued to press for applications of science and psychology in education.

Edward Thorndike was a peer of Dewey's and is often called the father of educational psychology. Like Dewey, Thorndike strongly supported the application of the scientific method evolving in psychology, and he himself was a leader in studying the psychology of learning as related to education. Perhaps the first major impact that Thorndike had on education was his research with Robert Woodworth that debunked the mental discipline notion of learning. Their studies changed the idea that school subjects were only to strengthen the faculties of the mind (like perseverance, neatness, and memory), arguing instead that school subjects should develop skills and knowledge that are useful and applied. The research became central to

the move to more utilitarian notions of curricula in schools.

Thorndike's conceptions of school subjects as having an applied and useful purpose became an overarching goal as he began to look more closely at applying psychology to teaching and learning. His research was at least in part due to his observations of his own children's school experiences. For example he noted his 11-year-old son had spelling words like "marasmus" and "phthisic." This observation, and undoubtedly some parental anger, motivated Thorndike to go into a study of word frequency as a means to identify words most commonly used in children's literature, textbooks, newspapers, correspondence, and other sources. From his word study, Thorndike developed a list of 10,000 common words, which he used to make spelling books and vocabulary lists. The thought was that spelling and vocabulary should focus on the words children are most likely to encounter and build up from there.

Thorndike's word lists also came into play in perhaps one of his most enduring impacts on education, the Thorndike dictionary. He responded to seeing his children struggle to use dictionaries where words were often defined using more difficult (less frequent) vocabulary, for example, *bear* defined as a carnivorous, quadruped (Thorndike, 1991). Thorndike, again, applied his psychological research and logic to redesign the dictionary. The words in the Thorndike dictionary were defined using only easier words than the object word, to make the definitions understandable. The definitions for words were in order of use, so the reader would encounter more frequent uses before the more esoteric ones. He also added pictures to the dictionary for the first time and used the object word in an example sentence to clarify further the definition through context. The Thorndike dictionary was revolutionary in its time and became a classic.

Thorndike also looked at mathematics and reading instruction in public schools and voiced concern for needed changes. For example, in mathematics Thorndike pushed for meaningful, real-world word problems and less emphasis on straight computation. In reading, Thorndike's observations were insightful as well. He argued that reading is reasoning and that reading instruction should be more than just "word calling"; reading instruction should involve students in reading interesting and thought-provoking stories. In his study of good and poor readers in sixth grade, Thorndike found that some readers knew when they were comprehending or not comprehending what they read, whereas poor readers often did not. Finally, Thorndike, like many of those who followed, argued that schooling should teach students by beginning with their existing knowledge or skills and building upon those, understanding that education must "take its lead from hu-

man nature as individually expressed" and lead the student to increased knowledge.

Thorndike's view of education, however, was overly mechanistic; he believed that it could be studied solely in the laboratory. This translated to a disdain of applied research in schools. He also recommended that teacher preparation should require no time observing or working in schools, instead preservice teachers should "read all they could about education in order to learn what was happening in the schools" (Berliner, 1993, p. 61).

Perhaps the lack of direct connection to schools and applied research was both Thorndike's and educational psychology's fatal weakness. Although the issues psychological research raised and psychologists' recommendations for change seemed appropriate, their impact on schools and the processes of education were minimal. Psychologists were likely to be perceived by teachers and the public as more interested in understanding and describing learning rather than in applied issues in classroom instruction (Berliner, 1993). Most educational psychologists during the first half of the twentieth century did not get actively involved in classroom practice or educational policy issues. As a result, by mid-century educational psychology was notably detached from schools.

Behavioral Movement in Schools

During the 1950s and 1960s, educational psychology became reconnected with school learning as an applied area of research of behavioral theories of learning. In 1954, B. F. Skinner visited his daughter's fourth-grade classroom and became very interested in applying his research to teaching humans. He was convinced that learning could be very effective with appropriate analysis of behaviors, active responding, shaping, and judicious use of reinforcement schedules. Skinner thought the greatest problem of classrooms was the infrequency of reinforcement for student behavior and the excessive use of aversive control (Skinner, 1954). Skinner believed that immediate positive reinforcement of correct responses would greatly promote learning. He also felt that through the use of the principles of behavior analysis and shaping, one would be able to see "learning take place" (Skinner, 1954, p. 86).

Skinner also recognized the real limitations to implementing these principles in a classroom with one teacher and thirty students, so he developed a teaching machine. The teaching machine presented small pieces of information to students, gave them response opportunities, and provided immediate reinforcement. By 1954, he was demonstrating a simple learning machine that presented spelling and arithmetic activities; this was clearly the precursor to modern instructional technology and web-based learning.

Although Skinner's teaching machines did not have

a great impact at the time, his focus on behavior analysis did. One long-lasting result is the conceptualization of behavioral or instructional objectives as explicit statements of the focus of an instructional episode. Robert Mager and others became great proponents of objectives, and many teachers trained in the late 1960s and early 1970s still cringe at memories of writing objectives to the point of monotony. Unfortunately, the connection of the objective to the instruction and assessment was often lost in the training.

Skinner believed that one of the most difficult problems in learning in schools was that all students were held to learning at the same rate, proceeding at the same pace through instruction. He called this "the greatest source of inefficiency in the classroom." He believed that slow learners suffered disastrous consequences by being pressured to progress at a faster pace than their own ability to learn permitted. He thought this produced gaps in learning that had profound cumulative effects on the slower learners. Unfortunately, his solution was for schools to use teaching machines.

The idea of differential learning rates took hold in the learning community, and John Carroll and Benjamin Bloom worked to apply it to school learning. Carroll developed his model for school learning where each individual's aptitude resulted in differential learning rates, and the amount of time allowed for learning (opportunity to learn) needed to vary according to the learning rate of the student (Carroll, 1989). Carroll also called for educational psychologists to become more focused on solving learning problems encountered in school, reinvigorating the relationship of psychology to education. Benjamin Bloom expanded on Carroll's model to include the quality of instruction along with the opportunity to learn and student aptitude in what became mastery learning. Both Carroll and Bloom believed strongly that any student could learn if given sufficient time and conditions for learning (Bloom, 1976). For the most part, programmatic research on mastery learning showed achievement advantages for students in mastery learning. Various forms of mastery learning spread through the nation's schools and for a time were well accepted. Eventually, however, teachers complained of the inflexibility of the model. Perhaps the most long-lasting impact is that the concept of mastering content and opportunity to learn are now foundational concepts in education and teacher training.

Open Education Movement

Other models of classroom instruction took their theoretical base from developmental psychology, rather than learning theory. Perhaps the most prominent being the open classroom, which was loosely based on Piagetian theory, although some have criticized open education as an inappropriate reading of Piaget's ideas

of education. Open education involved children in unstructured self-exploration of the learning environment. Children initiated learning activities based on curiosity and interest. Research did find more positive attitudes among students in open classrooms, but in all large well-designed studies, students in traditional classrooms achieved significantly higher than those in open classrooms. Over time, too, teachers became disenchanted with the lack of structure in classrooms, finding it difficult to manage a classroom where twenty-five students were all doing different things.

Increased Federal Government Involvement

In the 1960s, there was rapidly increasing federal government involvement in education brought about by two major historical events: the launching of Sputnik starting off the space race and the sociopolitical movement against poverty launching President Lyndon B. Johnson's Great Society Programs. These events focused the public and politicians on improving schools and, in particular, using schools as a vehicle to raise people out of poverty. This opened the door for approaches like mastery learning that promoted success of all students. It also focused financial resources on curricular and programmatic development to address school learning. The most notable curricular developments were in math and science. These advances typically involved content experts more than educational psychologists and provided schools with laboratory-based science curricula and new math curricula. The programmatic developments revitalized the study of learning and instruction in schools and revitalized application of psychology to education.

As part of the Great Society Programs' attempt to combat poverty through education, the Head Start preschool program was developed to better prepare low-income children for school. Although the short-term effects of the program were positive, after one or two years of elementary school, the Head Start children lost any achievement advantages. As a result researchers and politicians called for programmatic efforts for students in elementary school to "follow through" on the successes of Head Start for low-income students. The result was a large federally funded study implemented nationwide called the Follow Through Planned Variation Study. The mission was for research institutes and universities to develop programs based on current theory and research in learning, development, and sociology. Thirty programs received federal funding and their approaches ranged from parent education to redesigned elementary education. The education models were equally varied, being based on humanistic psychology, child development, and behavioral theories of learning. As a result, the instruction ranged from discovery learning to programmed learning to teacher-

directed instruction and combinations of the three. Taken as whole the instructional models represented nearly all aspects of psychology that could be applied to issues of classroom learning for elementary-age children (Stanford Research Institute, 1972).

A nationwide evaluation of these models was to determine the effectiveness of the programs as contrasted to traditional instruction and to investigate the instructional processes that led to achievement outcomes. In general, the findings supported teacher-directed models that actively engaged students in academic activities and interactions with the teacher. The three programs that were most closely tied to current learning theory produced positive effects on students' achievement. Programs that were loosely based on humanistic or developmental theories had achievement that was no better than traditional instruction, and, in particular, open unstructured models where children determined what they would study produced poorer achievement than traditional instruction. Some of the effective models continue to be used in schools today.

Concurrently, with the Follow Through study, a number of educational psychologists became interested in determining what processes or behaviors resulted in more effective classroom instruction, called teacher effectiveness research. Led by Nate Gage, Barak Rosenshine, Jere Brophy, and David Berliner, researchers used experimental and correlational studies to determine what made teachers effective. The research culminated in synthesis studies that delineated the behaviors and processes of effective teachers in a teacher-directed style of instruction with an academic focus, frequent student participation guided by the teacher, and positive and corrective feedback to student responses (Rosenshine & Stevens, 1986). Teaching functions have become integrated in textbooks for preservice teachers and many school districts have given training workshops to develop classroom teachers' skills in these behaviors.

Cognitive Psychology's Impact on Instruction

During the 1970s, learning theory underwent an evolution from behavioral to cognitive theory, where learning was considered a more active process involving learner input and interpretation, a more complex process than what can be described through reinforcement mechanisms. Many of these developments were due in part to increased federal funding for basic research in reading, math, and science learning. Cognitive psychology suggested that teacher-student and student-student interaction served important learning functions as learners made connections between new information and their prior knowledge (Wittrock, 1986). Instructional models based on cognitive theory stressed student interactions guided by the teacher, such as re-

reciprocal teaching (Palincsar & Brown, 1984), cooperative learning (Stevens, Slavin, & Farnish, 1991) and cognitive apprenticeship (Collins, Brown, & Newman, 1989). Research evaluating more interactive models of instruction has been generally positive although effective implementation requires intensive training of teachers (Rosenshine & Meister, 1994).

Beyond innovations in instructional processes, cognitive psychology has changed the content of what is taught. In both reading and writing, there is a stronger focus on strategic instruction. In part, strategies were derived from cognitive research on students who developed proficiency in reading comprehension and writing. Similarly, cognitive research in math has acted as a catalyst for problem-solving strategies and problem-based learning (Schoenfeld, 1985). Effective instruction still is viewed as teacher structured, actively engaging and interactive, but our increased understanding of different instructional tasks has helped increase our understanding of how to vary instruction to meet the demands of less structured kinds of learning.

Summary

Historically, the relationship between educational psychology and elementary education has been mixed. At times, educational psychology research has been at best tangentially related to educational practice. Yet, over time two important concepts emerge from educational psychology that have gradually shifted the way we think about learning in elementary school. All of the predominant research has focused on (a) students' opportunity to learn and master material, and (b) changing instruction to engage students more actively in learning.

Elementary education will continue to benefit from advances in educational psychology so long as educational psychology focuses on solving ecologically-pertinent questions that have implications for educational policy. Certainly, there has been a growth in that direction with researchers working in collaboration with teachers in classrooms and engaging in meaningful dialogue with administrators and policy makers concerning issues of learning in schools. The evolution of the relationship between educational psychology and elementary education to the point of collaboration and dialogue certainly bodes well for future applied research that both adds to our knowledge and has an impact on education practice.

[Many of the people mentioned in this article are the subjects of independent biographical entries.]

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Robert J. Stevens and Jennifer R. Duffy

ELLIS, HENRY HAVELOCK (1859-1939), English physician and sexologist. Born in Croydon, England and trained as a physician, Ellis dedicated most of his career to writing on subjects as diverse as literary criticism, philosophy, criminality, eugenics, psychology of sex,

reciprocal teaching (Palincsar & Brown, 1984), cooperative learning (Stevens, Slavin, & Farnish, 1991) and cognitive apprenticeship (Collins, Brown, & Newman, 1989). Research evaluating more interactive models of instruction has been generally positive although effective implementation requires intensive training of teachers (Rosenshine & Meister, 1994).

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color sense, sex differences, drug effects, and genius. Although he was a prolific author on psychological matters, Ellis remains a relatively unknown figure in the history of psychology, an obscurity due in large part to the fact that he neither trained in psychology nor held an academic position. Only recently have scholars examined the influence of Ellis on psychology, particularly his approach to the study of sexual deviance.

Most of Ellis's wide-ranging studies share a theoretical reliance on evolutionary theory. Drawing upon the work of Darwin and other evolutionists, Ellis selected among these writings, produced his own version of social and biological evolution, and then extended it to explain various psychological processes. Among the evolutionary tenets in his work are notions of variation, inheritance of characteristics, latency (the quiescence of an inherited trait for one or more generations followed by its reappearance), recapitulation (individual development recapitulates development of the race), natural and sexual selection, and the social evolution of customs and habits.

The application of evolutionary notions to human psychology is evident in Ellis's *Man and Woman: A Study of Human Secondary Sex Characteristics* (London, 1894) which arguably was the first systematic text published on empirical studies of the psychology of sex difference. In addition to asserting the necessity for conducting empirical studies of sex difference, Ellis also sought to distinguish "natural" or biologically based sex differences from "artificial" or socially induced differences, an aspiration which remains central to contemporary sex difference studies. He also distinguished between sex differences that are primary, secondary, and "tertiary" (characteristics such as intelligence and metabolism). He utilized an evolutionary criterion to assess differences in numerous characteristics including head size, affectability, intellectual impulses, and the variability of these characteristics. This evolutionary measure relied upon the idea of recapitulation in that Ellis classified the various characteristics as resembling either the human child or the savage: on this scale characteristics more resembling the human child represented a progressed degree of evolution. Ellis concluded that women were more akin to the child prototype, and hence, not only were they the more advanced sex but men were evolving after the female type. Especially in his later writings, however, Ellis warned that social progress and the realization of women's fuller participation in society might impede the manifestation of natural traits. He thus held that such social experiments would only be beneficial if they were consistent with biological evolution.

Ellis's better known work on the psychology of sex appeared in his multivolume *Studies on the Psychology of Sex* which began with the *Study of Sexual Inversion*, (London, 1897). Evolutionary theory was employed to argue that sexuality and reproduction were separate phenom-

ena; to establish what constituted "normal" sexual expression; and to explain types of sexual deviance, especially "inversion" or homosexuality. Sexual inversion was, according to Ellis, an organic variation of evolved characters, yet he believed that homosexuality was not a disease, as many of his contemporary sexologists claimed. By naturalizing homosexuality and by similarly justifying various sexual activities (including masturbation) as natural, higher-order acts, Ellis conveyed a sentiment of tolerance and open-mindedness.

Ellis's legacy, then, resides in his elaborate typologies, distinctions between natural and social, and in taking an open-minded attitude toward sex. Ellis is distinctive in his idiosyncratic meshing of liberal politics with scientific determinism and a philosophy of enlightenment with a dutiful reverence toward the hard empirical facts of nature. His works and ideas not only influenced psychologists who would later undertake empirical studies of sex and sex differences but also lay readers who were informed by his popular books and articles.

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Jill Morawski

EMIC-ETIC THEORY. See Cross-Cultural Psychology, article on Theories and Methods of Study.

EMOTION. [This entry comprises three articles: a broad overview and description of the term, including a brief history of the study of emotion in the field of psychology and a survey of the various kinds of emotion; a review of the principal theories of emotion, including those from various subdisciplines of psychology; and a discussion of the methods used to research and measure emotion and mood.]

An Overview

Psychology has witnessed a renaissance of interest in emotion. Emotion is now a central theme in neuroscience, development, personality, psychopathology, and culture. Although researchers approach emotion with

different measures and theoretical backgrounds, most agree in defining emotions as brief, rapid responses involving physiological, experiential, and behavioral activity that help humans respond to survival-related problems and opportunities. Emotions are briefer and have more specific causes than moods.

History of the Study of Emotion in Psychology

Emotion was a central interest to theorists who pioneered the science of psychology. In *The Expression of Emotions in Man and Animals* (1872/1988), Charles Darwin provided evidence of universality, continuity across different species, and explanations of why particular expressions are shown for particular emotions. In his 1884 essay "What is an emotion?" William James advanced two propositions that are the impetus of research and argument to this day: Each emotion is defined by specific physiological responses; and the experience of emotion follows rather than precedes the behavioral response of emotion.

The scientific study of emotion, however, would wait until the late 1960s to begin to emerge as a subdiscipline of psychology in its own right. Behaviorists who dominated psychological research during the 1930s, 1940s, and 1950s were skeptical of studying seemingly unobservable emotions that would prove difficult to measure with means other than introspection. The cognitive revolution in psychology of the 1960s, 1970s, and 1980s gave priority to cognitive and informational explanations over motivational and emotional explanations of human behavior.

The renaissance of interest in emotion has several origins. The theorizing of Sylvan Tomkins in the early 1960s directed a generation of researchers to consider the biological bases of emotion and the role of expression in emotional experience. Schachter and Singer's two-factor theory of emotion of 1962, which held that emotion is the result of the context-determined labeling of physiological arousal, had appeal because it seemed counterintuitive. Cognitively oriented theorists such as Herbert Simon posited that emotions serve functions within information processing systems. The study of stress and coping led researchers to consider different kinds of stress in the form of specific emotions. Finally, the cross-cultural studies of Paul Ekman and Izard, first published in 1969, demonstrated that facial expressions of emotion were universal, challenging the prevailing view that emotions, like the sounds of language, were culturally specific.

Questions, Issues, and Tensions in the Study of Emotion

The study of emotion is guided by a set of interrelated questions whose answers vary according to the theoretical perspective of the researcher. First, what is an

emotion? How do emotions differ and resemble each other and other psychological entities, such as sensations and moods? Is it most productive to develop theories about emotion in general, or about specific emotions or classes of emotions, such as the self-conscious, approach-related, or positive emotions? Are some emotions more basic than others, in the sense that more basic emotions are simpler, irreducible, and biologically based?

Second, what are the causes of emotions? To understand the proximal causes of emotion, researchers have examined how cognitive appraisals, expressive behavior, and physiological response contribute to the intensity and quality of emotional experience. Other researchers have considered the more distal processes that account for the content of emotion, addressing which aspects of emotion might be closed systems, predetermined by genetic code and biological maturation, and which aspects of emotion are open systems totally written by learning and culture, and which aspects are partially open.

Finally, why do humans have emotions? What functions do emotions serve? What adaptive problems do they solve? Theorists since the classical philosophers have often assumed that emotions disrupt rational, adaptive behavior. More recently, theorists, inspired by evolutionary theory, have argued that emotions solve specific problems essential to human survival, such as forming attachments, fleeing predators, or allocating collective resources. Researchers have likewise considered the functions of the different emotional responses, asserting that the facial, postural, and vocal display of emotion communicates important information to others, the physiology of emotion helps prepare individuals for quick action, and the experience of emotion serves to organize cognitive processes. These three general questions—what emotions are, what causes them, and what their functions are—motivate the different research traditions described in the ensuing sections.

Research on Different Aspects of Emotion

Research on different aspects of emotion has focused on how emotion is communicated, how it is registered in the autonomic and central nervous systems, and how it relates to cognitive appraisal, language, and judgment.

Communication. Information about what emotions are being experienced is conveyed by a person's facial expression, gaze activity, posture, gesture, voice, and spoken word. The research on the communication of emotion has centered on three related questions. First, is the experience of different emotions encoded or communicated in distinct behaviors? Second, do individuals accurately decode or interpret other individuals' emotions from their expressive behavior? Third, can individuals disguise their emotional reactions or fabricate

emotions they are not experiencing, and if so, what is the nature of that emotional experience?

Most studies have focused on people's abilities to interpret emotional expression. The initial studies of Paul Ekman and also of Carroll Izard presented photographs of theoretically derived facial expressions of emotion to individuals in different literate cultures and had those individuals judge the emotion shown. Ekman also did such studies with people who had little exposure to Western culture—the Fore of New Guinea. In those studies and dozens that followed, individuals from different cultures accurately identified facial displays of anger, disgust, fear, happiness, sadness, and surprise, in some studies shame and contempt, and more recently embarrassment and amusement. In one of the only cross-cultural studies of emotional expression (rather than recognition), Ekman found that American and Japanese students displayed similar emotional behavior when alone, but showed much different, culturally proscribed emotional displays when in the presence of an authority figure.

Subsequent research has focused on the nature of emotion perception and the functions of facial expressions within social interactions. Studies have ascertained that the perception of facial expressions is categorical, and that people may be biologically prepared to respond to certain expressions in adaptive ways. For example, when people are presented with facial displays of anger, even at subliminal levels, they respond with fear. Studies of parent-child interactions have found that facial expressions reward children for certain behaviors and discourage them from more dangerous behaviors, such as approaching a visual cliff.

Other researchers have investigated the acoustic properties of different emotions, motivated by the assumption that emotion is encoded in distinct acoustic properties that are reliably decoded by observers. Although the research is less extensive, findings indicate that different emotions are signaled by distinct acoustic properties, such as rise time and pitch, and that the acoustic signals of emotion play an important role in social interactions, for example, those between parent and child.

Autonomic Nervous System. William James argued that each emotion, from anger to aesthetic rapture, is defined by a distinct pattern of ANS activity, evident in changes in heart rate, breathing patterns, sweating, and other responses, that supports adaptive action. Walter Cannon and Carl Lange countered that emotions could not be associated with discrete ANS responses, which are too diffuse and slow to account for rapid and differentiated emotional responses.

To this day, the question of whether emotions involve discrete ANS responses is hotly contested. Studies have documented some emotion-specific ANS responses when people move emotion-related facial muscles or re-

live emotional experiences. For example, fear, anger, and sadness, compared to disgust, are associated with increased heart rate elevation, and anger is associated with increased blood flow to the hands, compared to fear. Critics have noted that these studies do not differentiate the ANS activity of certain emotions. Other studies have documented specific ANS responses associated with other emotions. The increased capillary blood flow in the cheeks associated with blushing and embarrassment differs from fear-related ANS activity, while parasympathetically mediated crying associated with sadness differs from nonemotional crying. Sympathetically mediated piloerection, the contractions of muscles surrounding the hair follicles on the neck, is another little explored ANS response related to specific emotions. More recent work by Stephen Porges has documented the role of parasympathetic ANS activity in stress responses and emotional communication.

Central Nervous System. Researchers examining central nervous system (CNS) activity have been motivated by such questions as: What is the CNS activity associated with each emotion? As emotions unfold, are different CNS structures and processes involved? Using such techniques as EEG, which measures electrical activity on the surface of the scalp, PET and functional MRI, which are slower in resolution than EEG but allow researchers to examine more specific brain sites, researchers have begun to make progress in understanding the CNS activity associated with emotion.

One of the first systematic attempts to examine emotion and the central nervous system was undertaken by Richard Davidson and his colleagues. Motivated by an approach-withdrawal framework, they have shown that approach-related emotions, such as happiness, correlate with relative left hemispheric activity, whereas withdrawal-related emotions, such as disgust, correlate with relative right hemispheric activity.

Other researchers have attempted to identify more specific CNS structures or systems that relate to emotion. Jaak Panksepp has posited that specific CNS structures and neurotransmitter systems relate to emotion systems related to play, expectancy, flight, and fight. Recent evidence by Joseph LeDoux compellingly demonstrates that the amygdala, a portion of the midbrain, provides an immediate emotional evaluation of stimuli, which is integrated with other kinds of information about the stimulus.

Cognitive Appraisal. Consistent with the formulations of Aristotle and Sartre, certain researchers have defined emotions as the products of appraisals of environmental events relevant to the individual's goals and well-being. Rapid, automatic appraisals of environmental events are believed to be the proximal causes of emotional experience. Although it is difficult to measure appraisal processes directly, the study of emotion-related appraisal is a central area in emotion research.

Richard Lazarus's theory of appraisal posits that each emotion is defined by a discrete "core relational theme," which is the specific appraisal of the individual's interaction with the environment that produces an emotion. For example, anger is produced by the appraisal that a demeaning offense has occurred against me or that which is mine. Dimensional appraisal theorists such as Ira Roseman, Klaus Scherer, Craig Smith, and Phoebe Ellsworth have proposed specific patterns of appraisal that differentiate the emotions, such as the valence, causal agency, effort, and certainty of the event. The advantage of a dimensional approach is that it can account for similarities in emotions and the transitions between them.

Language and Representation. Poets, therapists, and romantic partners all struggle to put emotions into words. The study of the language and representation of emotion reveals that people represent emotions with specific words, metaphors (e.g., emotion as a natural force), and complex narratives.

Studies of the words people use to describe emotions have addressed basic questions in emotion research. For example, members of different cultures classify emotion words into categories that resemble the categories for which there are facial expressions of emotion, suggesting that the organization of the emotion lexicon corresponds to the biological constituents of emotion. In contrast, reviews of the emotion lexicons of different cultures find variation in the emotions that are represented lexically as well as the number of emotion words (English has about 2,000, whereas the Ifaluk of Micronesia have 56). Certain distinctions made in English, between fear and shame for example, reportedly are not made in other languages; conversely, emotions represented by single words in other languages, such as the Czech *listost*, defined as the sudden realization of tragic circumstances, are not found in single English words.

Other researchers have studied how the representation of emotion is learned and influences emotional response. For example, mothers tend to talk about all emotions except anger to their girls more than their boys, which may account for why women appear to talk more about emotional events. Other researchers have addressed how the labeling of emotional experience changes the emotion, which has intrigued psychologists from Sigmund Freud and William James and is relevant to clinical treatment and certain psychological disorders, such as alexithymia, which is defined by a pronounced absence of emotion words. Evidence indicates that the labeling and written representation of stressful experiences gives structure and coherence to the experience and reduces the likelihood of health-related problems.

Judgment, Perception, and Memory. The widespread assumption that emotions influence judgment, memories, and perception has motivated research on

the effects of emotions on cognitive processes. Evidence indicates that emotions influence the content of cognitive processes: Positive and negative emotions influence memories from the past, levels of optimism, and personal satisfaction in valence-specific ways. Emotions also exert more specific influences on cognition: Anger but not sadness leads people to accentuate the injustice of others' actions. Finally, emotions influence the style of information processing: Anger and happiness lead to more automatic, heuristic, and less careful judgments, whereas sadness and fear are associated with more controlled, systematic, and careful judgments.

Research on Specific Emotions

Whereas certain researchers focus on the general properties of emotions, others focus on specific emotions. The same questions motivate such research: What are the defining properties, causes, and functions of specific emotions? The conceptual focus, however, is on single emotions or conceptually related families of emotions.

For example, several investigators have examined the forms and functions of the so-called self-conscious emotions, which include shame, embarrassment, guilt, and pride. Early emotion theorists defined these emotions as slight variations of the same emotion. Recent empirical work however, suggests that although embarrassment, shame, and guilt all remediate previous social transgressions, these three emotions have different antecedents, appraisals, and experiential properties, and in the case of embarrassment and shame, different facial displays. Other similarly motivated research has ascertained distinctions between jealousy and envy. More recently, theorists have speculated about possible differences between such little-studied positive emotions as amusement, contentment, relief, and sensory pleasure. Finally, other researchers have focused on variations within a category of emotion, as in Paul Rozin's study of the different kinds of disgust about death, gore, and moral violations, and their variations of the facial expression of disgust.

Related Topics in the Field of Emotion

Research on the aspects of different emotions has inspired researchers to look at how emotions emerge in the course of development and relate to individual differences and psychopathology.

Development. Emotions play a critical role in development. Consistent with the influential theorizing of John Bowlby, from the first day of the child's life emotional exchanges between parent and child contribute to the development of attachments. Parents' emotional displays are an essential source of information about the environment for the child. Learning how to regulate emotions appropriately, and to respond with embarrassment and shame following social transgressions, are important components of socialization.

Developmental psychologists have addressed several important questions regarding emotion. One of the first is the order in which children first display and understand emotions. Typically, researchers relate the emergence of specific emotions, such as fear or embarrassment, to the emergence of related abilities, such as motoric development or self-consciousness. Developmental psychologists have also advanced the understanding of certain functions of emotional expression in attachment processes. Finally, developmental psychologists have examined the processes by which young children develop the understanding of emotions and learn to talk about their emotions in social interactions, such as family conflict.

Individual Differences. Consistent with early theorizing about emotion and personality, researchers have made important discoveries concerning how and why individuals vary in the intensity and quality of the emotional experience. First, individual differences in emotion emerge in the first months of life and are quite stable during development. Second, basic dimensions of adult personality, in particular neuroticism and extraversion, consistently relate to the tendency to report and display increased negative and positive emotion, respectively. Third, the life histories of individuals prone to different emotions differ profoundly. For example, people prone to anger are less successful in love and work, whereas people prone to happiness are more successful. Finally, researchers are now investigating the distal etiological causes of individual differences in emotion, such as levels of serotonin or family conflict, and proximal causes such as individual variation in emotion thresholds or environmental events.

Psychopathology. The notion that deviation in emotional response contributes to psychological maladjustment dates to the ancient philosophers and is evident in the frequent reference to emotion in the *Diagnostic and Statistical Manual of Mental Disorders*. It is only recently that this general notion has generated systematic research.

Some researchers have identified specific emotions to which people with certain disorders are prone. Depression is characterized by high levels of negative emotion and low levels of positive emotion. Generalized anxiety disorder relates to excessive fear, and social phobia to excessive embarrassment and shame. Antisocial or externalizing disorder in young children has been linked to excessive anger and reduced embarrassment, which inhibits antisocial behavior. Researchers are now documenting the emotional correlates of other disorders, such as borderline disorder.

Other researchers have examined the interaction of the different emotion response systems within different psychopathologies. For example, contrary to claims that schizophrenia is defined by flat affect,

studies show that schizophrenics tend to report comparable levels of emotion in response to emotionally evocative stimuli, but show little of the reported emotion in the face.

Finally, other researchers have documented how coping responses to emotional experiences may contribute to psychological adjustment. For example, women may be twice as prone to major episodes of depression as men because they are more likely to ruminate than distract themselves in response to negative events, which prolongs and heightens the distress to the extent that it can lead to depression. Individuals who dissociate from the distress of losing a spouse actually experience less anxiety and depression in the course of bereavement.

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Dacher Keltner and Paul Ekman

Theories

In the field of emotions, theories have been numerous and, until recently, better known than empirical findings. In the second half of the twentieth century, with new conceptions and new research, those have become testable and related to theories in other areas of psychology, particularly in development, cognition, and biological psychology.

The history of theories of emotions remains fascinating because thinkers have offered insights into profound issues, in terms recognizable within folk psychology and aimed at self-understanding. What is more, because emotions are important in different ways, theorists have explored different aspects of them. So, rather than merely competing with each other, theories can be thought of as illuminating different facets of life.

The Philosophical and Literary Background

Plato devoted one of his best-known books, *The Symposium* (385 BCE), to love. Each guest at a party made a speech on love, and these included the wonderful idea of Aristophanes that human beings were once more powerful than now; each had two heads, four arms, four legs, and so on. Because they were so arrogant, these beings were sliced in half by the gods, the result being human beings much as we are now—afflicted by love, seeking our lost halves. In typical fashion, the dialogue is concluded by Plato's protagonist Socrates giving the correct answer: One has to start with earthly loves but must transform these into something resistant to worldly corruption, into love of truth. In this dialogue we see articulated two central issues in understanding human emotions: the enormous pull of interconnectedness in love and the intuition that cultural pursuits such as philosophy and psychology start from a warm and important relationship with someone, such as a teacher.

Plato's most famous student, Aristotle, is usually credited with the first analyses of emotions. Emotions, he said, are types of judgment. They are evaluations of events, and they are "all those feelings that so change [people] as to affect their judgments, and that are also attended by pain or pleasure" (circa 330 BCE).

Aristotle's functionalist approach is a forerunner of modern cognitive psychology, and his idea of emotions as evaluations has influenced much subsequent thinking. For instance, both Aquinas and Spinoza wrote ex-

tensively about emotions in this tradition. Even Descartes, who started his 1649 book, *Passions of the Soul*, by saying that he discarded the ideas of the ancients is recognizably Aristotelian. In this book he laid the foundations for the analyses of stimuli, and of both simple and complex response patterns that are recognizable today in ethological ideas of species-typical action patterns that used to be called instincts, and that in current biological psychology are thought to be the bases of distinct emotions in humans and other mammals. These are trustful infant attachment to a care giver, affectionate maternal behavior, fearful escape from predators, angry confrontation with rivals in dominance hierarchies, and so forth.

Aristotle's analyses were also the foundations for the Hellenistic ethical schools of Epicureanism and Stoicism as seen in the writings of Lucretius, Seneca, and Marcus Aurelius, which can be understood as forerunners of cognitive-behavioral therapies (Nussbaum, 1994). Then, as now, the fundamental insight is that although we cannot directly alter our emotions, because they are types of evaluations, we can change our emotions if we can change the thoughts that lead to these evaluations. It was Epicureanism, with its emphasis on being sensitive to our simple and natural propensities, that influenced the founding fathers of the American Constitution with the idea of a right to the pursuit of happiness. And Roman Stoicism blended easily with Christianity, and passed on to our own day the idea of being wary of certain worldly goals such as wealth and power, because the emotions of anger, contempt, envy, and pride that these goals often engender are destructive to the individual and society.

Alongside the philosophical background is the literary one. World literature takes emotions as given but problematic. From the Hebrew story of the creation comes the idea of human eagerness for knowledge—including sexual knowledge—and the consequent founding of self-conscious human society on the emotion of shame. In the tragedies of Aeschylus and Sophocles occurs the idea that we humans must act despite never being able to know enough to foresee the outcomes of our actions; nevertheless, we must take responsibility for them and suffer their emotional consequences. And, as Aristotle pointed out, if we join the audience at the theater, we too experience emotions—pity for the protagonist, fear for ourselves.

There is not space here to follow literary treatments of emotions, for instance, in the great novels of the nineteenth century—Jane Austen on the gradual revelation of oneself to another whom one loves, Gustave Flaubert on the transformation of boredom into sexual excitement, George Eliot on the personal and interpersonal effects of being alive to one's emotions, Henry James on the effects of envy and jealousy—as well as the modernist and postmodernist novels of this century.

But the insights of great philosophers and writers continue as central to understanding our own psychology.

Emotions as Human Universals

Modern research on emotions starts with Charles Darwin (1872), who proposed that emotions are human universals derived in part from our evolutionary past and in part from our development as infants. He sought to show that human beings were not perfect, as would be required if our species were a special and divine creation. Just as there are imperfections of human anatomy, such as the appendix that is now without function, so there are imperfections of behavior, notably emotional expressions. Although in our evolutionary past, expressions, like our hair standing on end in anger or the baring of a canine tooth in a sneer, were functional, they are no longer functional in modern humans. And whereas in infancy, as Darwin argued, crying protected the eyes during screaming, in adulthood tears are still shed although now they seem to have no use.

Nowadays all but radical social-constructionists accept that emotions have an evolutionary basis. Some emotions and moods, such as happiness, love, sadness, anxiety, anger, and shame have been taken up into many human cultures. The wide variability of emotions of sexual love, anger, anxiety, shame, and many other emotions in the East and West, and in industrial and nonindustrial societies, can be understood in terms of human emotional propensities that are elaborated into culturally functional patterns. So, according to a recent American survey, love in marriage is the state most closely associated with happiness, and this love has culturally specific attributes: the basis for contracting a lifelong partnership, expanding the individual self to include another, justification for severing existing ties. Sadness in grief is enabled and ritualized in many cultures in funerals and the social support that surrounds bereavement. Vengeful destructive anger has long been a motivator of personal and international aggression in many societies, and it has in turn been a source of social honor; it has also become recently a daily staple of our TV screens in the form of the proper response to wrongdoing.

If some of Darwin's arguments seem forced today, his conclusion that some emotional expressions take place whether or not they are of any use is not. For example, hostile contempt, by which other people are treated as nonhuman, has been shown by John Gottman (1993) to be the most destructive emotion in marriage; and it has socially corrosive effects through racial prejudice and in episodes such as the Holocaust or ethnic cleansing in Bosnia. Ethologists call the effect pseudospeciation: treating others as members of a different species. One can imagine that it had a place in former eras, perhaps as nomadic humans dispersed across un-

peopled spaces or separated themselves from other hominid species. But most commentators see no place for it in the modern world.

Emotions as Monitors of Bodily Events

It was William James who introduced the idea of emotions as monitors of our selves (1884). He argued that if we see a bear in the woods, the folk-psychological idea—that we become afraid and therefore run—is wrong. We see the bear and run; then our fear is the perception of our bodies as we run.

James's theory is known as the peripheral theory: emotions as perceptions of the periphery (the body), to be distinguished from central theories in which emotions derive from the brain. Stanley Schachter and Jerome Singer (1962) joined peripheral and central ideas by proposing that a peripheral change, induced, for instance, by the injection of adrenaline, caused arousal that could be labeled according to the current social situation. If the situation were happy, then people injected with adrenaline but ignorant of the effects of the injection would feel more happy than those given a placebo. If the social situation were angry, then injected individuals would feel more angry than those given a placebo. Replications of the effect have not been entirely successful, but Schachter and Singer's idea persists in a host of misattribution experiments, in which moods are induced but misattributed, and effects on social judgments found. It also continues in the theory of George Mandler, that emotion occurs with arousal at the failure of an expectancy, together with a cognitive labeling of the arousal (1984).

The idea of peripheral feedback was taken up by Sylvan Tomkins (1995), one of the first to propose a clear function for emotions: It is emotions that give the "oomph" to life. We have various motivations, such as hunger, thirst, sex, and exploration, but these do not determine our urges. The determinant is an emotion, which amplifies some specific motivation by means of feedback from the periphery. One of Tomkins's examples is sexual arousal: We have the capacity of sexual motivation all the time, but when this is accompanied by arousal of the genitalia it is amplified and becomes the urgency of sexual excitement.

Although other kinds of bodily feedback are important, Tomkins argued that it is the face that provides the most crucial feedback, so when we smile this amplifies happiness, and when our face droops, or we cry, we feel sad. According to Tomkins, an emotion is an affect program. It has a neural basis, it involves feedback from the body and it has a conscious feeling to it. The program tends to be set off as a package, with each aspect entraining the other parts. This idea fits easily with the idea of species-specific action patterns.

Tomkins's theories prompted research on facial ex-

pressions of the kind that Darwin described. Influenced by Tomkins, Paul Ekman and Carroll Izard both provided evidence of a small number of basic emotions, each with a distinctive facial expression that is a human universal, seen in infants as well as cross-culturally. Among Ekman's experiments is a study of actors and scientists who posed facial expressions characteristic of specific emotions, and accompanying each such expression there occurred a somewhat distinctive bodily response recorded by polygraph (Ekman, Levenson, & Friesen, 1983).

The conclusions of Ekman and Izard have been questioned (e.g., by Russell & Fernandez-Dols, 1997). It is not denied that there is some universal basis of facial expressions, but there are several theories, not just the theory of facial affect programs, that could account for them, including Russell's idea of orthogonal dimensions of pleasure-distress and arousal-relaxation.

Appraisal and Cognitive Theories of Emotions

In the same year that Tomkins first proposed his theory, ideas of Aristotle and Aquinas were introduced into modern research by Magda Arnold (e.g., Arnold & Gasson, 1954) and they form the bases of "appraisal theory." Emotions are those psychological states that relate the outer world of events to the inner world of desires—an emotion is an evaluation, or appraisal, of an event in terms of goals. The theoretical move made by Schachter and Singer involved linking bodily arousal to just such appraisals. Appraisal theory also connects to Tomkins's idea of amplification, because, according to Nico Frijda (1986), an emotion elicited by appraising an event in relation to a goal (which he calls a concern) is an "action-readiness," which sets priority among concerns and hence determines urgency.

Appraisal theorists today show that specific emotions are each determined by specific features of an appraisal, for example, an event that blocks a goal and that damages self-esteem is likely to elicit anger. So, as Richard Lazarus put it (1991), the primary appraisal of the event is made in terms of the goal affected by it. Then a secondary appraisal is made of what to do about the event, of how to cope with it: Anger becomes more likely if the goal could be reinstated. This line of research also led to the investigation of coping with events and the emotions they elicit and has become important in the psychology of health.

Emotions and Emotional Disorders

Research on emotional disorders can be thought of as starting with Sigmund Freud, whose innovation was to take what people said about their emotional lives seriously. Although Freud did not propose a theory of emotions, he launched a psychology based on human beings having multiple desires—goals. From this, it is a

short step to modern cognitive theories of the role of emotions in the management of goals, as described in the previous section.

First, Freud hypothesized that an emotional trauma could be responsible for later anxiety and depressive disorders (Freud & Breuer, 1895). Although the terms of his hypotheses have been modified, it is clear from the evidence of psychiatric epidemiology that traumatic events early in life not only increase the risk of adult anxiety and depressive disorder, but that severely stressful events and difficulties in adulthood are the immediate causes of most episodes of depression.

Second, Freud emphasized the importance of relationships with parents. It was John Bowlby (1971) who combined this idea with the idea from ethology, of baby animals becoming imprinted on their mothers, to produce the theory of attachment as a biologically given program in which an infant stays close to its mother, particularly in circumstances of danger. Following this came the idea of socioemotional development, which has achieved a level of importance in developmental psychology to rival theories of cognitive development.

Third, Freud instituted a form of psychotherapy. Although his work is a touchstone to which subsequent therapies in one way or another refer, it had much in common with the schools of Epicurean and Stoic thought, in the idea of self-knowledge, and also had much in common with Spinoza's theory that to understand and accept our emotions is to be liberated from the bondage that some of them can impose.

Emotions as Bases of Personality

Although Freud's theories of personality development are less accepted today than previously, the idea that enduring traits of personality derive from the interplay of genetics and early experience remains important. *Temperament* is the term used to describe genetically given aspects of emotional responsiveness, for instance, in reacting to novelty either calmly or with arousal and anger (Campos, Barrett, Lamb, Goldsmith, & Stenberg, 1983). A genetic predisposition plus a particular experience of upbringing then builds a foundation of personality. For instance, according to attachment theory, people with secure attachment to a care giver at the age of 1 subsequently form trusting relationships in life. Those who are anxiously avoidant of their care-giver tend to be more distrustful later. Those who are ambivalent—both anxious and angry at their care-giver—remain preoccupied with relationships and are likely to have a stormy love life in adulthood.

Taking Tomkins's type of theory, each individual tends to base his or her life around a script in relation to some specific emotion or to some emotional issue. In commitment scripts, an individual narrows options in the world through commitment to a specific relation-

ship, such as marriage, or to a cause. In an affect management script the object is to control negative emotions, so scripts might be based around alcohol, sex, travel, or watching TV, all of which can preoccupy and reduce negative feelings. Or, taking a more empirically based theory, individuals who are very shy or very aggressive in childhood base their appraisals of events on their preferred emotional style and show high continuity of the avoidant or the angry trait into adulthood in ways that profoundly affect their life chances (Caspi, Elder, & Bem, 1987).

Personality currently tends to be seen in terms of the "Big Five" personality traits: neuroticism, extroversion, openness, agreeableness, and conscientiousness. In the definitions of these traits, all but the last have explicitly emotional ingredients. Theories such as that of Tomkins are equipped to explain the continuities of such traits through socioemotional schemas built in early life so that life's multiplicity of events are appraised predominantly in just one particular way to yield a characteristic emotion, rather than appraised in different ways to yield a range of emotions. So, for an anxious person, almost all novel events are appraised as dangerous and hence are fear producing. Therefore, a fearful schema is built that minimizes novelty and danger. For someone aggressive, events tend to be appraised as frustrating, and a preferred response pattern of angry aggression is primed and constantly ready.

An extension of such ideas provides a basis for understanding some aspects of emotional disorders. Internalizing disorders of childhood are those of anxiety and sadness; externalizing disorders are those of anger. There is strong evidence of continuity: When people have internalizing patterns in early childhood, then, if they suffer disorder later, for instance in response to a severe loss, the later disorder is likely to be an anxiety or depressive disorder. By contrast, those with externalizing disorders in childhood will have tendencies to delinquency in adolescence and sociopathic or substance abuse disorders in adulthood (Oatley & Jenkins, 1996, from which further references to the issues discussed in this article may also be found).

Two Recent Theoretical Trends

Among interesting modern theoretical movements are ideas that emotions, rather than being disruptors of behavior, are the very center of rational life in the social world. Antonio Damasio, for instance, has shown that people with frontal lobe damage are impaired both in their emotions and in their ability to make ordinary arrangements with others (1994).

The idea of emotional intelligence (Salovey & Mayer, 1990), based on modern evidence, is of being aware of one's own appraisals and others' emotional expressions, of being able to manage one's own emotions to-

gether with being sensitive to emotions of others, and of being able to use emotion to motivate oneself. Unlike models of conventional intelligence, which have tended to emphasize genetically fixed factors, emotional intelligence can be cultivated and helped through reflection on one's own life and the insights of writers on emotions.

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Keith Oatley

Methods of Study

In recent years, interest in emotion has grown within psychology, along with methodological advances in emotion measurement. Emotions are complex processes, the understanding of which requires multiple measures and entails potentially numerous methodological problems.

When emotions are elicited, changes ensue among behavioral/expressive, physiological, and subjective systems of the body. The fact that emotional responses are so diverse is both a blessing and a curse; it allows for several routes of access to emotion but also creates difficulty in measurement, by either forcing a choice of which measure to obtain or creating the complexity of collecting and analyzing multimodal responses.

Unfortunately, there is often ambiguity about the type of emotional process under investigation. The term *emotion* has often been used interchangeably with *mood*, but these words are not synonyms. Emotions are very brief states that arise in response to important changes in a person's perceived environment. Though brief, emotions often register in consciousness before they are over. Moods, by contrast, arise much more subtly, can endure for much longer periods of time, and tend to occupy the background of consciousness. They may or may not be characterized by expressive changes, but moods do have physiological and experiential effects. The reader is referred to other sources for more in-depth discussion of the relationship between emotion and mood (see Ekman 1994). Although the present chapter focuses on emotions, many of the measurement issues apply to the study of mood, especially those regarding subjective experience. [See *Affect; Mood; and the overview article on Emotion.*]

Emotion Elicitation

One of the most difficult methodological issues is how to reliably elicit emotions. One cannot assume that any elicitor—however well planned or piloted—guarantees

an emotional response of any kind, let alone the particular response sought by the investigator. There is no elicitor that evokes the same emotion for everyone.

Ultimately the choice of elicitor depends on the researcher's questions: Does one want to measure a particular type or set of emotions or emotions generally, regardless of what type? Is the interest in intra- or interpersonal contexts, or naturally occurring or controlled situations? Several types of elicitors have been employed with varying degrees of success.

Films. Films are popular for eliciting emotion in the laboratory. It is not easy to establish ahead of time which emotions are likely to be elicited by a film, and the self-reports often used to determine the emotions films elicit are vulnerable to demand characteristics (e.g., the tendency of people to report experiencing emotions that are expected of them rather than what they are truly feeling). Even though it is impossible to create any film that reliably elicits the same emotion in everyone, it is possible to find stimuli that have greater tendency to elicit some emotions than others.

The benefits of films include standardization in emotion induction; ease of use; and the ability to show them to either individuals or groups. The drawbacks include: extensive piloting may be required to develop reliable film segments; with the exception of emotions like disgust, sometimes it is difficult to elicit emotions beyond mild to moderate intensity; and certain emotions, such as anger, are very difficult to elicit by film.

Still slides of emotional scenes are similar to films, involving the same advantages plus the possible added benefit of involving less time in presentation. Slides have many of the same drawbacks of films, plus the added possibility of eliciting less intense emotional reactions than films. We are not aware of studies comparing films and slides, however.

Emotional Stories or Statements. Individuals can read prepared statements of emotional content or brief scenarios describing emotional situations. Like film viewing, this method allows for standardization of induction procedures, can be used with individuals as well as groups, and requires confirmatory studies that demonstrate that the stories do, indeed, elicit emotion. Statements and stories are less likely to produce observable emotional behavior than film viewing, although they do elicit reports of emotional experience. Another drawback of this method is that the emotions induced are likely to be of mild to moderate intensity, at best.

Imagery Techniques. Imagery techniques of various types usually involve either imagining oneself in an emotional situation or recalling and reliving past emotional events. The primary benefit of imagery is that one can draw on intense, personally-relevant situations. This technique can be used to study single in-

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Keith Oatley

Methods of Study

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dividuals but not groups. The major drawback is that people vary in the extent to which they can successfully recall, relive, or imagine an emotional event. This technique is also less likely to elicit facial expressions of emotion than film viewing or other techniques, and it requires a coach to lead the imagery exercise.

Hypnosis has been used frequently in research on mood and memory, and it is also an imagery technique. The primary benefit is creating realistic emotional experiences in some people. The drawbacks are that hypnotic imagery requires a trained practitioner to administer hypnotic suggestions and works well only on highly hypnotizable people, who comprise about 10% of the population.

Voluntary Facial Movement. Another laboratory technique for emotion induction involves instructing subjects to voluntarily move their faces to produce facial expressions of emotion. Two general approaches have been taken: posing and directed facial action. Posing simply involves telling the subjects to either put on an expression that is known by common vernacular, such as a smile or frown. A variation on this theme is to tell people, "Put on a happy or sad or angry face." The posing approach is easy to use and it is standardized. There are some drawbacks, however. A given request, such as frown, can elicit several types of facial poses, ranging from a brow furrow to downturned lip corners; it is also not clear whether posing is sufficient to create an emotional experience in all or most people.

Directed facial action (DFA) is a quite different approach to voluntary facial movement in which subjects are instructed to move certain facial muscles. Although the muscular movement instructions produce facial configurations that are representative of certain emotions, no verbal reference to emotions or to lay expression terms are given during the instruction period. Given its anatomical basis, DFA overcomes the first drawback of standard posing methods—heterogeneity in expression is greatly reduced when muscular instructions are given rather than lay expression terms. Although DFA was developed with the intention of studying emotion-specific physiological patterns that are associated with facial expressions of emotion—and not necessarily emotional experience per se—the facial configurations often create emotional experiences. The drawback of DFA is that it requires a trained coach as well as participants who can contract their facial muscles voluntarily to produce high-quality expressions.

Interpersonal Interaction. Interpersonal contexts form the basis of our most intense emotions—the challenge is to capture such intensity in the laboratory. Marital interactions create personally significant emotions but involve the complexity of studying two individuals in conversation. Other interpersonal situations,

such as when two strangers are assigned to discuss a topic, are less likely to evoke personally significant emotion.

Naturally Occurring Emotion in Daily Life. Mood researchers have often looked to people's real-life experiences as a source of variation in emotional state. Both minor events (such as final exams for students) and major life events (such as bereavement) have been studied. Such events create strong, personally significant emotion, but they are very difficult to study by means other than self-report. If one's primary interest is in tracking variations in subjective experience of emotion or mood, then studying life events may be worthwhile. Daily events are not useful if one aims to measure the expression and physiology of emotion.

Measuring the Emotional Response

There is no agreement on which aspect of the response might serve as a gold standard for the occurrence of emotion. Furthermore, there may be individual differences in which response system is most sensitive for a given person. Given these caveats, it is incumbent on the investigator to use multiple measures, with the constraints that some will be used for verification and some as dependent variables. Also, there are practical limitations on what one can obtain without exhausting participants.

Physiological Measures. The physiological measures used in emotion research have aimed to tap activity in three particular systems: the autonomic nervous system, the central nervous system, and the endocrine system.

Autonomic Indices. The autonomic nervous system (ANS) has been the most widely studied physiological system in emotion research. The most common ANS measures are heart rate and skin conduction, but some studies have measured several additional channels, including but not limited to skin temperature, respiratory depth, pulse transit time to ear or finger, and beat-by-beat blood pressure. Measures vary in the extent to which they serve as indicators of sympathetic versus parasympathetic changes (heart rate, for example, reflects both). A relatively new approach to measuring sympathetic reactivity is impedance cardiography, which provides measures of cardiac output and total peripheral resistance.

Important methodological issues to consider when measuring the ANS include: choice of baseline, whether a marker will be used (such as facial expression) to dictate which epochs of data should be studied, and controlling for the influence of factors that might bias the data such as movement, drugs, and general health status. (For further discussion of ANS measurement, see Levenson, 1988).

Central Nervous System (CNS). The oldest method

of CNS measurement is electroencephalography (EEG), in which surface electrodes placed on the scalp (usually via a skull cap) detect the electrical activity of neurons in underlying brain areas. The spatial resolution of EEG is limited, allowing the discussion of activation in general regions of the brain (e.g., frontal, occipital, parietal, or temporal lobes) and/or the right versus left hemispheres only. EEG has good temporal resolution, however, making it possible to link electrical changes in general brain areas to exposure to emotional stimuli. Methodological issues involved in EEG research include: the choice of a reference point, movement artifact, issues of baseline measurement, and the parsing of data in relation to extrinsic emotion variables.

Positron emission tomography (PET) is a CNS imaging technique. The participant is injected with a radioactive isotope (usually glucose) and the activity of regions of the brain is measured by detecting where the radioactive glucose is being metabolized. PET offers good spatial resolution and may provide a useful index of brain function while the person is experiencing particular states. There are drawbacks: PET requires injection with a radioactive isotope, which is fairly benign but not risk free; the temporal resolution of PET is poor, thus metabolic brain changes are not easily linked to exposure to emotional stimuli; it is very expensive; and PET can only be done at institutions that have a cyclotron (which are rare and require highly trained medical personnel).

Magnetic resonance imaging (MRI), another CNS imaging technique, offers good spatial resolution. In contrast to PET, there is no risk for subjects except the discomfort of being in the confined and noisy environment of an MRI machine. It, too, is costly, but MRI is becoming more widely available and is more accessible than PET. The standard MRI simply looks at structure and is not very useful for studying brain changes during emotion, but functional MRI allows for the study of changes in brain activity and thus promises to be a safe alternative to PET.

Endocrine. Neuroendocrine systems have also been studied in relation to emotions and moods. The most common systems studied are the noradrenergic and the adrenocorticoid systems, given their involvement in ANS activation and the stress response. Each of these systems is sensitive to changes in emotional states, although it may be methodologically difficult to access such changes. The problems are with resolution and route of access. If these neurochemicals are assessed through urine it is difficult to determine how long one should wait after emotion induction to get a sample that might reflect that state. Timing is still an issue with blood samples, and there is the added stress of venipuncture, which could serve as an emotion induction in and of itself.

Behavioral/Expressive Measures. Measures of facial expression and vocal behavior comprise the major indices of the expressive component of emotion.

Facial Expression. The most frequently measured expressive system in emotion research is the face. Different types of facial measurement include: observer judgments, componential coding schemes, and electrophysiological recording.

Naive observers viewing videotapes or on-line behavior can make judgments of the extent to which they see certain emotions in a target face. Although this method seems easy, drawbacks include: naive judges may miss several subtle expressions; morphological characteristics of the target's face, independent of changes in facial muscular activity, might bias emotion judgments; and it is difficult to determine where in a segment of behavior the rated emotions actually occurred.

By contrast, in componential coding schemes highly-trained "coders" follow a prescribed set of procedures for detecting certain facial actions. The two most widely used systems are the Facial Action Coding System (FACS), developed by Paul Ekman and Wallace Friesen in 1978, and the Maximally discriminative facial movement coding system (MAX), developed by Carroll Izard in 1979. Izard's MAX is theoretically derived, coding just those facial configurations that he theorized correspond to universally recognized facial expressions of emotion. Although more economical than FACS, such a system cannot discover behaviors that were not posited in advance.

By contrast, FACS is a comprehensive measurement system that is anatomically based; it measures all movements that are observable in the face. As a comprehensive system, FACS is not limited to those behaviors that are theoretically related to emotion, and it allows for the discovery of new configurations of movements that might be relevant to extrinsic variables of interest.

Facial expressions of emotion have also been measured electrophysiologically through facial electromyography (EMG). Facial EMG measures electrical potentials from facial muscles in order to infer muscular contraction via the placement of surface electrodes on the skin of the face. The advantages of EMG include detection of muscular activity that is not observable to the naked eye. Problems include: The placement of electrodes calls subjects' attention to the fact that their faces are being measured, which may increase self-conscious behavior; although in recent years there have been considerable advances refining EMG signals, there remains a problem with cross-talk (whereby adjacent muscular contractions interfere with one another), which may misrepresent the "picture" of movement on the face.

Vocal Behavior. The autonomic arousal that accompanies emotion can cause measurable changes in voice production. Observers can rate the emotion they hear in audio tapes that have been filtered to remove intelligible speech. Componential measurement involves analysis of the characteristics of the vocal waveform. Patterns of change in vocal intensity (loudness), frequency (pitch), and quality (phonation type), as well as other features have been studied. To date, the evidence for distinctive patterning is not as refined as it is for the face. (For more detailed information, see Scherer, 1988.)

Subjective Experience. Measures of the subjective component of emotion are perhaps the most prevalent. Although it may seem that there could be nothing easier than asking people what they are feeling, subjective measurement is complicated and fraught with problems. There are social psychological problems such as presentation bias, social desirability, and demand characteristics as well as methodological problems, such as how the choice of time frame and response scales influences the information obtained from a given self-report.

Oral Versus Written Reports. Reports of one's emotional experience can be obtained via either oral query or written emotion report. Oral reports may benefit from the rapport developed between an interviewer and interviewee, and therefore may yield more honest reports. However, the social contact between the interviewer and interviewee might also increase self-consciousness and demand characteristics, leading to bias in what is reported. Written reports overcome some but not all self-consciousness in that research participants do not spontaneously reveal their feelings to another person, but rather write them down. The increased anonymity of a written report might also reduce social desirability effects. The problem with written responses is that participants may be less motivated to be accurate when they are not immediately held accountable for what they are reporting.

Open Versus Closed Response Options. Open response categories simply pose a question to the participant, for example, "What did you feel while watching the film?" Closed questions provide participants with a list of words or scales by which to rate their emotional experience. Open responses do not restrict subjective report, affording individuals the option of expressing their feelings verbally in whatever manner is most appropriate for them. However, categorizing open-ended responses can be painstaking and time-consuming. There is also the risk that participants will not write anything down. Providing them with response scales by which to rate their experience remedies these two problems but creates its own: Participants might report having felt emotions simply because those words appeared on the page in front of them, and the preset

categories or dimensions on which they must rate their experience may produce a distorted picture of that experience by forcing participants to convey their experience in a particular way. Ideally, response scales allow for a range of emotionality without being too cumbersome to complete.

Temporal Issues. A major problem concerns when to obtain self-reports. Retrospective reports are commonly used, but they involve problems of: memory recall bias (e.g., recency effects); memory reconstruction; and the problem of representing an entire emotional experience in a single report, as many emotions can occur in a very brief period of time, so a single report may be biased toward the most intense emotion felt. On-line reporting remedies this last problem but interrupts the flow of emotional experience.

Some techniques strike a balance between retrospective and on-line procedures. In Levenson and Gottman's video-recall technique, people watch a videotape of their marital interaction session and then report on what they remembered feeling during that interaction. The participants use dials to rate the degree of positive and negative emotion they remember having felt during the session and use the video replay as a cue to aid memory. The dial technique allows for the continuous retrospective reporting of emotion, but for only positive-negative emotion distinctions. Erika Rosenberg and Paul Ekman developed a recall procedure called cued-review for use in film-viewing situations. Cued-review involves the viewing of a previously seen stimulus film, during which time people complete multiple emotion reports according to when they remembered having felt an emotion during the initial film-viewing period. The detailed reports provide finer-grained distinctions among positive and negative emotions than does video-recall with dials.

Further Issues

Emotion researchers also need to be concerned with data analysis issues concerning how to compare, correlate, or combine multiple indices of emotions in order to address their hypotheses. As many emotions can be elicited during a brief period of time, one may either study point-to-point correspondences or combine several responses in a given time period. Each approach has its pros and cons, the full discussion of which is beyond the scope of this article (see Levenson, 1988, which discusses these issues in some detail).

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Erika L. Rosenberg and Paul Ekman

EMOTIONAL LEARNING. Our experiences consist of awareness of our stimulus environment as well as our emotional responses evoked by stimulation. Many emotional responses evoked by pleasant or unpleasant experiences are unlearned. However, our experiences also alter our subsequent emotional responses to specific stimulation and, additionally, emotions can influence our explicit memories of emotionally arousing events. These influences of emotion clearly have adaptive consequences. In his book *The Expression of Emotions in Man and Animals* (1872), Charles Darwin noted the similarities of emotional expression in man and animals and argued that emotions evolved because they compel organisms toward adaptive behaviors that increase their chances for survival.

There has been considerable controversy concerning the bases of our emotional states. In 1884, William James proposed that emotions are the conscious awareness of certain “peripheral” bodily responses (an idea independently proposed by the Danish physiologist C. G. Lange). In contrast, the research of Walter Cannon in 1927 and Philip Bard in 1934 suggested that emotions are the direct result of brain processes (critically involving the hypothalamus), and that bodily responses are but the consequences of the centrally activated emotions. An important experiment by Schacter and Singer in 1962 helped clarify the issue. They found that the emotional reaction produced by an injection of the adrenal hormone epinephrine (adrenaline) depended on the subjects’ cognitive interpretation of the situation. Although there is still no generally accepted theory of emotion today, there is a broad consensus that emotional reactions require both cognitive processes, based on activation of the central nervous system as well as peripheral nervous system responses.

As our past experiences modify our responses to emotionally arousing stimulation in several ways, the term *emotional learning* (or *emotional memory*) can have

several different meanings. Findings of research on emotional learning in human subjects indicate that emotionally related, learned judgments can be made without conscious awareness. In 1980, Robert Zajonc found that subjects develop affective preferences for stimuli they have seen before even when they have no explicit memory of the stimuli. Studies of amnesic patients confirm the development of this “mere exposure effect” in the absence of explicit memory. For example, amnesic patients developed preferences for Korean melodies despite the fact that they had weak explicit memory of having heard them (Johnson, Kim, & Risse, 1985).

Experiments with animals indicate that “emotional memory” can be readily induced through the formation of a classically conditioned (Pavlovian) stimulus-reinforcement association, that is, a neutral stimulus associated with a stimulus that induces that an emotional reaction may elicit an emotional response. Extensive research indicates that such learning involves a region of the brain in the medial temporal region called the amygdaloid complex (AC) (Davis, 1992; LeDoux, 1995). In 1956, Lawrence Weiskrantz reported that lesions of the AC impaired monkeys’ ability to learn stimulus-reinforcement associations. Subsequent research investigating the effects of AC lesions on Pavlovian aversive conditioning in rats has suggested that the AC may be a critical link in the formation of nonconscious “emotional memory” circuits (LeDoux, 1995). Lesions of the AC in rats, the basolateral nucleus in particular, impair acquisition and retention of several forms of Pavlovian aversive conditioning. However, as the AC is also critical for the expression of unlearned responses typically used as indexes of fear (e.g., “freezing” responses; see Blanchard & Blanchard, 1972), it is difficult to dissociate AC involvement in putative emotional memory circuits from its involvement in the expression of fear-based responses (Cahill, Weinberger, Roozendaal, & McGaugh, 1999).

The term *emotional memory* also refers to conscious (“declarative”) memory of emotionally arousing experiences. Many investigators have commented on the strong and detailed nature of conscious memories of emotionally arousing events. In a remarkably prescient discussion, Stratton observed that a person may recall “in almost photographic detail the total situation at the moment of shock” (1919). It is this vivid nature of emotionally influenced memory which inspired Brown and Kulik in 1977 to coin the term “flashbulb memory.” Although conscious memories of emotionally arousing events are not perfect “pictures” of the event and are not indelibly etched in the brain, there is substantial evidence that such memories are, in comparison with those of nonarousing events, more accurate and less susceptible to decay (see Christianson, 1992).

Emotional arousal thus appears to play an impor-

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Emotional arousal thus appears to play an impor-

tant role in selectively preserving memories of significant events. This influence of emotional arousal on lasting memory clearly has adaptive value. In 1890, William James noted that "if we remembered everything, we should on most occasions be as ill off as if we remembered nothing" and concluded that "selection is the very keel on which our mental ship is built." There is, as Seymour Kety commented in 1970, an "obvious adaptive advantage in a mechanism that consolidates . . . only those experiences that are significant."

Studies of the neurobiological systems activated by emotionally arousing experiences have provided important insights into how emotion influences long-term memory. Research on this issue was stimulated by the finding that long-term memory storage can be enhanced by administration of stimulant drugs immediately after learning (McGaugh & Herz, 1972). It is now well established that stress-related hormones, including epinephrine (adrenaline) and corticosterone (or cortisol in humans) are released from the adrenal gland (the adrenal medulla and the adrenal cortex, respectively) following emotionally arousing stimulation. Additionally, low doses of these hormones administered to animals after training enhance long-term memory (McGaugh & Gold, 1989). Such findings suggest that these endogenously released hormones regulate the storage of experiences that induce their release by activating brain systems involved in modulating memory storage.

Corticosterone freely enters the brain and can thus directly affect brain activity. Epinephrine passes the blood-brain barrier poorly, if at all. Several lines of evidence suggest that epinephrine influences memory by activating peripheral adrenergic receptors located on nerves (e.g., the vagus) that project to the brain (Williams & McGaugh, 1993). The influence may involve brain stem nuclei, such as the locus coeruleus and the nucleus raphe, which project diffusely throughout the forebrain. Other evidence suggests that epinephrine may influence memory, at least in part through its well-known effects on blood glucose levels (Gold, 1995). In any case, the effects of epinephrine on memory involves activation of β -adrenergic receptors. In animals, the β -adrenergic receptor antagonist propranolol blocks the memory-enhancing effects of epinephrine and, in human subjects, propranolol blocks the enhancing effects of emotional arousal on long-term memory (McGaugh, Cahill, & Roozendaal, 1996; Cahill et al., 1994).

Extensive evidence indicates that many drugs and stress hormones affect memory through influences involving the AC. In animals, lesions of the AC (particularly the basolateral nucleus) block drug and stress hormone influences on memory storage. Additionally, long-term memory can be enhanced by microinfusing drugs and stress hormones directly into the AC after learning (McGaugh, Cahill, & Roozendaal, 1996). These effects appear to require activation of β -adrenergic re-

ceptors within the AC, as they all blocked by β -adrenergic antagonists. Findings of studies using human subjects also indicate that the amygdala is involved in emotionally influenced memory. For example, in humans with lesions of the AC, the enhancing effect of emotional arousal on long-term memory is impaired (Babinsky et al., 1993; Cahill, Babinsky, Markowitsch, & McGaugh, 1995).

Modern brain-imaging techniques (such as positron emission tomography, or PET) allow us to examine directly the activity in specific regions of the human brain. To date, only a handful of studies have used human-brain-imaging techniques to examine "emotional learning." One PET study examined AC participation in emotional versus unemotional learning situations (Cahill et al., 1996). Subjects in this study received two PET scans: one while viewing a series of relatively emotionally arousing (aversive) film clips, and another (on a separate day) while viewing a series of similar but relatively nonemotionally arousing film clips. Three weeks later, memory for both the emotional and neutral films was tested. The results showed that activity in the right AC correlated very highly with recall of the emotional films, yet did not correlate with recall of the neutral films. Thus, the right AC appeared to be selectively involved with memory formation for the emotional material.

Another recent PET study (Reiman et al., 1997) found that the AC became active while subjects viewed (and presumably stored memories about) emotional material, but was not active when subjects recalled previously learned emotional material. Both of these PET studies are consistent with the view derived from animal experiments that the AC is especially important for storing memories of emotionally arousing events in humans. Analogous to the hippocampus, the AC does not appear to be involved in the retrieval of long-term declarative memory once it is formed. It seems likely that AC activity serves to modulate the storage of information in other brain regions, and that the AC is not the locus of emotionally influenced, conscious memory traces.

Attempts to understand basic mechanisms of emotionally influenced memory have led to new developments in understanding clinical disorders associated with emotionally stressful events. In considering the potential implications of the evidence for endogenous, hormone-based memory modulation systems, Roger Pitman proposed in 1989 that an overactivation of such normally adaptive systems after a highly traumatic event may underlie the pathogenesis of anxiety-based disorders, such as posttraumatic stress disorder (PTSD). This proposal raised the possibility that it may be possible to prevent PTSD with pharmacological blockade of stress hormone modulation of memory soon after a trauma is experienced.

A final meaning of the term *emotional memory* concerns memory of the personal feelings (as opposed to the facts or details) associated with an emotional experience. It is a common experience that memory of feelings associated with an event often seems to last long after memory of the facts of the event has all but disappeared. Sir Fredric Bartlett, in his classic 1932 book *Remembering*, argued that the primary memory of an experience is often affective in nature (for example, "I remember I liked it" or "I remember it was awful"), and that memory retrieval in this case is a process of reconstructing events to justify this affective memory. This important aspect of "emotional memory," the conscious memory of feelings associated with an event remains an important and largely unexplored area for neurobiologists interested in "emotional learning."

[See also Learning; and Motivation.]

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Larry Cahill and James L. McGaugh

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EMPATHIC ACCURACY. Empathic accuracy emerged as an important research topic in the 1990s. It is the most recent of four areas of study within the accuracy tradition of interpersonal perception research (Ickes, 1997). This tradition began over 50 years ago with the

study of accuracy in judging other people's personality traits. It later expanded to include the study of accuracy in judging others' attitudes, values, and self-conceptions, the study of accuracy in inferring others' emotional states, and the study of accuracy in inferring the specific content of others' thoughts and feelings (i.e., empathic accuracy).

As early as 1957, the American clinical psychologist Carl Rogers called attention to the importance of accurate empathy in the therapist-client relationship. His work suggested that an ideal measure of empathic accuracy would be one that (a) could be used to track the accuracy of the therapist's inferences over the course of the client-therapist interaction, and (b) would be objective in defining accuracy in terms of the degree to which the perceiver's inferences matched the client's actual reported thoughts and feelings. During the next four decades, many attempts to develop such a measure were made by researchers in areas such as clinical and counseling psychology, communication studies, marriage and family studies, psychiatry, and personality and social psychology.

Two of the most promising measurement approaches were introduced in the early 1990s by William Ickes, Linda Stinson, Victor Bissonnette, and Stella Garcia (1990) and by Robert Levenson and Anna Ruef (1992). The approach developed by Ickes and his colleagues assesses how accurately perceivers can infer, "on-line," the specific content of other peoples' successive thoughts and feelings. The approach developed by Levenson and Ruef assesses how accurately perceivers can infer "on-line" the valence and intensity of other peoples' changing emotional states. In both approaches, perceivers attempt to infer aspects of a target person's actual subjective experience while viewing a videotape of the target person in conversation with either a therapist or another interaction partner. Accuracy is objectively defined in terms of the degree to which the perceiver's inference matches the target's actual subjective experience, and the accuracy scores for individual inferences can be differentially aggregated to assess changes across time or to create a single, more global index.

In 1992, Levenson and Ruef found evidence that a perceiver's accuracy in inferring a target's negative emotional states was related to the degree of physiological synchrony between the perceiver and the target. They interpreted this finding as supporting their more general argument that emotional contagion may mediate the accuracy of one's inferences about another person's emotional states. This argument was supported by evidence that the perceivers' own facial expressions of emotion were positively correlated with both (a) their level of empathic accuracy, and (b) at least one measure of their level of physiological synchrony with the target.

Applying the measurement procedure developed by Ickes and his colleagues in a clinically relevant context, Marangoni, Garcia, Ickes, and Teng (1995) found evidence that empathic accuracy improved with increasing exposure to a target person and could be further enhanced through the provision of immediate, veridical feedback about the person's actual thoughts and feelings. They also found evidence that although targets differed substantially in their overall "readability," perceivers nonetheless displayed impressive cross-target consistency in their empathic accuracy, with some perceivers being consistently good, others consistently average, and still others consistently poor at reading different target persons' thoughts and feelings.

Trying to develop a psychological profile of the "good" perceiver has proved difficult, however. Surveying the available research conducted since 1955, Davis and Kraus concluded in 1997 that self-report measures of social sensitivity have consistently failed to predict individual differences in accuracy on various social inference tasks. A plausible reason for this failure is that individuals cannot provide valid self-report data because they lack the requisite metaknowledge regarding their own empathic ability (Davis & Kraus, 1997). Moreover, contrary to the social stereotype regarding the presumed superiority of "women's intuition," a review of the relevant literature did not find that women, on average, have more *ability* than men to accurately infer the specific content of other people's thoughts and feelings. Instead, the findings suggested that situational factors can evoke more *motivation* in women to do well on empathic inference tasks, and that women will outperform men when this differential motivation is engaged (Graham & Ickes, 1997).

The role of empathic accuracy in close relationships has received increasing research attention. As common sense suggests, friends are reliably more accurate than strangers in "reading" the content of each other's thoughts and feelings (Colvin, Vogt, & Ickes, 1997). However, satisfaction and stability in close relationships are not always enhanced by high levels of empathic accuracy. Under certain circumstances, motivated inaccuracy appears to be adaptive in helping individuals preserve their close relationships in situations in which accurate knowledge of the partner's thoughts and feelings would have a highly threatening and destabilizing effect (Simpson, Ickes, & Blackstone, 1995). And, surprisingly perhaps, empathic accuracy in marital relationships may actually decline after the honeymoon period is over, as the spouses devote less effort to monitoring each other's specific words and actions and instead increasingly rely on more general cognitive representations of each other (Bissonnette, Rusbult, & Kilpatrick, 1997; Thomas, Fletcher, & Lange, 1997).

Although the research on empathic accuracy is still in its infancy, the topic has already proved to be of

considerable theoretical and applied interest. As a fundamental dimension of social intelligence, empathic accuracy is of interest to communication researchers, evolutionary theorists, clinical and counseling psychologists, developmental and social psychologists, and psychiatrists and social workers. From an applied perspective, it is of interest not only to clinical practitioners but also to professionals in fields such as education, diplomacy, bargaining and negotiation, personnel management, and direct sales and marketing.

[See also Empathy.]

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William Ickes

EMPATHY has been defined in many ways, in different decades, and in different subdisciplines of psychology. In the 1950s and 1960s, empathy meant the ability to understand others' mental states. More recently, empathy has been defined as an emotional reaction to the comprehension of another's emotional state or condi-

tion that is the same or very similar to the other's state or condition (e.g., a girl observes a peer crying and reacts by feeling sad). Thus, empathy involves not only some minimal recognition and understanding of another's emotional state (or what the other person is likely to be feeling given the situation), but also the affective experience of the other person's actual or inferred emotional state.

Empathy is similar to, and often may be the origin of, other related emotional reactions. Especially after the early years of life, empathy is likely to turn into either sympathy or personal distress (or both). Sympathy is an emotional reaction based on the apprehension of another's emotional state or condition; it involves feelings of compassion, sorrow, or concern for another person rather than feeling merely the same emotion as the other individual. Sympathy involves an other-orientation and the motivation to assist the needy or distressed person, whereas empathy by itself does not. [See Sympathy.]

Empathy may also engender personal distress, an aversive, self-focused emotional reaction to another's emotional state or condition, such as anxiety, distress, or discomfort. Personal distress is hypothesized to result from empathic overarousal and to lead to the egoistic motive of alleviating one's own distress. Thus, people experiencing personal distress are expected to try to escape contact with the emotion-eliciting individual and to help that person only if doing so is the easiest way to reduce one's own distress. In real-life interactions and in much of the existing research, it is difficult to differentiate among empathy, sympathy, and personal distress.

Theories of Vicarious Emotional Responding

Based on a social learning perspective, theorists such as Aronfreed and Hoffman have suggested that empathy is acquired early in life through conditioning or association, that is, by repeated pairing of the young child's positive affect or pain with another person's expression of the corresponding feelings. In contrast, some psychoanalytic theorists have suggested that empathy emerges in early infant-caretaker interactions as the caretaker's moods are communicated to the infant by touch, tone of voice, and facial expressions.

Martin Hoffman has emphasized both the cognitive and affective aspects of empathy, and the link of empathic emotion with prosocial action. In his view, empathic distress, defined as experiencing another's painful emotional state, develops early in infancy as a consequence of either built-in, biological tendencies toward empathy or early classical conditioning. For example, cues of pain or displeasure from another or from another's situation may evoke associations with the ob-

considerable theoretical and applied interest. As a fundamental dimension of social intelligence, empathic accuracy is of interest to communication researchers, evolutionary theorists, clinical and counseling psychologists, developmental and social psychologists, and psychiatrists and social workers. From an applied perspective, it is of interest not only to clinical practitioners but also to professionals in fields such as education, diplomacy, bargaining and negotiation, personnel management, and direct sales and marketing.

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server's own past pain, resulting in an empathic affective reaction.

Hoffman has argued that infants are capable of experiencing empathic distress before they can clearly differentiate themselves from others. Consequently, they are often unclear about who is feeling the emotion that they witness and may behave as if what has happened to another person is happening to them. Once infants can cognitively differentiate between themselves from others, their empathic distress may be transformed, at least in part, to concern for the victim. However, although toddlers are aware of others as separate individuals, they view the world for some time from their own perspective and do not understand that other people have their own thoughts, preferences, and feelings. Thus, their empathy- or sympathy-based helping is often inappropriate because toddlers attribute their own feelings to others.

According to Hoffman, at about the age of 2 or 3, children begin to view others as distinct physical entities with their own emotions and thoughts, so they are better able to determine the source of another's distress and engage in sensitive helping behavior. However, young children's vicarious emotional responses are restricted to another's immediate, transitory, and situation-specific distress. Because of their greater cognitive maturity and awareness of their own and others' continuing existence, older children begin reacting to others' general conditions (including deprivation, oppression, illnesses, and incompetence), as well as to another's immediate distress.

Some aspects of Hoffman's theory have received support, such as the shift from helping behaviors based on an egocentric view of the world to those based on an understanding of others' emotions, thoughts, and needs. Moreover, the role of developmental advances in cognitive perspective-taking skills in empathy has received some support, as has the relation of self-related processes (i.e., the recognition of the self) to empathy and prosocial behavior. Although some of the theory is speculative and difficult to test, it has provided a basis for developmental studies of empathy.

Development of Vicarious Emotional Responding

In the first days of life, infants cry in response to the cries of other infants, a behavior that Hoffman believes is a precursor to empathic responding (although others question whether this is true). Although 6- to 12-month-olds show little reaction to the distress of others, children between 12 and 18 months of age sometimes react to others' negative emotion with agitation or sustained attention. By 18 months of age, toddlers occasionally try to comfort others in distress, and some children's prosocial actions appear to be based on empathic reactions. By 2 to 3 years of age, it is not unusual for

children to demonstrate behaviors that seem to reflect empathy and genuine sympathy. By ages 4 to 5, children sometimes report or display emotions akin to empathy, sympathy, and personal distress, and markers of their empathic sadness or sympathy tend to be associated with prosocial behavior. By ages 11 to 12, individual differences in self-reports of empathy are relatively stable.

Children's reports of increasing sympathy or empathic sadness during the elementary and junior high school years may be real or due to increases with age in the desire to appear sympathetic to others and to oneself. Facial reactions indicative of empathic sadness, sympathy, or distress sometimes decrease with age (particularly for boys), perhaps because of the general tendency to inhibit facial displays of negative emotion more with age. However, some forms of prosocial behavior do increase with age, a finding that suggests that empathy may increase in frequency in childhood.

Gender Differences in Empathy and Related Responses

A common gender stereotype is that females are more caring and emotionally responsive than males. However, the degree to which males and females have been found to differ in empathy varies with the method used to assess empathy. For self-report measures of empathy, especially questionnaire measures, there are large differences favoring girls and women. In self-reports of emotional reactions in experimental settings in which study participants are exposed to empathy-inducing stimuli, a modest difference favoring females has been found. However, no consistent gender differences have been found when physiological or unobtrusive observations of nonverbal (e.g., facial) behavior have been obtained, although females occasionally exhibit slightly more empathy or sympathy facially when exposed to needy or distressed individuals.

Differences in findings for different measures may reflect, in part, the degree to which the intent of the measure is obvious and respondents can control their responses. Gender differences are greatest when what is being assessed is clear and respondents have conscious control over their responses, as in self-report measures. Gender differences in empathy generally disappear when demand characteristics are subtle and respondents have less conscious control over their responses, as when physiological responses are the measure of empathy. Thus, when gender stereotypes are activated and individuals can control their responses, they may try to project a stereotype-consistent image. Moreover, females more than males may want to believe that they are empathic and sympathetic and, consequently, may tend to interpret their emotional reactions in empathy-inducing contexts as empathy or sympathy, even when they are in personal distress.

Gender differences in observed empathy-related behavior may also reflect the tendency for girls to perform more prosocial behaviors than boys. This finding, along with the gender difference in self-report data, suggests that girls may be slightly more empathic than men. It also is possible that females experience more sympathy rather than empathy than males.

Empathy, Aggression, and Prosocial Development

Numerous theorists have suggested that people who tend to experience another's pain or distress are likely to refrain from aggression because of the discomfort induced by their empathic response to the victim's emotional (or imagined) reactions. There is some empirical support for this notion, although the association between aggression and empathy appears to be modest and contingent on whether empathy is measured by self-report. When empathy has been assessed with picture-story measures (in which children are told stories about hypothetical children in emotion-eliciting situations and are then asked how they themselves feel), empathy has been negatively related to elementary children's aggression, but not preschoolers'. When empathy has been assessed with questionnaire measures, there is also a negative association between empathy and aggression/acting-out behaviors. For example, Cohen and Strayer (1996) found that empathy was lower among conduct-disordered than comparison youth. Moreover, low maternal empathy has been linked to child abuse. In contrast, the relation of aggression to adolescents' and adults' reports of empathy in experimental contexts and to facial reactions indicative of children's empathy has been weak and nonsignificant. Thus, it appears that there is a modest relation between empathy and aggression, albeit primarily for self-report measures of empathy.

There also is evidence that empathy is related to prosocial behaviors such as helping and sharing, as well as higher level reasoning about prosocial moral dilemmas. However, it is likely that sympathy is more closely related to prosocial behavior than is pure empathy.

Origins of Empathy

In studies of twins, there is evidence that genetic factors partially account for individual differences in empathy-related responding. For example, Carolyn Zahn-Waxler and her colleagues (1992) noted a significant genetic component for empathic concern, prosocial actions, and unresponsive-indifferent reactions to others' distress at both 14 and 20 months of age. However, the sizes of the heritability estimates were modest (generally in the .20s), so socialization is also likely to influence the development of empathy-related responding.

Children with a secure attachment to their parent

and who experience supportive parenting appear to be relatively empathic, although the findings are not always consistent. Parental empathy (rather than sympathy) has not been found to be related to children's empathy, although parental abuse appears to be negatively related to children's empathy. However, parental warmth may be insufficient in itself to foster empathy in children. Parental practices that involve appropriate discipline or restrictiveness may foster empathy. For example, parents' demands for their children's responsible behavior (i.e., the parent's tendency to point out responsibilities or say which behavior is expected in a given context) have been associated with elementary-school children's self-reported empathy. However, research on the socialization of empathy per se, rather than sympathy, is limited.

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EMPIRICISM. See Philosophy, article on Philosophy of Science.

EMPLOYEE ASSISTANCE PROGRAMS. About 10% of the U.S. workforce suffers from some type of chemical dependency, and the costs of chemical dependency amount to billions of dollars annually. Chemically dependent employees are four times more likely to be involved in accidents and use sick leave three times more often than other workers. Alcohol and drug abuse affects personnel at all levels in the organization, from rank-and-file employees to top management executives. Employee assistance programs (EAPs) are job-based programs that help employees with personal or job-related problems that impair job performance. EAPs are the most popular vehicle for mental health and substance abuse counseling in the workplace. A nationally representative survey of U.S. work sites conducted in 1993 found that 33% of all work sites had some type of EAP, and the average cost of an EAP was \$22 to \$27 per employee (French, Zarkin, Bray, Hartwell, T.D. 1997).

History of Employee Assistance Programs

EAPs have their roots in occupational alcohol programs, which were started in the 1940s by Alcoholics Anonymous. These programs offered an alternative to dismissing employees whose job performance had severely deteriorated due to alcohol abuse. First-line supervisors were trained to recognize alcohol-related problems and to refer the worker for treatment. These programs grew from about 50 in the early 1950s to 500 by 1970. In the early 1970s, occupational alcoholism programs gave way to broader-based, employee assistance programs. EAPs did not rely as heavily on supervisor identification model and focused more on impaired work performance as the criterion for early identification. Thus, EAPs avoided the stigma associated with alcoholism by focusing on returning employee work performance to acceptable levels.

Central Practices and Services

EAP services range from screening, assessment and referral of employees to community resources through direct clinical treatment by psychologists and/or other mental health professionals. At minimum, EAPs offer assessment and substance abuse and personal counseling to workers and their families. In the past decade, however, EAPs have been asked to deal with more varied and serious workplace problems, such as job stress, workplace violence, sexual harassment, attention deficit disorder (ADD), posttraumatic stress disorder (PTSD), and financial problems. These new problems require more than short-term counseling and signal a more prominent role for psychologists who have specialized training in psychosocial disorders, the clinical skills to conduct long-term therapy, the administration skills for case management, and methodology skills to evaluate program effectiveness.

Structure of Employee Assistance Programs

EAPs can be either internal or external to the organization. Large firms (over 10,000 employees) tend to sponsor in-house programs, whereas smaller firms, singly or in consortia, tend to contract with external agencies, such as consulting firms and hospitals. About 80% of all U.S. work sites utilize external EAPs. It is easier to maintain confidentiality in external EAPs and they tend to offer a greater variety of counselors, but they often lack knowledge about the internal workings of the organization they serve. Internal EAPs usually offer a broader range of services, such as consultations with supervisors (internal = 88% vs. external = 58%), constructive confrontations (internal = 63% vs. external = 30%), follow-up with employees' supervisors (internal = 65% vs. external = 40%), and involvement in health promotion activities (internal = 86% vs. external = 36%). The staff of EAPs can include a wide range of health professionals, including psychiatric social workers, psychiatric nurses, alcohol abuse counselors, and clinical/counseling psychologists. Alcohol abuse counselors often are recovered alcoholics who have been state certified as alcohol counselors or alcohol and drug counselors.

Key Assumptions and Theories

The primary assumption of the EAP is that it is more cost-effective to rehabilitate a formerly competent employee than to hire and train a replacement. Employee replacement costs have been estimated at \$7,000 for a salaried worker, over \$10,000 for a midlevel employee, and more than \$40,000 for a senior executive. (National Institute on Drug Abuse, 1992).

Employees enter an EAP in one of two ways: The first is self-referral, in which the employee initiates con-

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tact with the EAP and obtains counseling independent of supervisory awareness. The second is supervisory referral, which occurs in response to declining job performance. The employee is confronted by the supervisor and informed of company disciplinary actions that may be taken unless the employee agrees to seek confidential assistance through the EAP. Constructive confrontation has been the predominate strategy for dealing with alcoholics in the work setting. The confrontation is between the supervisor and the employee, and the focus is on poor work performance, not problem drinking. The constructive element of the strategy is the provision of EAP services to the worker while still employed. The constructive confrontation strategy utilizes social controls within the work organization rather than creating a "deviant" role for the worker. Constructive confrontation has been successful because (a) the focus is on work performance, not the employee's personal behavior, which is a legitimate concern for employers; (b) it is more difficult for the alcoholic to use denial mechanisms in view of documented evidence of impaired work performance; and (c) the threat of disciplinary actions, even job loss, is a powerful motivating factor for employees.

Effectiveness of Employee Assistance Programs

Many studies since the 1970s have attested to the benefits of EAPs for rehabilitating employees and reducing health care costs. Roman and Blum (1996) reviewed the literature and concluded that EAPs are effective in rehabilitating workers with chemical dependencies, and seem to be cost-effective for organizations. However, they also noted that many of the studies were subject to criticism on methodological grounds (e.g., no random assignment to experimental and control groups).

Based on accumulated research and experience, an effective EAP has these key ingredients: commitment and support from top management; a written set of policies and procedures outlining the purpose of the EAP and how it functions in the organization; close cooperation with local union(s); training of supervisors on their role in problem identification; education of employees and promotion of EAP services to foster widespread utilization throughout the company; a continuum of care, including referral to community agencies and follow-up; an explicit policy on confidentiality of employee information; and coverage of EAP services by company health insurance benefits.

Several organizations provide current information and assistance about EAPs and substance abuse prevention. The Employee Assistance Society of North America (EASNA) is an international group that was formed to provide a standard of care for EAPs through accreditation, peer review, and staff development; a step-by-step guide to accreditation is available on the

Internet (<http://www.ccsa.wiseeasn.html>). The National Clearinghouse for Alcohol and Drug Information's Web page (<http://www.health.org/aboutn.htm>) is the information service of the Center for Substance Abuse Prevention of the U.S. Department of Health and Human Services, and is the world's largest resource for current information and materials concerning substance abuse prevention. The National Institute for Alcoholism and Alcohol Abuse's (NIAAA) Web site (<http://www.niaaa.nih.gov>) is the most complete Web site on alcohol abuse, and contains information on publications, videos, and a complete list of assessment and screening instruments.

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refers to the fact that the employee training is intentional; it is being conducted to meet some perceived need. Learning and development concerns the building of expertise as a function of these systematic training efforts. Learning outcomes include changes in knowledge, skills, and/or attitudes. The issue of improvement focuses on the extent to which the learning that results from training leads to meaningful changes in work performance. Therefore, a critical issue is the extent to which the knowledge, skills, and/or attitudes gained in training are transferred to the job and improve individual effectiveness. Finally, employee training can also be viewed from a broader, more macro perspective, as a mechanism for enhancing work team and organizational effectiveness. In this way, training is seen as integral to facilitating larger-scale organizational change and development issues.

Businesses are spending an increasing amount of money on training their own workforce in order to increase competitiveness and to improve services. Psychologists play various roles relevant to improving the quality and effectiveness of employee training. These include:

1. The development of theoretical perspectives and models of what is meant by learning and transfer;
2. The derivation of testable models and the conduct of empirical research on the factors that impact learning during training and the transfer of training to the job;
3. The identification, design, delivery, evaluation, and improvement of training programs;
4. The study of key issues beyond individual training to broader issues of team training and organizational change and development.

The Learning Process

Learning is typically defined as a relatively permanent change in knowledge, skill, or attitudes produced by some type of experience. Training transfer is usually defined as the degree to which trainees effectively apply the knowledge, skills, and attitudes gained in training to a job. Applied psychologists have tended to view learning and transfer as conceptually distinct constructs, with learning during training seen as a direct precursor (necessary, but not sufficient) to transfer. In contrast, researchers in cognitive and instructional psychology often conceptualize learning and transfer as two ends of the same continuum. Proponents of this perspective argue that the effectiveness of learning is revealed and measured by the level of retention and transfer shown. It is clear that the psychological processes underlying transfer and learning are largely inseparable. From an organizational training perspective, though, there remains value in discussing separately the acquisition or building of expertise and the application of that expertise to the job.

Acquisition and Building Expertise. Psychologists are quite interested in identifying and understanding the changes that occur as an employee moves from novice through competence and then on to expert status. Expertise is defined as the achievement of consistent, superior performance through the development of specialized mental processes acquired through experience and training. To investigate the dynamic issues underlying this movement toward expertise, researchers have taken a multidimensional perspective to learning. Three key learning outcomes are changes in cognition, skills, and attitudes.

Cognition refers to the quantity and type of knowledge obtained as a function of various experiences, such as training. Evaluations of training effectiveness have tended to examine whether the trainees have achieved a certain level of declarative knowledge. Declarative knowledge is the acquisition of facts as measured by multiple-choice or free-recall methods. Recent advances in research on expertise have led to the examination of procedural knowledge, knowledge organization, and metacognitive strategies as key knowledge-acquisition outcomes.

As individuals move beyond novice levels and gain knowledge and experience, declarative knowledge can become proceduralized. This means that an individual's expanding knowledge about situations, responses, and outcomes leads to the development of context-specific rules for diagnosis, action, and monitoring. Proceduralized knowledge is often described as a set of conditional-action rules of the form "if condition A, then action B" (e.g., if I pull this lever, then the plane will go in this direction).

As knowledge becomes highly proceduralized, the learner begins to develop meaningful structures for organizing that knowledge. The term *mental model* has been used to describe how well people organize their knowledge. Mental models serve as frameworks that trainees use to describe functions and forms of tasks, explain and observe the integration of tasks, and anticipate future task requirements. Trainees are believed to possess separate models for multiple functions on the job. For example, a military pilot may possess distinct mental models for preflight briefings, takeoffs, landings, tactical engagements, and aircrew coordination. Mental models provide a context for the interpretation of events; they not only organize existing information, but also influence the acquisition of new knowledge.

Metacognitive strategies involve the capability of a learner to self-monitor and self-regulate activities. These capabilities allow individuals to take actions that lead to improved knowledge and skill acquisition, retention, and application to the job. Indicators of metacognitive processes include the ability to select alternative learning strategies, monitor the use of strategies, and revise or select a different strategy if the current

approach is not successful. For example, experts are more likely to know that they have understood task relevant information, are more likely to discontinue a problem-solving strategy that would ultimately prove unsuccessful and are more accurate about judging the difficulty of new problems.

Skill-based learning refers to the development of technical or motor skills. The development of expertise from initial skill acquisition to skill compilation and automaticity requires more than just practice and experience. The transition from declarative to procedural knowledge sets the stage for initial skill development as procedural knowledge enables the reproduction of modeled behaviors. The compilation of skills occurs with the development of highly organized mental models that comes from experience beyond initial successes at reproducing certain behaviors. Performance at the compilation phase is characterized by faster, less error-prone performance and by the integration of discrete task steps into a single act. With subsequent practice, experience, and feedback, individuals can obtain a level of automaticity at which they not only can perform tasks quickly but also are able to maintain parallel rather than successive processing of activities. Automaticity enables task accomplishment with minimal conscious monitoring. Cognitive resources are then available for concurrent performance on additional tasks or for attending to peripheral demands of the task (e.g., situational pressures).

Models of learning that focus solely on knowledge and skill acquisition are incomplete. Individuals come to training programs with various attitudes, beliefs, and motivations based on individual characteristics, past experiences, and social influences. These affective reactions are internal states that influence the choice of personal action. While attitudes arise from some complex set of beliefs and feelings of liking and disliking, the important issue for training is what action these reactions support. For example, if a trainee's attitudes toward the value of safe behaviors in the workplace have undergone some change as a function of training, then learning has occurred. The key issue is how changes in attitudes lead to changes in behaviors on the job.

Applying Expertise to the Job. The systematic acquisition of knowledge, skills, and attitudes is an important but imperfect indicator of learning. Acquisition performance during training may indicate only temporary rather than a permanent change in the individual. The main objective of training is to enhance performance in the transfer or work setting. Demonstrating transfer requires clear linkages between the expected changes during training and observable changes in behaviors in the work setting. Expected outcomes of the transfer process include the generalization of trained skills to the job, the maintenance or long-term

retention of training, and the adaptability of trained responses to new tasks and situations.

Generalization concerns the extent to which attained skills and behaviors are exhibited in the transfer setting and are applied to situations and conditions beyond those incorporated into the training program. Generalization involves more than mimicking trained responses to particular events that occurred during training; it requires trainees to exhibit behaviors in response to stimuli that is similar but nonidentical to that presented in training (different settings, people, and situations).

Maintenance or long-term retention is defined as the length of time that trained skills and behaviors continue to be used effectively on the job. It is clear that people who exhibit similar levels of skill proficiency immediately after training can differ substantially in long-term retention. Performance at the end of training is not a sufficient predictor of long-term retention.

An emerging literature in cognitive psychology contends that another key indicator of learning is the extent to which an individual can adapt to novel or changing situational demands. Adaptability is evidenced when the trainee responds successfully to changes in the nature of the trained task. Adapting one's knowledge and skills to novel tasks requires an understanding of the deeper principles underlying the task, executive-level capabilities to recognize and identify changed situations, and knowledge of whether or not the existing repertoire of procedures can be applied. In training for adaptive expertise, it is critical to encourage active and mindful learning during training.

Factors That Affect Learning and Transfer

Much research has been conducted to examine the factors that might affect knowledge and skill acquisition during training and the transfer of those skills and knowledge to the job. A number of training effectiveness models have been developed. Three categories of variables identified as having an impact on acquisition and transfer include the incorporation of learning principles and learning strategies into training design, the impact of individual differences, such as the motivation and abilities of the trainees, and the influence of various characteristics of the work environment.

Learning Principles and Strategies. Traditionally, research has centered on the four learning principles: (1) identical elements; (2) the teaching of general principles; (3) stimulus variability; and (4) various conditions of practice. Identical elements contends that retention is enhanced when there is psychological and physical fidelity between the training context and the job setting. Physical fidelity involves matching the training context as closely as possible to the actual work environment (surroundings, tasks, and equip-

ment). Psychological fidelity is the degree to which trainees attach similar meanings to objects and events in the training and organizational context. To enhance psychological fidelity, training exercises can be developed that necessitate the same responses and decision-making processes that the trainee should use in the work setting, given similar job pressures and stresses.

Teaching through general principles maintains that learning and transfer are facilitated when trainees are taught not just applicable skills but also the general rules and theoretical principles that underlie the training content. Retention is enhanced when the principles underlying a specific content or behavior to be learned are understood or coded along with new behaviors.

Stimulus variability is based on the notion that transfer is enhanced when the variety of situations that trainees will face on the job are incorporated into the training program. Providing several examples of a content to be learned strengthens the trainee's knowledge structure so that the trainee is more likely to see the applicability of a concept in a new situation.

Conditions of practice include a number of specific design issues, including whole or part training, feedback, and overlearning. Whole or part training concerns the relative efficiency of practice with all the steps involved in a performance event as opposed to practice one step at a time. Evidence suggests that the whole method is advantageous for enhancing learning when the training material is high in task organization but low in task complexity.

Feedback or knowledge of results refers to information provided to trainees about their progress in training. Feedback is a critical element in achieving learning, with the timing and specificity of feedback the critical variables in determining its effects. Overlearning is the process of providing trainees with practice far beyond the point at which the task has been performed successfully. Overlearning impacts retention and can lead to skill compilation and automaticity.

The learning principles provide a structured strategy for designing training programs and building expertise. Researchers have begun to examine learning environments that facilitate learning and transfer by taking into account individual needs and preferences. Three such strategies include inductive learning, learner control, and error management.

The typical learning strategy is to explicitly instruct learners on the complete task and its concepts, rules, and strategies. With inductive approaches to learning, such as discovery learning, individuals must explore and experiment with the task to infer and learn the rules, principles, and strategies for effective performance. The approach emphasizes the importance of hypothesis testing and problem solving by the learner that is guided by an instructor. For example, an instruc-

tor can provide the general strategy to troubleshooting an electrical problem and then have the trainee discover the specific steps to take.

Training is often designed to maximize control over the learning process by the instructor. Recent attention has been given to enhancing the learner's control of their own learning process. Learner control refers to the extent to which trainees have the opportunity to select the method, timing, practice, and/or feedback of training. With greater control, learners can more actively tailor the training to meet their own changing needs. It is hypothesized that this method for engaging learners leads them to a deeper understanding of the task (its procedural knowledge and mental models). Effective use of metacognitive strategies is a critical component to the learner being more in control of their own learning.

The behavioral approach to learning has emphasized the need to shape correct responses, minimize incorrect responses, and reinforce the correct responses to build skills. Error-based learning strategies highlight the advantages of designing an experience in which trainees learn from mistakes. Errors can gain learner's attention because they signal unexpected events and can alert learners of incorrect assumptions that are being made. In this way, making progress as well as mistakes can lead to a more comprehensive mental model of a task.

Individual Differences. Trainee characteristics such as ability, skill, experience, personality, and motivational factors are important predictors of performance in a training-and-transfer environment. Ability, experience, and skill factors have been examined to understand trainability or the extent to which certain types of trainees (e.g., those with high levels of previous experience) benefit more from training than others. For example, researchers have examined issues of aptitude/treatment interaction, or the extent to which certain types of trainees (e.g., high-ability trainees) perform better with one type of training method (e.g., self-paced), while other types of trainees (e.g., low-ability trainees) perform better with another type of method (e.g., instructor-led training). Indicators of abilities include scholastic aptitude, spatial aptitude, verbal reasoning, reasoning ability, and analytic ability.

A variety of personality and motivational factors have been examined for their impact on training effectiveness. Personality factors that have been found to be predictors of learning in training settings include the dimensions of conscientiousness, openness to experience, and extraversion. Thus, individuals who are outgoing have a strong sense of purpose and a willingness to take risks seem to do better in training, especially when training is a new experience. Work-related attitudes, such as job involvement and career-related atti-

tudes, have also been found to have an influence on trainee motivation to learn and subsequent learning in the training environment.

Research has examined motivational determinants more directly. *Social cognitive theory* posits reciprocal determinism among the trainee's knowledge, the environment, and behavior. That is, individuals regulate their behavior based on their prior beliefs about their ability to accomplish a task (self-efficacy) and their beliefs about the environmental consequences of their behavior (outcome expectancies). Training success is maximized when trainees believe that they have the capability to learn the training material and that they perceive that desirable outcomes are attained as a result of completing a training program satisfactorily.

Work Environment Characteristics. The work context that surrounds the employee is critical for effective transfer. This context can provide opportunities to apply training or obstacles to successful transfer. Key factors that have been studied for their impact on learning and transfer include situational constraints, work-group climate and factors in the larger organizational system.

Investigators have examined situational constraints to performance on the job, including the lack of job-related information, tools and equipment, materials and supplies, budgetary support, services and help from others, and time availability. These factors can place limits on how much of what is trained can be successfully applied to the job. A key constraint that has direct relevance for training transfer is the opportunity to use or apply the knowledge and skills gained in training on the job. Lack of the opportunity to immediately apply trained skills not only reduces subsequent motivation to enhance skill development but can also lead to rapid skill decay. Research has found that factors such as supervisory attitudes toward a trainee, the supportiveness of the work group, and the individual's level of self-efficacy can impact the quantity and quality of opportunities that trainees obtain to use trained skills on the job.

Work-group climate is a multidimensional construct which includes issues such as supervisory and co-worker support for training, an openness by the work group to innovation and going beyond the status quo, and a tolerance for mistakes made as part of learning. The more favorable the work climate, the more likely the trainee will attempt to apply the knowledge and skills gained in training to the job. Once applied, the level of support impacts transfer outcomes of generalization, maintenance, and adaptability. For example, research shows that pretraining discussions with supervisors and subsequent posttraining mentoring contributes to the transfer of skills to the job.

Training programs are embedded within a larger or-

ganizational system. This system conveys information regarding the importance of training and development relevant to other uses of organizational resources. Also conveyed is information as to what individual behaviors are rewarded and whether learning and improvement lead to desired outcomes, such as promotions. Similarly, organizational policies and procedures that impact what happens on a daily basis on the job can facilitate or hinder effective transfer. The bottom line is whether employees feel that there is commitment through all levels of the organization in support of training, workplace development, and continuous learning efforts. Without that commitment, trainees may feel little need to acquire and transfer trained knowledge and skills.

Systematic Approach to the Design and Delivery of Training

Numerous researchers and practitioners have stressed the need for training to be based on a systematic and organized framework. Training activities must be carefully planned and developed to meet the needs of individual employees, teams, departments, and/or organizational functions. A well-established framework for organizing the important steps of training is the instructional systems design model. Based on this model, psychologists can be involved in the development of a systematic approach to employee training programs in one or more of the following ways: analysis of training needs; design and planning of the training program; delivery or implementation of training; and evaluation and improvement of training.

Training Needs. A thorough assessment of training needs forms the foundation of any training endeavor. Training needs analysis is typically described as consisting of three interrelated components: (1) organizational analysis; (2) operations analysis; and (3) person analysis. Organizational analysis involves the examination of the entire organization to determine where training is needed. This analysis typically examines whether the existing goals of the organization might be better met by increasing employee knowledge and skills or changing existing attitudes.

Given an organizational need for training, an operations analysis can be conducted. An operations analysis concentrates on the jobs that are to be part of the training effort. It focuses on what tasks employees must perform, what knowledge and skills are required to complete those tasks, and what standards of performance are expected. Based on this comprehensive analysis of the job, the required content of a training program can be identified. A person analysis assesses whether individuals are performing to expected levels. This analysis determines if there is a gap between standards of performance for a job and the actual level of performance of the employees. An analysis can then be

done to determine if the cause of the performance "gap" is due to inadequate knowledge, skills, or experience with the task. An action plan for each individual can then be developed that might include training activities, goal setting, job rotation, or other developmental actions that might be needed to meet or exceed job expectations.

Training Design. Training needs assessment provides information about where, what, and who needs to be trained. The next step is determining how to design training environments and experiences that enhance acquisition and transfer. Program design is the process of developing a plan of instruction for each training program to be offered. Developing a plan of instruction requires the identification of training content, training objectives, and specific lesson plans.

A plan of instruction requires some prioritization of information from the training needs assessment. The content of training should be based on the important tasks or knowledge and skills identified. Then decisions have to be made about how much effort (time and resources) will be devoted to training each component (task, knowledge, and skill) that is part of the training program. Once the content is specified, training objectives can be written and the sequencing for training can be determined. Training objectives constitute the formal description of what a trainee should be able to do once training is completed. The next step is to sequence the training objectives in such a way as to enhance learning activities in the training program. The key to sequencing is to ensure that the prerequisite knowledge and skills have been acquired prior to the introduction of advanced material. Once objectives are sequenced, lesson plans can be developed. For each objective, the specific facts, concepts, principles and skills needed to build competency in an area can be identified. The methods of instruction (lecture, discussion, demonstration, and practice), testing procedures to use, and how much training time is needed to accomplish each training objective must be identified.

Training Method and Delivery. Training methods can be divided into nonexperiential and experiential techniques. Nonexperiential training methods are knowledge-oriented and include such techniques as lecture, group discussion, and audiovisual presentation.

Experiential techniques focus more on building trainee skills and include work simulations, behavioral modeling, and on-the-job training. Work simulations allow trainees to perform outside the work context but with high levels of physical (e.g., the equipment used on the job) and psychological (e.g., noise level and time pressures) fidelity. Behavioral modeling is based on the principles of social learning theory, which contends that we learn most through focused observation of ourselves and others and through the reinforcements we obtain as a consequence of our behaviors or actions.

Behavioral modeling involves trainees watching a model display the set of key behaviors to be learned (e.g., how to be assertive), role-playing so that trainees can practice the key behaviors, and feedback and social reinforcement for successful behavioral rehearsal. With on-the-job training, an experienced worker or mentor provides instruction in the actual work context and supports the application of required knowledge and skills to be effective. For example, police cadets are often paired with an experienced officer on the job to refine the skills gained in the formal training program.

While the majority of training is face-to-face classroom instruction, there are a number of emerging training delivery platforms. A platform that allows for training across multiple sites at one time is distance learning. Through audio and data links, trainees from various sites can access and interact with an instructor from a distant location. Another platform is the development of work simulations through virtual reality training. Trainees can view a three-dimensional world of the kinds of situations they might typically face on the job. Objects in this simulated world can be touched, looked at, and repositioned. The learner (e.g., astronaut) is immersed in the training experience (such as correcting the Hubble telescope) where mistakes can be made without real-world consequences.

Other platforms, such as computer-based instruction (CBT), intelligent tutoring systems, and Web-based training allow for more self-paced instruction and learner control. With CBT, trainees interact with instructional materials on CD-ROM that allow for intensive drill and practice with knowledge-based tests and immediate feedback. CBT can embed branching patterns (e.g., different levels of difficulty to learn training material) based on responses to questions to allow for some individualized learning or provide simulations that place trainees in scenarios in which they must use problem-solving skills (e.g., troubleshooting a mechanical malfunction on a jet engine).

Intelligent tutoring systems are computer-based programs that strive to completely individualize instruction. Through various methods, there is a diagnosis of the trainees' current level of understanding or performance and the selection of the appropriate intervention that can transform a trainee toward more expert performance. The difference between CBT and intelligent tutoring systems lies in the use of artificial intelligence programming techniques to emulate the properties of tutors in one-on-one instruction.

The growth of the World Wide Web has triggered an interest in Web-based training delivered via the Internet or corporate intranet. Information is sorted and transmitted as requested by trainees at remote sites as accessed by Web browsers. Web-based instruction allows for just-in-time training delivery, with trainees accessing the material when needed. Learners can also

control how much information to attend to through the use of hyperlinks to additional material, practice exercises, and feedback. Web-based systems also have the potential for sharing intellectual capital by linking people across locations through chat rooms and e-mails to discuss training and support each other's learning.

In addition to these training platforms, organizations are moving away from traditional classroom training and embracing experienced-centered learning that emphasizes learning from job-related activities. One of the most practiced job-oriented learning experiences is job rotation, where employees are provided a series of job assignments in various parts of the organization. Another approach has been called action learning, where groups of participants work to solve real organizational problems or develop new and innovative approaches and reflect on how the learning can be generalized throughout the organization. This is in contrast with recent efforts at adventure learning, where a group of employees are exposed to difficult and unfamiliar physical and mental challenges in an outdoor environment in order to build problem-solving and team-building skills that will hopefully be transferred back to the job setting.

Training Evaluation. A key characteristic of a systematic approach to training is the emphasis on the continuous use of evaluative feedback to adapt the program to better meet its stated objectives. The evaluation process can aid in identifying, collecting, and providing information to make a variety of instructional decisions. Evaluation information can be collected prior to or during training program implementation to make immediate instructional improvement in the design, development, and delivery stages. This formative evaluation process is typically conceived of as an iterative process of tryout, measurement, and revision of instructional components by program developers.

Other efforts focus on posttraining evaluation for decision-making and marketing purposes. This summative evaluation process is conducted to determine instructional effectiveness after the program has been implemented and stabilized. Information collected at this point is used by decision makers to determine whether training objectives have been met, whether trainees are applying the knowledge and skills gained in training to the job, and whether the program should be continued or perhaps expanded to other locations or trainees. The evaluation information can also be used to select new training course content, revise the emphasis placed on different aspects of the current course content, and modify instructional objectives and activities to improve learning and transfer to the job.

A key evaluation question is whether any changes found in performance on the job can be attributed to the training. Research methods and experimental and quasi-experimental designs can be used to systemati-

cally examine this issue. One useful design for determining the success of training is the pretest, posttest, experimental design, which compares the acquisition and transfer of knowledge and skills for a group of trainees with a control group that has not had access to the training program.

Beyond Individual Effectiveness

Businesses are spending an increasing amount of money on training and development of their own workforce as people are seen as the primary source of enduring competitive advantage. In addition, the increasing scope and complexity of the changes occurring in the workplace, such as team-based work systems, the focus on quality and customer service, and the infusion of new technology all require a highly trained workforce that is prepared to deal with the changing realities of the workplace. Training is now viewed not only as an important factor in improving individual effectiveness but also from a broader perspective as a key lever for improving team and organizational effectiveness.

From a research perspective, the emerging literature in organizational psychology on multiple levels of analysis issues mirrors the applied interests in moving beyond the examination of factors impacting individual effectiveness. A levels perspective, an extension of the general systems paradigm, posits that events should be viewed within their larger contexts (e.g., individuals are part of groups of workers) and that the levels are interrelated (organizational issues can impact work team effectiveness). Organizational researchers typically have used the terms *organizational*, *team*, and *individual* to denote the hierarchical ordering of levels. While there are a number of training models that focus on factors impacting the success of training in improving individual effectiveness on the job, few models exist on training from a broader perspective at the team and organizational levels.

Team Training and Effectiveness. Work organizations have embraced new initiatives, such as just-in-time inventory control, total quality management, and advanced computer-based systems. These types of initiatives have led to more integrated approaches to work that require the increased coordination of efforts. Many organizations have adopted team-based work systems as a way of meeting these increasing integration needs, with training as a critical component in improving the work team effectiveness.

Recent efforts have investigated the knowledge and skills that distinguish between effective and ineffective teams. Based on this type of information, training interventions can be developed to build team skills for enhancing work team effectiveness. In particular, team researchers have differentiated between task-work and teamwork skills. Task work refers to the individual performing the tasks required for their job. Individuals

must be competent in their role if they are to become effective team players. One approach for increasing coordination is cross-training, in which individuals learn multiple jobs. This not only increases flexibility in the workgroup (e.g., if a team member is absent from work), but also provides teams with a greater appreciation of the demands of each job and the need for coordinated efforts.

Teamwork skills are those related to functioning effectively as a team member—skills such as communication, coordination, cooperation, morale, adaptability, decision making, and situational awareness. Training teamwork skills can advance the ability of teams to dynamically adapt to the demands of the situation, often without explicit instruction from leaders or supervisors. For example, work with airline cockpit crews indicates that training on key skills such as how to be assertive helps to reduce team conflicts and decreases the likelihood of crews experiencing avoidable accidents.

Organizational Learning and Effectiveness. The success of new initiatives in work settings, such as team-based work systems and total quality management, relies on the expertise of individuals and the coordinated efforts of team members. Organizations have begun to acknowledge the importance of learning and creating a knowledge base as a key strategic weapon for improving competitiveness and for delivering effective services. Consequently, organizations have become more interested in how to build learning capabilities in the workforce on an ongoing basis. This organizational learning cycle has been labeled continuous learning.

The goal of continuous learning is to encourage everyone in the organization—employees, line managers, supervisors, and technical personnel—to become actively engaged in expanding their skills and improving organizational effectiveness. Learning becomes an everyday part of the job rather than being confined to formal training sessions in the classroom. Employees can learn skills of others in their work unit (cross-training), teach other employees in areas of expertise, and learn from one another on a day-to-day basis. Thus, while learning and development are clearly rooted in individuals, organizations can attempt to create the context for a positive learning environment. A positive learning environment occurs when individuals know how their job fits with the larger systems, individuals are assigned tasks that stretch and challenge them, mistakes are tolerated during learning, constraints to learning are minimized, new ideas are valued and encouraged, and policies and procedures support the effective use of training.

The backbone of any effort to develop a continuous learning orientation is the development of problem-solving skills. Problem-solving skills include the ability

to identify the gap between the aims of an improvement effort and the current reality of the system, the analysis of the root causes of the gap, the identification of improvement options, the choice of which option has the greatest potential to add value to the organization, and the evaluation of the effectiveness of the improvement effort. There are a number of methods or techniques to facilitate this problem-solving process, including the use of brainstorming, the nominal group technique, and multivoting, all of which identify and prioritize gaps. Methods for diagnosing problems and conducting root cause analysis include the use of flow charts of a work process, force-field analysis, and cause-and-effect diagrams.

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J. Kevin Ford

EMPLOYMENT DISCRIMINATION is adverse treatment of an employee in which the employee's race, color, national origin, sex, age, religion, psychological or physical disability, previous opposition to apparent discrimination, or participation in discrimination claims, is a motivating factor resulting in restricted employment opportunities or limited career advancement. Prohibited adverse actions include both discrete decisions, such as nonhire, nonpromotion, discipline or discharge, and acquiescence in the face of harassing comments or conduct about protected groups. Four theories of discrimination are distinguished: (a) intentionally less favorable treatment than that afforded to similarly situated individuals who are not members of a protected group; (b) facially neutral systemic practices that fall more harshly on a protected group and that are not justified by business necessity; (c) a hostile or abusive workplace atmosphere that unreasonably interferes with an employee's work performance or employment opportunities (e.g., sexual harassment); and (d) denial of reasonable accommodation or special consideration for an employee's religious observances or for a physical or psychological disability (Goodman-Delahunt, 1999).

Stereotyping and Discrimination

Hostility to outside groups is a culturally learned phenomenon. Employer perceptions and attitudes about the abilities of various groups in society (ethnic, racial, gender, age, etc.) can cause negative stereotyping. Use of cultural or gender differences as a basis for categorizing and defining intergroup boundaries diminishes the salience of multicultural shared values. As sociological constraints against discrimination became more widespread, racism, sexism, and other forms of prejudice became more subtle. Contemporary research on prejudice demonstrates how normal cognitive and motivational processes can contribute to the development, maintenance, and perpetuation of discrimination through processes of social categorization, negative

stereotyping, and priming (Rudman & Borgida, 1995; Tyler, Boeckmann, Smith, & Huo, 1997).

Conditions that generate negative stereotyping based on membership in a protected class include: (a) the target protected group constitutes a disproportionately low ratio of the work team, usually 15% or less of the total group, leading to role encapsulation; (b) the target is in a nontraditional occupation; and (c) the evaluative criteria are ambiguous or subjective, and individuating information is scarce, perhaps limited to brief encounters between the evaluator and employee. In such circumstances, successes of women and minorities in other protected groups may be attributed to external factors such as luck, rather than the skill or expertise of the employee. Employers may resort to determinations based on the perceived "fit" between stereotypes and the job type or task. Ambiguous evaluation criteria that permit the use of subjective factors can enable aversive racism (Dovidio & Gaertner, 1986). Examples of negative stereotypes are, for instance, that clientele prefer not to be served by racial minorities, or that it is inappropriate to discuss finances with women.

Comments or conduct by coworkers based on sex role expectations, sexual, racial, disability, or age-biased stereotypes may comprise actionable harassment or a hostile workplace. A workplace environment in which sexually oriented materials are present, or in which employees are perceived as sex partners or sex objects, rather than in terms of their occupational role and worth, is sexualized and can foster discriminatory sexual harassment through sex role spillover. Local organizational norms and what is tolerated by management may encourage sexual harassment. For example, when male employees and management share sexualized views of women, men with a proclivity to harass become disinhibited (O'Donohue, 1997).

Factors that inhibit harassment in the workplace include: (a) unbiased attitudes of top management personnel who serve as role models and establish policies and who counteract negative stereotypes, because people look to authority figures to define "outsiders"; (b) use of cooperative work teams to promote the interdependence of diverse groups and diminish the salience of intergroup boundaries; (c) an increased ratio of protected group members at the work site; (d) clearly defined and appropriate nondiscriminatory norms; and (e) disincentives, such as discipline, for violating nondiscriminatory norms (Eberhardt & Fiske, 1998; Fishbein, 1996; Jackson & Ruderman, 1996).

Psychologists may testify as expert witnesses in employment cases, drawing on research on stereotyping to describe the mental antecedents of prejudice, or how social influence, social roles, and group dynamics can foster prejudice or inhibit it. To establish that stereotyping is discriminatory, there must be evidence that (a)

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discriminatory comments or behavior occurred that included stereotypes, and (b) those stereotypes were relied upon in making the employment decision that adversely affected an individual employee or group of employees in a protected class (*Price Waterhouse v. Hopkins*, 1989).

Statistically Based Evidence of Differential Hiring and Promotion Practices

Circumstantial proof of discriminatory patterns and practices that disproportionately impact a protected group of employees can be demonstrated by statistical evidence. Statistical evidence typically compares the composition of the workforce with the pool of applicants or relevant labor market. Facially neutral practices with a substantially greater impact on a protected group comprise systemic disparate impact discrimination, such as glass-ceiling cases, where women and minority-group members are overrepresented in low-level positions.

Psychologists can identify specific objective or subjective employer practices that cause the significant disparities, such as employer reliance on biased tests or other selection devices, and can also identify less discriminatory alternatives to achieve job-related objectives. Three statistical methods to assess the impact of hiring or promotional criteria are the policy-capturing or regression models, the survey model, and psychometric analysis (Schwartz & Goodman, 1992). Multiple regression analysis computes mathematical equations that combine several factors to provide the best possible prediction of the employment decision in issue, expressed in correlations or proportion of variance accounted for by job-relevant qualifications (e.g., education, age, most recent occupation, etc.). Significant relationships between employment decisions like hiring and illegitimate factors like race or gender when relevant factors are controlled for, may establish intentional discrimination. Decision-making models may also prove that innocent factors (career choices personality factors, employee interest) produced some portion of the apparent glass-ceiling phenomenon.

Survey analysis gathers data to determine the impact of permissible (employee interest in promotion) and impermissible (negative stereotypes) factors that cause an adverse impact. For example, current and former employees may be surveyed about management attitudes to promotions of male versus female or majority versus minority individuals, and about employee interest in promotion, to determine whether disparities in the work force are caused by perceived discriminatory attitudes or employee interest. To contest liability, psychologists may offer relevant analyses challenging the raw data, labor market, or statistical methods and tech-

niques. They may demonstrate, for example, that factors other than the challenged practice can account for the disparity, or may provide expertise about the validity of personnel tests to establish that the practice is job related and justified by business necessity.

Psychometric analysis is most useful when a specific employment practice (e.g., a psychological test, structured interview, education, or experience requirements) is at issue. Validation studies examine the extent to which a test instrument or other selection procedure is job related. Three psychometric methods of validation are criterion-related validity, content validity, or construct validity. Criterion validity studies are preferred as they most clearly examine whether an employment practice is predictive of successful performance of important elements of a job. Psychologists can evaluate whether employers are using a test the way the publisher planned it and whether the validation methods meet professional standards (Haney & Hurtado, 1994). Most typically, industrial/organizational psychologists provide expertise on psychometric analysis and statistical proofs.

[See also Discrimination.]

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Jane Goodman-Delahunty

EMPOWERMENT. The concept and practice of empowerment has many different interpretations and has been an elusive construct in psychological, political, and community contexts. Empowerment has been viewed as both a process and an outcome. As a fluid process that moves individuals, communities, and organizations along a continuum, empowerment has an end point wherein individual, community, and organizational systems are perceived as having reached a state of actualized power. However, the lack of agreement on the conceptualization of empowerment at micro and macro levels of practice and process makes measurement of this construct even more elusive. In a very general sense, the term refers to one's capacity to acquire understanding and control over personal, social, and political forces in order to improve life situations.

Empowerment is the antithesis to powerlessness. It is easy to define in its absence. It is often seen as a political process, suggesting a societal redistribution of power and advancement of equity among stakeholders. In *Pedagogy of the Oppressed* (1970), Paulo Freire (a Brazilian educator) applied empowerment principles to his internationally renowned work to address the illiteracy problem among Brazilian peasants. His approach first defines community powerlessness as a prevailing state of mind in which the individual assumes the role of "object," controlled by random impulses of the environment, as opposed to "subject," exerting significant influence on the factors that affect one's life and community. In the context of this definition, the individual is alienated from genuine participation in the construction of social reality. For Freire, powerlessness results from the passive acceptance of oppressive cultures. It further combines an attitude of self-blame, a sense of generalized distrust, feelings of alienation from sources of social influence, experiences of disenfranchisement and economic vulnerability, and a sense of hopelessness in the sociopolitical struggle.

Previous work by Braithwaite advocated for community organization and development as an antecedent to community empowerment. However, poverty of the spirit and resources remains the antecedent risk factor for preventable disease. Poverty and powerlessness create circumstances in people's lives that predispose them to high levels of social dysfunction, the highest indices of morbidity and mortality, the lowest access to primary care, and little or no access to primary prevention programs.

Social epidemiologic research has well documented that lower socioeconomic status is negatively correlated with increased morbidity and mortality, from such risks as poor sanitation, hazardous work environments, malnutrition, poor education, unemployment, and minority status. Recent studies have begun to assess the underlying susceptibility to disease from the risk of lack

of control and disempowerment as confounders of specific risk factors. Except for slavery, the most contemporary and blatant example of disempowerment in this context is the infamous Tuskegee syphilis experiment (1932–1972), when racism (a confounder) was perpetrated against African American men from Macon County, Alabama, resulting in egregious abuse as uninformed research subjects by the U.S. Public Health Service.

Individual empowerment has been used in therapeutic environments in an effort to assist clients in changing self-defeating behaviors to more adaptive and health promoting ones. In health promotion and therapy, empowerment is often defined as "a process of assisting others to assert control over factors which affect their health." It has been used synonymously with such measures as coping skills, mutual support, social support systems, personal efficacy, competence, locus of control, self-esteem, and self-sufficiency. Individual empowerment is positively correlated with self-efficacy, positive self-esteem, and self-concept or personal competence. The psychological effects of empowerment enable one to actualize a sense of full citizenship participation, and mastery, control, and proficiency over life's obstacles. Historically, such actualizations have been marginalized for ethnic minorities, women, the illiterate, physically challenged, poor, uninsured, unemployed, and other disenfranchised populations.

Community empowerment grew from roots in social action ideology and advances the plight of disenfranchised groups to gain control of resources affecting their quality of life. According to many health psychologists and behavioral scientists actively involved in the conduct of empowerment research, increasing citizen participation in community activities typically leads to improved neighborhoods, a stronger sense of community, and personal and political efficacy. Community empowerment and its relationship to civil rights, justice, political and social structures, and quality-of-life issues have been the focus of study in such disciplines as philosophy, religion, political science, sociology, education, and psychology. While considerable research documents the effects of lack of control or powerlessness in causing disease, empowerment is health enhancing. The literature in social epidemiology and community psychology addresses the relationship between the lack of control over one's life as a risk factor stemming from an overburden of life demands without the adequate resources to meet those demands. Several models for community empowerment exist, such as social action, social planning, national campaigns, single-issue advocacy, and community organization. These models transcend hierarchical, patriarchal, coercive, or violent conceptualizations of power and challenge the assumption that power is a zero-sum

commodity (the premise that increasing the power of one community, organization, or individual implies decreasing the power of another).

The object of organizational empowerment is to maximize the effectiveness of the members of the organization relative to decision-making processes for the mutual benefit of meeting personal and organizational goals. Given that information is power, organizational empowerment places a premium on communication, information sharing, and shared leadership. In this context, the management style typically embraces concepts of mutually defined goals wherein members develop and buy in to a collective vision for the organization. Organizations that practice genuine empowerment principles can be viewed as open systems, where any organizational member (irrespective of status) can affect organizational change for improvement and capacity building.

Philosophically and pragmatically, to embrace empowerment means that one refrains from "blaming the victim" for his or her disadvantaged status and focuses attention on structural impediments and systemic reasons for the presence of negative forces in the environment. With regard to addressing equity among community stakeholders, "victim blaming" and "deficit model" approaches are no longer acceptable explanations for the ills that plague disenfranchised citizens.

[See also Power.]

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Ronald L. Braithwaite

ENCODING. See Memory, article on Coding Processes.

ENCOPRESIS. Having bowel movements in the clothing or in other inappropriate places is a common childhood problem. It is estimated that between 5 and 8% of children have this problem. Fecal incontinence can occur for a wide variety of reasons, such as illness or other organic conditions or as a result of psychological or behavioral factors. Encopresis, by definition, refers to cases in which the problem has no basis that is primarily organic or due to illness. The official diagnostic criteria specified by the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994) further state that the inappropriate fecal soiling, which may be voluntary or involuntary, must occur at least once per month for three months in a child who is 4 years of age or developmentally the equivalent of this age before diagnosis may be made.

Walker (1978) has identified three categories of encopresis: (1) manipulative soiling, (2) soiling due to diarrhea, and (3) constipation-based soiling (sometimes referred to as overflow incontinence). Manipulative soiling refers to cases in which the child uses soiling as a means to control the environment. For example, a child might have a soiling accident at school when he or she is not prepared for a class test. The soiling makes it necessary for the parent to remove the child from school in order to change clothes. Although many mental health workers believe this to be a frequent cause of soiling, it is really relatively rare. Soiling due to diarrhea occurs when excessive stress in the life of the child produces loose bowel movements that the

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child is unable to control. This is somewhat more common than manipulative soiling but is still not the most common reason for encopresis. Approximately 85 to 90% of cases of encopresis result from constipation (Levine, 1975).

It may seem paradoxical to state that fecal soiling accidents are caused by constipation. However, an understanding of the process involved makes the relationship clear. Children may become constipated for many reasons. Some individuals seem to have inherited a tendency to become constipated more easily than others. Unfortunate dietary choices undoubtedly play a very significant role in the majority of cases. If the child becomes dehydrated while playing or withholds stools rather than interrupting play for necessary toileting, constipation may result. Similarly, inattention to teaching the child proper toileting habits often plays a role. Emotional factors such as depression tend to reduce motility of the bowel, which may precipitate constipation. These, as well as many other factors, may produce the original condition of constipation in the child. The fact that the child is constipated generally goes unrecognized because the child does not report it to the parent, and the parent may not notice that the child is not using the toilet for bowel movements with sufficient frequency. In time, the constipation becomes chronic and produces a condition known as psychogenic megacolon, in which the colon becomes excessively enlarged and distended. The distended and impacted colon is unable to move fecal material through the body via normal peristaltic action. When the child ingests food, the stomach converts the food to liquid form, which then moves through the intestine. Eventually the food reaches the point of impaction, where it forms a pool. This liquid material seeps around the impacted mass and leaks out of the anal opening. This produces a stain in the child's underclothing. Since this leakage is a passive process, not accompanied by the normal contractions of defecation, the child correctly reports that he or she was not aware that the soiling was occurring. Parents often think their child is not trying to control the bowel, but from this description it is obvious that the bowel cannot be controlled under the circumstances. To further complicate the problem, after a period of time, the chronic constipation obliterates the sensation of the need to have a bowel movement. Thus efforts to help the child are met with protests that he or she does not feel the need to use the toilet.

Emotional and psychological characteristics of encopretic children have been studied. Contrary to popular belief, most encopretic children are not emotionally disturbed. Rather, they have had the misfortune to develop chronic constipation. The following statements summarize the literature in this area. Most encopretic children are not emotionally disturbed. Most emotion-

ally disturbed children are not encopretic. However, there is a slightly higher rate of encopresis in emotionally disturbed children compared with children who are not emotionally disturbed. This higher rate of incidence is probably due to emotional or family problems interfering with establishing and maintaining good dietary and toilet habits. No profile of unique or unusual personality characteristics has ever been established for encopretic children. Other than suffering some embarrassment and loss of self-esteem due to their problem, encopretic children are like all other children (Walker, 1995).

Treatment of encopresis depends on the specific etiology. If the problem results from efforts to manipulate the environment, psychotherapy to improve the child's coping skills and family therapy to deal with related factors will generally be effective. If the cause of soiling is stress-induced diarrhea, stress management skills, along with medication for symptomatic relief, are effective. Constipation-based encopresis is best treated with a program involving, first, elimination of the underlying constipation by enemas, laxatives, and dietary changes, and second, reestablishing bowel control by rewarding regular bowel movements and toileting hygiene. Numerous programs for accomplishing this have appeared in the literature (Houts & Abramson, 1990; Walker, Milling, & Bonner, 1988). Appropriate treatment for encopresis is effective in over 90% of cases. Some difficult cases may require biofeedback or medical intervention such as surgery. These two treatments, however, are much more likely when there is an organic etiology for the problem, in which cases, as noted, the diagnosis is not encopresis.

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C. Eugene Walker

ENCULTURATION. See Acculturation.

ENDOCRINE SYSTEMS. Endocrinology is the study of hormones, and hormones are chemical messengers that activate cellular processes. There are three types of chemical messengers: autocrine, paracrine, and endocrine. Autocrine messengers are produced by the same cells in which they act. Paracrine messengers act upon cells nearby those that produce and release them, for example, neurotransmitters. Endocrine signals are produced at some distance in the body from where they act. Hormones generally are endocrine signals but can, in specific circumstances, play the part of autocrine and paracrine messengers.

Types of Hormones

A partial list of hormones is found in Table 1. Peripheral target hormones of the thyroid, adrenals, and gonads are formed and released in response to pituitary hormones, which are in turn released in response to hormones from the hypothalamus. Hormones of the posterior pituitary gland are produced by neurons residing in the hypothalamus that send long axons to form synaptic endings in the posterior pituitary gland; the posterior pituitary hormones are released in response to the activation of these neurons by nerve impulses. These two components—the anterior and posterior pituitary hormones—constitute the neuroendocrine system, described in more detail below.

Hormones from the adrenal medulla, principally adrenaline, are released by direct nerve stimulation from the autonomic nervous system. They play a major role in mobilizing energy stores during the “fight or flight” response and they cause peripheral vasoconstriction and increase heart rate and blood pressure.

Hormones of the pancreas, thyroid, and cells within the gut are involved with metabolism; they are regulated for the most part by a combination of nervous and hormonal agents. Insulin and glucagon from the pancreas regulate glucose homeostasis. Parathyroid hormone and calcitonin control calcium and mineral balance. Hormones of the gut are involved in regulating satiety. The renin-angiotensin system of the kidney and liver regulates the production of aldosterone from the adrenal cortex, which, in turn, promotes retention of sodium by the kidney and regulates salt appetite via the brain.

Neuroendocrinology

Neuroendocrinology studies the relationships between the endocrine system and the brain, including all of the hormone systems mentioned above that are regulated by innervation from the autonomic nervous system. Part of neuroendocrinology deals with regulation of hormone release, whereas another aspect concerns the actions of hormones to produce changes in brain function and behavior.

Regulation of hormone secretion involves both neural control of the hypothalamic neurons that produce hormones as well as hormone feedback. Negative feedback acts like a thermostat and turns down hormone secretion. Postive feedback, which operates in controlling ovulation, primes the neuroendocrine system to produce a large bolus of luteinizing hormone, which is the stimulus for ovulation. Nerve cells in the hypothalamus produce hormones, called releasing factors, which are released into a portal blood supply and travel to the anterior pituitary gland where they trigger the release of trophic hormones such as adrenocorticotrophic hormone (ACTH), thyroid stimulating hormone (TSH), luteinizing hormone (LH), follicle stimulating hormone (FSH), prolactin and growth hormone (see Table 1). These hormones, in turn, regulate endocrine responses—for example, ACTH stimulates cortisol secretion by the adrenal cortex; TSH, thyroid hormone secretion; and LH stimulates sex hormone production.

Other hypothalamic neurons produce the hormones vasopressin and oxytocin and release these hormones at nerve terminals located in the posterior lobe of the pituitary gland. Brain activity stimulates the secretion of these hormones. For example, oxytocin and prolactin release are stimulated by suckling, and the sight and sound of an infant can stimulate “milk let-down” in the mother; ACTH secretion is driven by stressful experiences and by an internal clock in the brain that is entrained by the light-dark cycle; and LH and FSH secretion are influenced by season of the year in some animals and by sexual activity in many species.

As far as hormone actions are concerned, the brain controls the endocrine system through the hypothalamus and pituitary gland, and the secretions of the gonads, adrenals, and thyroid act upon tissues throughout the body, and on the brain and pituitary, to produce a wide variety of effects. Some hormone effects occur during development and are generally long-lasting and even permanent for the life of the individual. Other hormone actions take place in the mature nervous system and are usually reversible. Still other hormone actions in adult life are related to permanent changes in brain function associated with disease processes or with aging.

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ENDOCRINE SYSTEMS. Table 1. Hormones

Hypothalamic Hormones	Anterior Pituitary Hormones
Hypothrophin releasing factor	Adrenocorticotrophic hormone (ACTH)
Thyroid hormone releasing factor	Thyroid stimulating hormone (TSH)
Luteinizing hormone releasing factor	Luteinizing hormone (LH)
Somatostatin, growth hormone releasing factor	Follicle stimulating hormone (FSH)
Dopamine	Growth hormone (GH)
	Prolactin
Peripheral Target Hormones	Posterior Pituitary Hormones
Cortisol (ACTH)	Oxytocin
Thyroid hormone (TSH)	Vasopressin
Testosterone (LH)	
Estradiol (LH)	
Progesterone (LH)	
Somatomedins (GH)	
Some Other Hormones	
Renin	
Angiotensin	
Aldosterone	
Parathyroid hormone	
Insulin	
Glucagon	
Calcitonin	
Melatonin	
Adrenaline	

Mechanism of Hormone Action

Steroid hormones and thyroid hormone act on cells throughout the body via intracellular receptors that regulate gene expression. Such intracellular receptors are found heterogeneously distributed in many organs and tissue of the body, and they are also found in the brain, with each hormone having a unique regional pattern of localization across brain regions. The hypothalamus and amygdala have receptors for sex hormones, with both sexes expressing receptors for androgens, estrogens, and progestins, although, because of sexual differentiation, there are somewhat different amounts of these receptors expressed in male and female brains. The hippocampus and amygdala have receptors for adrenal steroids, whereas thyroid hormone receptors are widely distributed throughout the nervous system, particularly in the forebrain and cerebellum.

Effects mediated by intracellular receptors are generally slow in onset over minutes to hours and long lasting because alterations in gene expression produce effects on cells that can last for hours and days, or longer. Steroid hormones also produce rapid effects on the membranes of many brain cells via cell surface receptors that are like the receptors for neurotransmitters. These actions are rapid in onset and short in duration; however, the precise nature of the receptors

for these rapid effects is in most cases largely unknown.

Actions of hormones that are amino acid derivatives, like epinephrine, or peptides, like corticotrophin releasing hormone, or proteins like ACTH and the gonadotrophins involves cell surface receptors that are linked to intracellular second messenger systems, like cyclic AMP or phospholipase C. The activation of these intracellular second messenger systems results in phosphorylation of enzymes, ion channels, and gene-regulatory proteins, which become more or less potent in doing their jobs when they are in the phosphorylated state.

Developmental Action of Hormones

Thyroid hormone and sex hormones act early in life to regulate development and differentiation of the brain, whereas the activity of the stress hormone axis is programmed by early experiences via mechanisms that may depend to some degree on the actions of glucocorticoid hormones.

Both excesses and deficiencies of thyroid hormone secretion are associated with altered brain development. Extremes in thyroid hormone secretion lead to major deficiencies in cognitive function (e.g., cretinism), whereas smaller deviations in thyroid hormone secretion are linked to more subtle individual variations in brain function and cognitive activity.

Sex hormones play an important role in development and sexual differentiation. Testosterone secretion during mid gestation in the human male and then again during the first two years of postnatal life alters brain development and affects cognitive function as well as reproductive function. Other mammals have comparable periods of testosterone production in early development. In genetic females, the lack of testosterone leads to the female behavioral and body phenotype. Likewise, the absence of androgen receptors in the testicular feminizing mutation leads to a feminine phenotype. Exposure of genetic females to androgens early in development produces a masculine phenotype. Sexual differentiation of the brain involves subtle sex differences in a variety of brain structures, ranging from the hypothalamus (which governs reproduction along with many other processes) to the hippocampus and cerebral cortex (which subserve cognitive function). Though less well studied, the human brain undergoes functional and structural sexual differentiation that are similar to those found in lower animals. This includes subtle effects upon cognitive function. For example, sex differences are found in the strategies used for spatial learning and memory, with males using the more global spatial cues and females relying upon the local contextual cues.

Stress and stress hormones play a role in brain development. Early experience has a profound role in shaping the reactivity of the stress hormone axis and the secretion not only of ACTH and glucocorticoids but also the activity of the autonomic nervous system. Prenatal stress and certain types of aversive experience in infant rodents (e.g., several hours of separation from the mother) increase reactivity of the stress hormone axis for the lifetime of the individual. In contrast, handling of newborn rat pups, which is a much briefer form of separation of the pup from the mother, produces a life-long reduction in activity of the stress hormone axis. Actions of glucocorticoid and thyroid hormones play a role in these effects. There is growing evidence for rodents that elevated stress hormone activity over a life time increases the rate of brain aging, whereas a life-time of reduced stress hormone activity reduces the rate of brain aging.

Activational Effects of Hormones

Whereas the actions of hormones on the embryonic and neonatal brain are confined to windows of early development and also, later on, in the peripubertal period, most of the same hormone produce reversible effects on brain structure and function throughout the life of the mature nervous system. Sex hormones activate reproductive organs as well as reproductive behaviors, including defense of territory, courtship, and mating, and they regulate neuroendocrine function to

ensure successful reproduction; however, reflecting sexual differentiation of the brain and secondary sex characteristics of the body, the activational effects of sex hormones in adult life are often gender specific.

Thyroid hormone actions maintain normal neuronal excitability and promote a normal range of nerve cell structure and function; excesses or insufficiencies of thyroid hormone have adverse effects on brain function and cognition, which are largely reversible. Among these effects are an exacerbation of depressive illness by the hyperthyroid state.

There are two types of adrenal steroids—mineralocorticoids and glucocorticoids—which regulate salt intake and food intake, respectively, and also modulate metabolic and cognitive function during the diurnal cycle of activity and rest. Adrenal steroids act to maintain homeostasis, and glucocorticoids do so in part by opposing, or containing, the actions of other neural systems that are activated by stress and also by promoting adaptation of the brain to repeatedly stressful experiences. Containment effects of glucocorticoids oppose stress-induced activity of the noradrenergic arousal system and the hypothalamic system that releases ACTH from the pituitary.

Primary targets of stress hormones are the hippocampal formation and also the amygdala. Repeated stress causes atrophy of hippocampal pyramidal neurons and inhibits the replacement of neurons of the dentate gyrus by ongoing neurogenesis. Adrenal steroid hormones produce biphasic effects on cognitive function, enhancing episodic and declarative memory at low to moderate levels but inhibiting these same functions at high levels or after acute stress. Along with adrenal steroids, the sympathetic nervous system participates in creating the powerful memories associated with traumatic events, in which the amygdala plays an important role. Glucocorticoid hormones act in both the amygdala and hippocampus to promote consolidation of fear-related memory traces.

Hormone Action in Pathophysiology and Disease

Hormones participate in many disease processes, in some cases as protectors and in other cases as promoters of abnormal function. Estrogens enhance normal declarative and episodic memory in estrogen-deficient women, and estrogen replacement therapy appears to reduce the risk of Alzheimer's disease in postmenopausal women. Estrogens also have antidepressant effects. They modulate pain mechanisms, and they regulate the neural pathways involved in movement, with the result that estrogens enhance performance of fine motor skills and enhance reaction times in a driving simulation test in women. Androgen effects are less well studied in these regards. Adrenal steroids exacerbate neural dam-

age from strokes and seizures and mediate damaging effects of severe and prolonged stress, and this leads to a consideration of stress.

The Physiology and Pathophysiology of Stress

Stress is an aspect of neuroendocrinology that has far reaching implications for health and disease. Stress may be defined as a threat, real or implied, to the psychological or physiological integrity of an individual. Because psychological and physiological systems are linked through the brain, the behavioral and physiological consequences of stress reflect two sides of the same coin. Developmental process, experiences, genetic factors, and the actions of hormones on the brain, however, combine to produce large differences among individuals in how they react to stress.

Stress involves a stressor and a stress response. A stressor may be physical, such as trauma or injury, or physical exertion, particularly when the body is being forced to operate beyond its capacity. Physical stressors include environmental factors like noise, overcrowding, excessive heat or cold. Stressors also include primarily psychological experiences such as traumatic life events as well as daily hassles in the family and workplace, but these stressors have real physiological consequences such as increased blood pressure and altered metabolism. Job stress, both physical and mental, is among the most important stressors that exacerbate disease.

Stress responses include both behavior and the responses of physiological systems, particularly the autonomic nervous system and the adrenocortical system. Behavioral responses to stress may get the individual out of trouble, but they may also exacerbate the consequences of stress. In the latter category are behaviors that confront and exacerbate the stressful circumstances, as well as self-damaging behaviors like smoking, drinking, and driving an automobile recklessly.

Physiological stress responses include primarily the activation of the autonomic nervous system and the hypothalamo-pituitary-adrenal (HPA) axis. There are two important features of the physiological stress response. The first is turning it on in amounts that are adequate to the challenge; the second is turning it off when it is no longer needed. The physiological mediators of the stress response, namely, the catecholamines of the sympathetic nervous system and the glucocorticoids from the adrenal cortex, initiate cellular events that promote adaptive changes in cells and tissues throughout the body that in turn protect the organism and promote survival.

Physiological stress responses produce not only protective and adaptive changes, but they also can promote disease processes, particularly when the stress re-

sponse is stimulated frequently or when it does not shut off or habituate when it is not needed. The price of adaptation, involving wear and tear on the body and promotion of pathophysiological changes, has been called "allostatic load." Allostasis, meaning achieving stability through change, refers to the process of physiological adaptation, and allostatic load refers to a gradual process of incremental change. Examples of allostatic load include the exacerbation of atherosclerosis by psychosocial stress, stress-induced acceleration of abdominal obesity, hypertension and coronary heart disease resulting from job strain, bone calcium loss in depressive illness and as a result of intensive athletic training, atrophy and damage to nerve cells in the hippocampus with accompanying memory impairment.

The brain and behavior play an important role in determining what is stressful, and the brain is a target of stress. The brain interprets what is stressful on the basis of past experience of the individual and then determines the behavioral response—whether to flee or to fight or to engage in displacement behaviors such as smoking and drinking that are themselves harmful. The brain is also a target of stress, which increases activity of systems that subserve fear (the amygdala) and impairs systems that subserve declarative, episodic, spatial, and contextual memory (the hippocampus). One of the most important aspects of stress that is related to disease is the sense of control. Learned helplessness is a condition that has been described in animals and humans and represents one type of coping mechanism. Less extreme, the lack of control on the job has been shown to have adverse health consequences, affecting rates of cardiovascular disease. Interventions that have increased the sense of control and reduced time pressures have increased physical and mental health.

Hormone Effects Related to Aging

The vulnerability of many systems of the body to stress is influenced by experiences early in life. In animal models, unpredictable prenatal stress causes increased emotionality and increased reactivity of the HPA axis and autonomic nervous system and these effects last throughout the lifespan. Postnatal handling in rats, a mild stress involving brief daily separation from the mother, counteracts the effects of prenatal stress and results in reduced emotionality and reduced reactivity of the HPA axis and autonomic nervous system and these effects also last throughout the life span. The vulnerability of the hippocampus to age-related loss of function parallels these effects—prenatal stress increasing and postnatal handling decreasing the rate of brain aging.

Age-related decline of gonadal function reduces the beneficial and protective actions of these hormones on brain function. At the same time, age-related increases

in adrenal steroid activity promotes age-related changes in brain cells that can culminate in neuronal damage or cell death. Life-long patterns of adrenocortical function, determined by early experience, contribute to rates of brain aging, at least in experimental animals.

Conclusion

Hormones are mediators of change, acting in large part by regulating the activity of enzymes and ion channels and, in part, by modulating expression of the genetic code. They provide an interface between structure and function of the brain and other organs and tissues and experiences of the individual, including the regular changes in season of the year and day and night, as well as traumatic and stressful events. Hormone action during development and in adult life participates in the processes that determine individual differences in physiology, behavior and cognitive function, and helps, along with the genetic endowment, to determine the risk for a variety of diseases.

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Bruce S. McEwen

ENDORPHINS. Morphine can produce powerful analgesia and intensely pleasurable sensations. In the early 1970s, this opiate drug was found to act at specialized receptors in the brain and in peripheral tissues. This finding fueled a search for substances, produced within the body, that not only attached to those receptors, but that also precipitated similar pain-killing and euphoric effects. As reported in *Nature* (1975, 258, 577–580), Hughes, Smith, Kosterlitz, and other researchers at St. Andrew's University in Scotland isolated the first two of these substances from the brain tissue of pigs.

In the ensuing years, additional endogenous opioid (opiate-like) compounds were discovered. The term *endorphin*, meaning “the morphine within” is often used generically to refer to all substances produced in the body that have opioid properties. However, endorphins are actually classified within three families or categories: enkephalins, endorphins, and dynorphins. These families are structurally similar, but differ in terms of their distribution within the nervous system and their genetic and biochemical precursors. Although regulatory (e.g., temperature, cardiovascular, and respiration) and other functions have been proposed for endorphins, their involvement in “natural” pain control and pleasure systems has received the most research attention

Endorphins and Analgesia

It is well established that analgesia can be elicited, without administration of exogenous opiates or other drugs, by a wide variety of aversive environmental stimuli. A

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Endorphins and Analgesia

It is well established that analgesia can be elicited, without administration of exogenous opiates or other drugs, by a wide variety of aversive environmental stimuli. A

common test for the involvement of endorphins in the production of this stimulation- or stress-induced analgesia (SIA) assesses the extent to which drugs (e.g., naloxone or naltrexone) that antagonize or block the pain-killing effects of exogenous opiates have similar effects on SIA. The literature on SIA refers to naloxone- or naltrexone-sensitive SIA as opioid mediated and SIA that is insensitive to these drugs as nonopioid mediated. Shock, centrifugal rotation, cold swims, food deprivation, restraint, and exposure to innate predators are among the events shown to produce a naloxone- or naltrexone-reversible SIA in rats. Furthermore, opioid-mediated analgesia can be produced by conditioned stimuli (CSs) that are associated with shock or other aversive stimuli following training with Pavlovian procedures.

Evidence for opioid mediation of SIA has not been obtained consistently or under all conditions. Several generalizations have been offered in an attempt to identify factors that produce opioid and nonopioid forms of SIA. According to the severity hypothesis (M. Fanselow, *Behavioral Neuroscience*, 1984, 98, 79–95), opioid mediation of SIA is confined to relatively weak (e.g., low intensity, short duration) aversive stimulation. Nonopioid analgesia becomes more likely as the severity of aversive stimulation increases. Alternatively, J. Grau (*Behavioral Neuroscience*, 1987, 101, 272–288) interpreted SIA within the sometimes opponent process (SOP) model of animal memory proposed in 1981 by the American learning theorist A. Wagner. According to the SOP model, when a painful stimulus first occurs, it is represented in the “A1 state” of working memory before gradually decaying into the A2 memory state. Furthermore, Pavlovian CSs that are associated with painful stimuli activate the memory of those aversive events directly into the A2 state, bypassing the A1 state. According to Grau, memories of aversive stimuli evoke nonopioid SIA when they reside in the A1 state, and evoke opioid-mediated SIA when they reside in the A2 state. A third view, offered by L. Watkins and collaborators (*Brain Research*, 1982, 243, 119–132), also proposes that the opioid form of conditioned analgesia is elicited by Pavlovian CSs that signal shock. In contrast, only shock that is confined to certain bodily locations, such as the hind paws, evokes an unconditioned, nonopioid analgesia.

Endorphins and Pleasure

Endorphins have been linked to the production of pleasurable sensations such as those accompanying sexual activity and food intake. It is also claimed that endorphins underlie the occurrence of certain behavioral addictions in humans, based on mechanisms similar to those that support opiate drug addiction. For example, intense physical exercise is often reported to produce euphoria (e.g., runner’s “high”) that is subject to both

tolerance (reduced euphoria with repeated stimulation) and to the unpleasant consequences of withdrawal should the opportunity to maintain the addictive behavioral regimen be denied. These phenomena are viewed by some as the manifestation of addiction to endorphins. Furthermore, mood disorders such as depression have been attributed to impaired endorphin system functioning. Unfortunately, evidence for such claims has often been anecdotal or based on studies that lack the controls necessary for unambiguous interpretation of the findings.

More direct evidence for the involvement of endorphins in pleasure systems has been provided by experiments with animal subjects. Rats learn to perform responses (e.g., lever pressing) that deliver small quantities of endorphins directly to the ventricles of the brain. Thus, these intracerebroventricular (ICV) infusions reinforce or reward conditioned responses that enable rats to self-administer endogenous opioids. Intracerebroventricular administration of β -endorphin (a specific subtype of endogenous opioid) also supports “place conditioning” in rats. In place conditioning the rewarding or reinforcing effects of opioids are demonstrated to the extent that animals prefer a place where the effects of the opioids were experienced relative to a place that is not associated with those effects.

Intracerebroventricular infusion of opioids also stimulates food intake, whereas administration of opiate antagonists has been shown to reduce feeding and drinking. Rather than influencing hunger or satiety, S. J. Cooper and T. C. Kirkham suggest that endorphins mediate the palatability or reward value of food. This suggestion is based, in part, on findings that preference for highly palatable tastes is enhanced by administration of opioid peptides and reduced by opiate antagonists, whereas these treatments have little effect on responding for neutral or nonpreferred tastes.

Research has also been directed toward specification of the brain areas involved with the rewarding effects of endorphins. There is much evidence that the dopamine pathways in the mesolimbic system of the brain mediate the rewarding properties of not only opiates, but of other drugs of abuse, such as cocaine and amphetamine. According to Spangel, Herz, and Shippenberg (*Proceedings of the National Academy of Sciences of the United States of America*, 1992, 89, 2046–2050) the role of endogenous opiates in reward and motivation is based on their ability to modulate the activation of this dopamine reward circuit.

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Terry L. Davidson

ENDSTAGE RENAL DISEASE. Chronic renal failure, or, in other words, the gradual deterioration of kidney function, can be caused by many diseases and conditions. Some of these diseases are localized only in the kidneys, while others are generalized and also attack other organs or systems. Some of these diseases are hereditary while others are acquired. Whatever the cause of chronic renal failure, the outcome is always bad, that is, death.

During the 1960s, machines were introduced to replace the functioning of the kidneys. The term *end stage renal disease* (ESRD) was introduced to describe that final and terminal phase in which replacement therapy was required to sustain life. The introduction of replacement therapy, or as one should now say, replacement therapies, was a major breakthrough in medicine. For the first time, machines could replace the functions of a vital and complicated internal organ. It also fired the excitement and imagination of the behavior scientists. Here was a group of patients “alive after they should have been dead” and having machine-dependent life.

Every year, about 50 to 60 people per 1 million reach ESRD and require replacement therapy—tens of thousands of people survive by renal replacement therapies. Basically, there are three modes of replacement. The oldest and still the most common in most countries is hemodialysis. In this treatment, the patient is “hooked” to a machine, the blood circulates through the machine, and the waste products, as well as excess fluids, are taken out, that is, dialyzed. The early machines were big and inefficient, and patients had to have dialysis 24 to 26 hours a week. The whole process has since become much more efficient. Dialysis hours

per week have been reduced to about 12 and the problems of severe anemia that accompanied dialysis have been solved. Still, patients are severely restricted in fluid intake as well as in protein and potassium intake. Most important of all, their lives depend on being connected to the machine three times a week, forever.

The second mode of replacement therapy is peritoneal dialysis, and the most common form of this is the continuous ambulatory peritoneal dialysis (CAPD). The basic idea in this treatment is that the peritoneum—a kind of curtain inside the abdomen—can do the dialysis of waste products, like the membranes in the machines of hemodialysis. Thus, fluids are introduced into the abdomen and later taken out, and so on. Broadly speaking, in CAPD the patients are not machine dependent and are less restricted in their diet, but are highly exposed to infection.

The third replacement therapy is kidney transplantation, with more than 90% being cadaver transplant and the rest involving living, usually related, donors. Great progress has also been made in this replacement, especially with the introduction of cyclosporine, which decreases, though it does not abolish, the problem of rejection.

Many people are alive by virtue of one or another of the renal replacement therapies. For example, in Japan the prevalence of ESRD treatment is more than 700 per 1 million; in the United States it is more than 600 per 1 million, and in Germany more than 500 per 1 million. Yet from the very beginning, these treatments have raised a host of problems that have not become less acute. Only two areas, resources and their allocation, and patients’ psychological condition, are briefly reviewed here.

Allocation of Resources

From the beginning of hemodialysis in the early 1960s, resources were not sufficient, and behavior scientists were involved in a selection process. One of the early solutions was to determine the patient’s “value to society.” This was unacceptable to many, and a “first come, first served” policy was adopted. However, contrary to some events in medicine that are acute (e.g., one can state exactly the day and hour when a myocardial infarct occurred), chronic renal failure and ESRD is often a question of weeks and months. Thus, a patient can be taken on dialysis weeks earlier and at times months later. A third policy has been to allocate the limited facilities to patients with the best chances to survive. Thus, patients with life-threatening diseases, for example, cancer or severe heart disease, were excluded, as well as the elderly. An effort was made to exclude patients who would shorten their survival by their behavior. Some of the very early studies have a reportedly high rate of suicide in dialysis patients, and many studies describe severe compliance problems with

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ENDSTAGE RENAL DISEASE. Chronic renal failure, or, in other words, the gradual deterioration of kidney function, can be caused by many diseases and conditions. Some of these diseases are localized only in the kidneys, while others are generalized and also attack other organs or systems. Some of these diseases are hereditary while others are acquired. Whatever the cause of chronic renal failure, the outcome is always bad, that is, death.

During the 1960s, machines were introduced to replace the functioning of the kidneys. The term *end stage renal disease* (ESRD) was introduced to describe that final and terminal phase in which replacement therapy was required to sustain life. The introduction of replacement therapy, or as one should now say, replacement therapies, was a major breakthrough in medicine. For the first time, machines could replace the functions of a vital and complicated internal organ. It also fired the excitement and imagination of the behavior scientists. Here was a group of patients “alive after they should have been dead” and having machine-dependent life.

Every year, about 50 to 60 people per 1 million reach ESRD and require replacement therapy—tens of thousands of people survive by renal replacement therapies. Basically, there are three modes of replacement. The oldest and still the most common in most countries is hemodialysis. In this treatment, the patient is “hooked” to a machine, the blood circulates through the machine, and the waste products, as well as excess fluids, are taken out, that is, dialyzed. The early machines were big and inefficient, and patients had to have dialysis 24 to 26 hours a week. The whole process has since become much more efficient. Dialysis hours

per week have been reduced to about 12 and the problems of severe anemia that accompanied dialysis have been solved. Still, patients are severely restricted in fluid intake as well as in protein and potassium intake. Most important of all, their lives depend on being connected to the machine three times a week, forever.

The second mode of replacement therapy is peritoneal dialysis, and the most common form of this is the continuous ambulatory peritoneal dialysis (CAPD). The basic idea in this treatment is that the peritoneum—a kind of curtain inside the abdomen—can do the dialysis of waste products, like the membranes in the machines of hemodialysis. Thus, fluids are introduced into the abdomen and later taken out, and so on. Broadly speaking, in CAPD the patients are not machine dependent and are less restricted in their diet, but are highly exposed to infection.

The third replacement therapy is kidney transplantation, with more than 90% being cadaver transplant and the rest involving living, usually related, donors. Great progress has also been made in this replacement, especially with the introduction of cyclosporine, which decreases, though it does not abolish, the problem of rejection.

Many people are alive by virtue of one or another of the renal replacement therapies. For example, in Japan the prevalence of ESRD treatment is more than 700 per 1 million; in the United States it is more than 600 per 1 million, and in Germany more than 500 per 1 million. Yet from the very beginning, these treatments have raised a host of problems that have not become less acute. Only two areas, resources and their allocation, and patients’ psychological condition, are briefly reviewed here.

Allocation of Resources

From the beginning of hemodialysis in the early 1960s, resources were not sufficient, and behavior scientists were involved in a selection process. One of the early solutions was to determine the patient’s “value to society.” This was unacceptable to many, and a “first come, first served” policy was adopted. However, contrary to some events in medicine that are acute (e.g., one can state exactly the day and hour when a myocardial infarct occurred), chronic renal failure and ESRD is often a question of weeks and months. Thus, a patient can be taken on dialysis weeks earlier and at times months later. A third policy has been to allocate the limited facilities to patients with the best chances to survive. Thus, patients with life-threatening diseases, for example, cancer or severe heart disease, were excluded, as well as the elderly. An effort was made to exclude patients who would shorten their survival by their behavior. Some of the very early studies have a reportedly high rate of suicide in dialysis patients, and many studies describe severe compliance problems with

the strict diet. Therefore, the idea was to exclude these patients. It is possible, although very costly, to predict patients' compliance as well as psychological and psychiatric complications. However, no study succeeded in predicting patients' survival by their pre-ESRD-treatment behavior or personality.

The resources have increased dramatically over the years, at least in the developed countries, and the basic, impossible question of who should be given a chance to live has disappeared. Yet some resource allocation problems are still very acute.

Patients' Psychological Condition

Many studies have described the psychological problems of ESRD patients. Though not specific to ESRD, these problems are more extreme than in other chronic diseases. One should mention the loss of control because life is machine dependent, the severe body image problems caused by transplantation, the bloating up because of peritoneal dialysis or of having to accommodate the machine. One should also mention the very strict diet in hemodialysis and the constant threat of infection in CAPD and that of rejection in transplantation. This is a population that has had many losses—loss of control and freedom, vigor, looks, and often potency, loss of income, and often social status. Therefore, it is not surprising that it was often stated that about 25% of patients are moderately to severely depressed.

In the earlier years, studies concentrated on psychological reaction and psychiatric complications. Later, the focus shifted to quality of life (QOL), though the definition and/or assessment of this concept is no easier. Hundreds of papers were published about the QOL of ESRD patients but still little is known about the factors that influence it.

There is no doubt that comorbidity, especially diabetes, which is so common in ESRD, decreases QOL. Some, but not all, reported poorer QOL in women than in men, and some reported lower QOL in the elderly. It seems that patients with higher education and higher incomes have better QOL. On the other hand, in the United States, Whites seem to have poorer QOL than Blacks.

The question of whether the QOL is influenced by the mode of treatment is crucial. There has not been even one study that has randomized the patients between the modes of treatment or between the three major modes of treatment—hemodialysis, CAPD, and transplantation. Furthermore, only a few longitudinal studies have followed up patients as they transferred from one mode of treatment to another. The typical study is a cross-sectional one, often of a not very large group and often not controlling for case mix and for comorbidity. Nonetheless, the general impression is that transplanted patients are happier than dialysis patients. However, it seems that the superiority of transplanta-

tion is only minimal when case mix is controlled. At the same time, many dialysis patients wish to have transplantation. One could claim that their expectations are not realistic, yet there is not even one study of transplanted patients wishing to go back to dialysis.

One additional issue should be addressed, and that is the dissociation between the medical condition of the patients and their QOL. Nowadays, hemodialysis is shorter and better than it was in the 1960s, but not the QOL of the patients. That can be explained possibly by differences in case mix and/or comorbidity. There is no such simple explanation for the limited effects of erythropoietin. There is no doubt that this drug solved the problem of anemia and improved the physical functioning and vigor of the patients. However, this was not followed by improved rates of employment, and only little, if any, improvement was found in patients' psychological conditions.

In summary, one could say that it is now more than 30 years since ESRD and its therapies have graduated from experimental treatments to accepted medical treatment. Many thousands of papers have been written, and some of the excitement of machine-dependent life has died. The medical, surgical, and technical aspects have vastly improved, with no concomitant improvement in patients' QOL. Furthermore, the problems of allocation of resources, which modes of therapy are better and for whom, and what factors enhance or reduce patients' QOL are as acute today as they were in the early days of ESRD.

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A. Kaplan-DeNour

ENEMY IMAGE. When people look at other political groups, they assess them. What kind of group is it? More importantly, what are its motivations toward my group? Is it threatening or does it offer the opportunity to achieve some goal? As these questions are answered, people classify other groups into images. Images are similar to stereotypes. They are bundles of knowledge about, and feelings toward, groups commonly found in a person's environment.

The image concept has been used in political psychology as an analytical device for many years (Boulding, 1956; Finlay, Holsti & Fagen, 1967; White, 1968; Jervis, 1976). It is now the foundation of a general theory of political psychology called image theory. Drawing on studies of cognition, political psychologists have argued that people must organize and simplify their political environments as they do any other environment. The world is too complex to be understood in its entirety, so we simplify it by organizing it into cognitive categories, or images. Images are used to filter information, make sense of the actions of others, and guide the perceiver in determining a course of action.

In political psychology the image concept is most frequently used to examine perceptions of other countries in international politics. In that context it is argued that images of types of states, such as enemies and allies, are the cognitive organizing devices that serve as information filters. The image of the enemy is not necessarily restricted to international politics, however, and there is increasing interest in using that image and others to analyze conflict in the domestic politics of multiethnic and multinational states. Indeed, the concept of the enemy image may even be useful in analyses of gang violence and competition.

What is the enemy image? The enemy image, in its ideal-typical form, is an image of a country that is highly threatening, relatively equal to the perceiver's state in capability and cultural sophistication, mono-

lithic in decision making (that is, a small elite makes decisions), and highly rational to the point of being able to generate and orchestrate multiple complex conspiracies (R. W. Cottam, 1977; R. K. Herrmann, 1985). Emotions associated with the enemy image include fear, distrust, anger, and, when the image is very intense and salient, hatred. Most Americans saw the Soviet Union in these terms during the Cold War as well as Hitler's Germany during World War II. Countries perceived as inferior in capability and/or culture are not, by definition, perceived as enemies, even if their intentions are considered hostile. Thus, neither Saddam Hussein's Iraq, nor Fidel Castro's Cuba, fits the image. Instead, they would belong to variants of what is referred to as the colonial image.

When a country, or any political group, is perceived as an enemy, it is assumed to have the above characteristics and intentions toward the perceiver's country. Interactions with the country are then largely determined on the basis of the characteristics associated with the image, rather than the true characteristics of the country in question. Information about a country that is consistent with the preexisting image is accepted as correct, while inconsistent information is rejected. Particular policy alternatives are also part of the image. The appeasement of an enemy, for example, is generally considered to be a foolish course of action.

There are different views regarding the origin of the image. Vamik Volkan (1988) examines the enemy image from a psychoanalytic perspective and believes that enemies are psychologically necessary. The enemy image is a natural outgrowth of human psychological development, beginning with stranger anxiety in young children. Others rely on social cognitive psychology and argue that the enemy image exists only when it is useful in organizing one's environment (M. L. Cottam, 1986, 1992; Herrmann, Voss, Schooler, & Ciarrochi, 1997). If the international world regularly contains countries that fit the enemy image, people will be socialized to use the image and will be resistant to information indicating that that image is inappropriate for countries so perceived. The logic of this argument is supported by social identity theory, which has increasingly been used as another psychological foundation for the study of images (Druckman, 1994). The human propensity to form in-groups and out-groups would make the emergence of an enemy image very possible whenever intense threat is perceived to emanate from another country or group. Thus, the image is likely to emerge in the world views of observers of political arenas, but it is not inevitable.

The impact of the enemy image on behavioral predispositions is of central concern to political psychologists. Once a country or group is perceived through the enemy image, what policies are favored in dealing with the enemy? Clearly, since the enemy is equal in capa-

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bilities and cultural sophistication and is also highly rational, it is a formidable opponent. Because it is equal in capabilities and cultural sophistication, the odds are even that if it is challenged directly it cannot be defeated. Given its aggressive intentions, it also cannot be changed. Therefore, a policy of containment is logical. Containment involves avoiding direct confrontation, never permitting oneself the luxury of trusting the enemy, and preventing it from increasing its opportunities to attack or hurt you. This was the policy followed by the United States during the Cold War as one administration after another entered office with an enemy image of the Soviet Union.

Not all situations are simply bilateral, however. Image dynamics and policy predispositions change when an enemy is perceived as interfering in another country. If that other country is perceived through a childlike "colonial" image, as in many Americans' perceptions of countries and people in Latin America, the assumption is that they are inferior in terms of culture and capability, simple, inefficient, often corrupt, and generally in need of strong guidance by the perceiver's country. Given the calculating rationality and aggressive intentions accorded the enemy, the country seen as a colonial could never withstand the enemy's evil and clever machinations. In this kind of perceptual scenario, which occurred with great frequency during the Cold War, immediate action is necessary to prevent the colonial country from falling under the influence of the enemy. Rapid intervention is called for, using quick-acting instruments such as military or paramilitary forces. If time allows, a covert operation would be favored to eliminate local "agents" or sympathizers helping the enemy infiltrate the country in question.

Some studies of the impact of the enemy image on behavior have focused on variations in policy preferences when individuals in policy-making positions differ in the extent to which they perceive another country as fitting the enemy image. Generally, the less extreme the image, that is, the farther a person's enemy image of another actor is from the ideal-typical, the more willing the person is to take risks in negotiations with the enemy (Shimko, 1991). To date, studies of the enemy image and individual variations therein have focused only on the extremity of the image and have not examined other personality factors that would affect the policy preferences. This is a ripe area for theoretical cross-fertilization in political psychology.

Images do change. There have been several studies of the process of change in the American enemy image of the Soviet Union. The Soviet Union was increasingly perceived as less and less appropriately belonging to the enemy image after Mikhail Gorbachev came to power (Silverstein & Holt, 1989; M. L. Cottam, 1992). When the Soviet Union was no longer seen as an enemy, the Cold War was over. But images may change in a more

hostile direction as well. The logic of containment as a policy for dealing with an enemy was quite clear in the case of the U.S.-Soviet standoff during the Cold War. Interaction with an enemy group can remain at low emotional intensity levels more easily in interstate relations than in conflicts among enemy groups within a single country, which may occur in multiethnic states. Often in such situations, as Bosnia illustrates, people see themselves in terms of in-groups and out-groups but may live together without violence for years. When circumstances change and the perceived threat from the other groups increases, enemy images emerge. When people live cheek-to-jowl with those they fear and hate, the emotional intensity and sense of the proximity of a conflict over a group's very existence is much greater than in interstate conflicts, such as the Cold War. Thus, such conflicts can easily be overwhelmed by the emotional properties associated with enemies. With fear, hatred, and rage driving the response to an out-group now perceived as an enemy, and with actual acts of violence being committed the image itself shifts, and the group is increasingly seen not as an equal, but as a barbarian. Once this threshold is crossed, genocide is a serious possibility.

[See also *International Relations; Peace; and War and Conflict.*]

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Martha Cottam

ENGINEERING PSYCHOLOGY. See Human Factors Psychology.

ENGLAND. The study of historical and philosophical psychology in England has been marginalized over the last 30 years or so. This is because there has been a strong move to make psychology a truly scientific field of study. However, more recently it has been argued that psychology may be a very different science (Valentine, 1998) and that history and philosophy provide a necessary social and historical perspective to present-day psychological enquiry. Therefore, it seems we have come full circle, for the origins of modern-day English (and also British) psychology began, as we shall see, from a strong empirical philosophical base in the seventeenth century. Furthermore, up until the present, the development of English psychology has often benefited from historical analysis, as we periodically assess the merits and demerits of the key figures in psychology, such as Galton, Spearman, Burt, and, more recently, Eysenck.

The Philosophical Genesis of English Psychology

It was John Locke (1622-1704) who laid the foundations of empirical philosophy, which emphasized the role of experience in gaining knowledge for human beings. His position was strongly opposed to that of Descartes's notion of ideas being innate entities. Rather, the human mind, according to Locke, is like a blank sheet on which ideas first appear through our sensory system. For Locke, ideas or concepts are linked in a logical fashion and are part of a network of associa-

tions. The association of ideas is at the heart of Locke's philosophical position, which provided English psychology with a sound base from which to develop.

George Berkeley (1685-1753) overlaps Locke somewhat, strengthening the role of sensation as a key factor in explaining the nature of thinking. He provided a valuable source of ideas for investigating the field of perception for future English psychology, in which other areas, such as attention and visual and auditory perception, continue to be investigated.

Although David Hume (1711-1776) was a Scot, he had a profound influence on English psychology, as he probed more deeply into the validity of knowledge through experience. To Hume, there were two main sources of knowledge: first, through impressions (sensations), and secondly, through ideas that arise from what we perceive and how we organize what we perceive in the act of thinking. Unlike Berkeley, Hume reformulated Locke's view of human understanding by proposing so-called laws of association, which were implicit in Locke's original thinking on the subject. Hume, in effect, laid the basis for associationist psychological enquiry, setting the scene for a distinguished number of associationists to follow in his footsteps. The first of these was Hartley (1705-1757), a physician who provided a particular brand of associationism, which emphasized the physiological basis for explaining human behavior. Much of his ideas on the importance of vibrations that impinge on our senses, although somewhat sketchy in detail, were remarkably prescient of later twentieth-century neurological theory of brain behavior.

Like Hartley before him, James Mill (1773-1836) was a strong advocate of associationism in explaining human behavior. However, Mill's approach to human behavior was essentially one of classifying and analyzing mental phenomena. He interpreted behavior from the standpoint of philosophical associationism and was not comfortable explaining feelings through scientific observation and experimental approaches. Mill marks the zenith of English associationism.

John Stuart Mill (1806-1873), the son of James Mill, widened the concept of associationism to embrace a more chemical explanation of the mind. For J. S. Mill, association was not a mixture of components, but more like a compound bearing little resemblance to its original ingredients. At the end of the present century, chemical interpretations of mental states have once again emerged as neurochemistry, which is currently having a significant impact on explaining defects in brain functioning and its effect on behavior.

Establishing a Scientific Psychology

Alexander Bain (1818-1903), another Scot, made psychology a more scientific discipline in both in Scotland

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Alexander Bain (1818-1903), another Scot, made psychology a more scientific discipline in both in Scotland

and England. His training as a physiologist in Aberdeen enabled him to pioneer the link between physiology and psychology, which in turn influenced English psychology by becoming more scientific in its outlook. Bain's contribution marks a transition in the history of British psychology, forming a link between the dominant empirical philosophical tradition and the movement to make psychology a science. However, a number of Bain's contemporaries, such as James Ward (1843–1925) and Francis Galton (1822–1911), were to establish beyond any doubt that in England psychological enquiry would be characterized by strong scientific credentials. English psychology would be molded by the combined influences of Ward's idealistic philosophy and Darwin's evolutionary theory as interpreted by Galton.

Galton, the most important of Bain's contemporaries, left an indelible mark on English psychology with his work on individual differences and the use of statistics in measuring behavior. Darwin's theory of evolution was the catalyst which led Galton to study the inheritance of abilities and especially the nature of genius. His first book on the subject, *Hereditary Genius* (1869), and his later publications on the development of human faculties were to prove a landmark not only in England, but in the United States, France, and Germany. His contribution to the field of individual differences was to have a major impact on American work in this area, mainly through that of James McKeen Cattell.

James Ward, the other of Bain's key contemporaries, worked at Cambridge, and together with his student George Stout (1860–1944), was to establish a philosophical tradition for English psychology which would replace associationism with philosophical idealism. Ward's views were influenced by the Scottish philosopher Thomas Reid and the German school of philosophy represented by Leibnitz and Immanuel Kant. While Ward and Stout were undoubtedly well disposed to the establishment of a scientific and experimental psychology in England, their philosophical position was to strongly influence English theoretical psychology, some would say even having a retarding effect on the advancement of scientific psychology until the start of World War II (Misiak & Sexton, 1966).

As we enter the next millennium the fact that English psychology is once again reflecting on its philosophical and historical traditions raises issues about the significance of the historical and philosophical roots of the subject. While Galton was the most influential and original of the late nineteenth-century figures to be responsible for the establishment of psychology as a scientific discipline in England, three other persons—Herbert Spencer, James Sully, and William H. R. Rivers—must also be seen as having played an important part in the development of the “new scientific psychology.” Spencer (1820–1903), the author of *Principles of Psy-*

chology (1855) introduced evolutionism into English psychology, while Sully (1842–1923), a professor at University College, London, wrote *Outlines of Psychology* (1884), the first textbook of psychology to be published in the English language. In 1886, he published a simplified version of this text, entitled *The Teachers' Handbook of Psychology*. Sully will also be remembered for founding an experimental laboratory at University College, London, and pioneering the cause of child psychology as a field of psychological study.

William H. R. Rivers (1864–1922) played an important role in the development of experimental psychology in England. He originally trained as a physician and turned to psychology later in life. He injected an enduring sense of experimentalism into psychology, establishing the first and now famous experimental psychology laboratory in Cambridge in 1897. Rivers can be regarded as the first truly experimental psychologist of the English school.

The Twentieth Century

Unlike American psychology, the rise of psychology in England was slow. This was mainly attributable to the cautious and conservative attitudes of English universities, which did not consider psychology a serious discipline in the curriculum. The strong and continuing influence of philosophical psychology also contributed to the lack of progress in the subject. This was reflected especially in the older universities like Oxford and Cambridge, where there was a strong distrust (mainly by philosophers and theologians) of a subject that tried to approach the study of mental processes from a purely scientific point of view.

By the turn of the century the new scientific psychology had been launched along more experimental lines, much of it influenced by the German tradition. This tradition was reflected in the work of Sully, Rivers, William McDougall, and Charles Spearman, who either studied or were well acquainted with the famous German centers of experimental psychology. Galton's work, however, is representative of a key indigenous British influence, namely that of Darwinism. Galton's work on individual differences and his use of statistics to measure behavior meant that the stage was set for intensifying the drive to bring English psychology closer into the wider scientific community. Preparation for this had already begun with the work of Rivers, for he saw the need to train future psychologists to continue the experimental tradition, which he had initiated. He trained a cadre of future British experimental psychologists during his time at the Cambridge laboratory, among the most famous of whom was Charles S. Myers (1873–1947).

In 1912, Myers was appointed director of the Cambridge laboratory. He is remembered for his book *The Text-book of Experimental Psychology*, published in 1909

and considered to be the first text of its kind in the field. Myers laid great stress on psychophysical methods but was also aware of the importance of introspection in experimental psychology. He had great insight and a sense of clarity about his subject and was among the most able and balanced minds that have contributed to English psychology (Hearnshaw, 1964). His connection with Cambridge terminated with World War I, but not before he had firmly established the Cambridge laboratory on new premises.

Charles E. Spearman (1863–1945) is one of the great pioneers of English psychology, and he is often considered, along with Galton, to be a main protagonist of the correlational tradition, embracing statistical and measurement psychology. Spearman was trained in the German psychological tradition, having studied under Wundt in Leipzig, where he obtained his doctorate in 1904. He later studied physiology, also in Germany. In 1906 he returned to England and took a teaching appointment at University College, London, where he stayed until 1931. His best-known contributions are to statistics and the study of human abilities as part of a wider understanding of human intelligence. He enriched the correlational tradition by laying the fundamentals for factor analysis. In 1904, he published his ideas on a two-factor theory of intelligence. Spearman distinguished between a general ability factor, *g*, and a special abilities factor, *s*. His theory was to form the basis of much speculation, but it also provided English psychology with a basis for mental measurement.

A contemporary of Spearman was Karl Pearson (1857–1936), who also worked at University College, London, where he eventually occupied the chair of eugenics endowed earlier by Galton. Pearson was an ardent devotee of science and scientific method. His main contribution to English psychology was in the field of statistics. It is to Pearson that we owe the sustained use of correlation in psychology, and also the first-time use of terms such as *normal distribution*, *standard deviation*, and *chi squared* or *goodness of fit*. Pearson was to provide countless psychologists and other scientists with many of the tools of statistical analysis worldwide.

During this time, other figures made a mark on the rise of scientific psychology. One such figure was Lloyd Morgan (1852–1936), known for his seminal work on comparative psychology, especially in the area of methodology. Another was Henry Maudsley (1835–1918), the first person in England to attempt to unite normal and abnormal psychology. He was only partially successful, but he will be mainly remembered for his work on insanity, his theory of imagination, and his advocacy of a multidisciplinary approach to mental problems.

William McDougall (1871–1938) was another key figure during these formative years. He spent the first 20 years of his professional life at University College,

London, being appointed in 1900 as a part reader in the Psychology Department. After 1920, he crossed the Atlantic to the United States and worked at Harvard University and then Duke University, where he was to make a profound impact on psychology. His main influence on English psychology was in the field of physiological psychology, for he posed significant questions about the physiological basis of attention and consciousness, among other areas. His book *Introduction to Social Psychology* (1908) was to become a watershed for the future development of psychology. His wider conception of psychology as a social science, however, was yet to be appreciated by the international community. In his early years, McDougall had been influenced somewhat by the work of Sir Charles Sherrington (1857–1952), and it is to this high-profile contributor to English psychology that we now turn.

The contribution which Sherrington made to the scientific development of English psychology is immensely important, as he strengthened the link between physiology and psychology at the start of the twentieth century. Most of his productive life was spent as professor of physiology at the universities of Liverpool and Oxford, respectively. His dictum that “behavior is rooted in integration” sums up his position concerning the neural functioning that lies at the heart of any scientific psychology. The implication of his fine and elegant work on neuromuscular action, his coining of the terms *synapse* and *proprioceptors*, and the discovery of neuromuscular feedback mechanisms are key landmarks in the development of physiological psychology. However, Sherrington was more skeptical about the part the brain played in explaining the notion of mind, and in this area he remained a dualist. Sherrington’s contributions to psychology extend through to the interwar years.

The Interwar Years

By 1939, there were only six chairs of psychology in the whole of Britain and 30 university teachers of the subject. The principal interests of English psychology centered around its applications to education, mental health, and industrial and occupational problems. Animal psychology did not develop very significantly and was overshadowed by the growth of Nikolaas Tinbergen’s ethology at Oxford. While the contribution of key figures such as Spearman, Sherrington, and Myers continued to be felt in their fields of psychology, the subject was not taken seriously by most universities.

There are a number of reasons for this. First was the conservatism of English universities toward new disciplines and methodologies. Second was the skepticism and even hostility of some philosophers toward the recognition of a new subject that dared to study the mind from a scientific point of view. A sense developed among philosophers, especially Alexander

(1859–1938), professor of philosophy at Manchester University, that psychology should be concerned with actions and not content. However, the long drawn-out philosophical debate that ensued was to retard considerably the development of psychology in England.

During this period, the theoretical position of English psychology was to be shaped by McDougall's hornic system, the reemergence of the doctrine of instinct, and the focus on a factor-analytical theory of intelligence and cognition. These ideas provided psychology with a framework for a comprehensive theory of personality, and that provided a rich substratum for the development of educational psychology. While developments in social psychology, personality, research methodology, learning, and behaviorism were gaining ground in America, none of these fields of study were getting any substantive attention in England.

There were, however, pockets of expertise and specialization in different parts of the country that were contributing significantly to the development of the subject. Sir Frederic Bartlett (1886–1969), who later succeeded Charles Myers as director at the Cambridge Laboratory, contributed to experimental psychology in the fields of thinking, memory, and imaging. He was also interested in the industrial applications of psychology, and his work on skilled performance laid the foundations for further developments in this field at Cambridge. Many future holders of British chairs of psychology were to be filled by persons who had studied under Bartlett. Between the wars, James MacCurdy (1886–1947), a Canadian by birth, had a substantial influence on psychology at Cambridge University. His main contribution was in the field of psychopathology, in which he attempted to integrate psychology with physiology through the concept of patterns.

While Oxford University remained aloof to scientific psychology, it was the motivation of William Brown (1881–1951), a physician, which was partly responsible for the creation in 1936 of the now famous Oxford Institute of Experimental Psychology. Brown became its first director, but a chair of experimental psychology was not established until 1947. At University College, London, the so-called London School, initiated by Spearman with its interests in human abilities and the structure of personality, enjoyed wide recognition not only throughout Britain, but also in America and continental Europe. In 1930, Spearman was succeeded by Cyril Burt (1883–1971), who maintained the same interests as Spearman for the 20 years he was the director.

The interwar years also saw specific developments within educational psychology. The interest of earlier figures, such as Mills, Bain, Adams, Nunn, Ballard, and McDougall regarding the relationship between psychology and its possible application to education were later taken up by three famous workers, namely, Burt, God-

frey Thomson, and Charles Valentine. Burt's written work was extensive and varied, covering areas such as testing, juvenile delinquency, and factorial statistics. He was successful in selling educational psychology to the teacher training establishment, as well as popularizing educational psychology through the press and professional journals. His main interest was in the psychology of individual differences, claiming that these differences owed more to nature than to nurture. Although after his death his standing was severely shaken by accusations that he based much of his arguments regarding individual differences on fraudulent data, his reputation has recently been restored.

Godfrey H. Thomson (1881–1955) was the director of Moray House for over 25 years, supervising and developing the Moray House tests, which were used in many parts of the English educational system. The third interwar figure was Charles W. Valentine (1879–1964), who will be remembered as the founder of the prestigious *British Journal of Educational Psychology*, in 1931. Valentine also wrote extensively in the field of early childhood and on the principles of educational psychology for those training to be teachers.

While other fields in psychology, such as social psychology, industrial psychology, comparative studies, physiological psychology, and clinical applications, were also being pursued in this interim period, compared to the intensity that existed within educational psychology, the interwar years for these areas were not particularly productive.

Renaissance in English Psychology

The effect of World War II and the period up to the present day has seen exciting developments in several fields of English psychology, the culmination of which is a discipline characterized by a greater degree of integration across areas of psychology, and with other disciplines like medicine and the social sciences. Furthermore, as we enter the next millennium, there is a growing awareness on the part of English (as well as British) psychologists that psychology is becoming part of a more global discipline. Let us trace the course of English psychology during the last 50 years or so by examining a number of key developments embracing professional and organizational influences, as well as changes in academic and intellectual direction, which have affected psychologists and others, such as teachers, those in the caring professions, social scientists, and commercial and industrial managers.

Professional and Organizational Influences. Before World War II, psychology as a profession was a muted affair, even though the mainly academic British Psychological Society was founded in 1901. The beginnings of applied psychology dates from 1918, when a committee set up on the Health of Munition Workers,

in which issues of health and occupation related to these workers, formed the basis of research to improve their working conditions. The work of Craik (1914–1945) and Bartlett during the interwar years was mainly responsible for developing occupational psychology. This was done with the help of funding from the Medical Research Council. Furthermore, it is from C. S. Myers's work at the private National Institute of Industrial Psychology that industrial psychology as a profession can trace its origins. During World War II, psychologists such as P. E. Vernon and A. Rodgers were actively engaged with the armed forces reinforcing previous developments in occupational psychology.

Earlier, we discussed the dominant position of educational psychology and its established place as respected profession during the interwar years. Cyril Burt is mainly seen as the driving force behind this development, but Susan Isaacs and Charles Valentine also played key roles. After the World War II, the scene was set for the establishment of another professional body, namely clinical psychology. Here, Hans Eysenck (1916–1997) built on the foundations laid by Henry Maudsley during the interwar years. As professor of psychiatry at the Institute of Psychiatry at the University of London, the German-born Eysenck not only contributed to a fine intellectual tradition focusing on personality, but also put the training of clinical psychologists on a firm footing with the help of Mary Davidson and Grace Rawlings. Eysenck will also be associated with the creation of an empirically tested and scientifically based psychotherapy, now called cognitive-behavioral therapy, that replaced psychodynamic dogma.

With the rapid expansion of higher education in the early 1960s and the upgrading of polytechnics to universities at the end of the 1980s, the number of psychology departments has mushroomed. The job aspirations for clinical and educational psychologists qualifying from these institutions is generally met by the National Health Service and the State Educational System, respectively. Those students who qualify in occupational, industrial, and organizational psychology find jobs mostly in the private sector. There has also been an increase in the numbers qualifying in social psychology, psychotherapy, and health psychology over the last 20 years. These trends provide a new cadre of professionals who we hope will be equipped to deal with society's mental and social pressures.

The professional status and activities of psychologists are handled by the British Psychology Society, founded in 1901. The society started as an academic organization, which admitted anyone interested in the subject. However, since the end of World War II, members are admitted on the basis of having qualifications in psychology. There are graded forms of membership (e.g., member and fellow) based on the applicant having higher qualifications and proven contributions

of high caliber to the subject. The British Psychological Society was incorporated under the Companies Act in 1941, and further incorporated by royal charter in 1965. This means that the society is required not only to promote the advancement of psychology as a study in its own right, but to ensure that it applies its knowledge and research, where appropriate, to the community at large. In 1987, the charter was amended to require the society to maintain a code of conduct for the guidance of its members and to draw up a register of chartered psychologists. At the end of 1990s, the number of society members is over 30,000, making it the second largest psychological society in the world.

This is an impressive and encouraging achievement when viewed against the faltering attempts during the earlier years of this century to give the field of psychology a higher academic and professional profile. However, the society is proving to be a dynamic and forward looking body of professionals who are currently discussing the development of the profession as we enter the next millennium (Lunt, 1998). Through conferences and colloquia, a vision is being drawn which is optimistic and expansionist, building on the gradual development of psychology since 1901, and especially since 1945. The society is determined to strengthen its scientific and professional standing, and to foster excellence in basic and applied research that will be reflected in sound praxis in all areas of psychology.

Academic and Intellectual Directions. By the close of World War II, psychometrics, neurophysiology, and cognitive psychology (i.e., memory and thinking) were still well-established academic and intellectual traditions in English psychology, and (with modifications) they continue to be so. Psychometrics formed the dominant theme of most of educational psychology until the late 1950s, when its overall value and relevance for schooling began to be questioned. However, psychometrics continued to have an academic direction when the field was developed to determine personality differences. An example of this application would be the employment of factor analysis to tests of personality, in which Hans Eysenck's work on neuroticism and introversion is well known. However, with the change in successive government policies favoring a return to more pupil testing in primary and secondary schools, psychometrics is once again playing a higher profile in education. Nevertheless, it is unlikely that it will return to the preeminent status that it enjoyed during the interwar years.

The work of Sherrington in neurophysiology, discussed earlier, and that of neurologists like Hughlings-Jackson (1835–1911), Sir David Ferrier (1842–1928), and Sir Henry Head (1861–1940) laid a firm foundation of what was to become the most intensive development within psychology by end of the twentieth cen-

tury, namely, that of neuropsychology. At Cambridge, O. L. Zangwill developed innovative methodology to study the link between brain damage and deficits in brain functioning. Weiskrantz and his associates, with their investigations into the impairment of the visual system and brain functioning, coupled with research by Warrington, Baddeley and Coltheart on aphasia and amnesia, have provided valuable data for clinical applications, as in dyslexia, and provides new and exciting insights into the complex functioning of the brain as an organ. This surge in neuropsychological research is also reflected by the work of J. A. Gray, which currently links personality dimensions (akin to Eysenck's work in this field) with the role of the hypothalamus.

Human cognition is also an extremely active field of research in current English psychology. A short survey by the author, of psychological research carried out at English universities over a period of 25 years (prior to 1998) appearing in the prestigious *British Journal of Psychology*, showed that over half of the articles reported research into cognitive psychology. A further breakdown of these contributions showed that almost two thirds reported research on memory or memory-related behavior. Other areas of cognitive psychology in this survey included work on thinking processes, visual and auditory perception, language development, reading, and psychomotor research, including the behavioral effects of being right- or left-handed. The work of Donald Broadbent, the director of the Applied Psychology Unit in Cambridge for 16 years, and workers such as Gregory, Poulton and Conrad, are regarded as the key figures in furthering the development of cognitive psychology in the later part of the twentieth century. Broadbent's seminal work on attention, memory, and information processing laid the foundations for the current research being carried out on "working memory," on which Alan Baddeley, the current director of the Cambridge Applied Psychology Unit, is a leading authority.

The renaissance in English psychology also embraces areas of psychology that had been neglected prior to the 1950s. For instance, in developmental psychology, the work of J. S. Bruner as visiting professor at Oxford University in the mid-1970s and early 1980s, and, more recently, Bryant at the same university, has given genetic psychology a more constructivist stance. In social psychology there is renewed activity in interpersonal relationships, development of social skills, and social interaction in general. The influence of Oxford-based Michael Argyle is seminal in these fields; his research has provided English social psychology with a well-defined tradition in this area. Henri Tajfel, who was based in Bristol, also invigorated social psychology in England by his work on sociolinguistics and the dynamics of group cohesiveness.

As we come to the close of the twentieth century,

the pragmatic and applied tradition of British and English psychology is taking a new and exciting intellectual direction, one characterized by integration of certain psychological specializations. For instance, some workers in cognitive and occupational psychology are collaborating with their counterparts in clinical and health psychology to investigate growing concerns about job stress and anxiety. As one of the "trail blazers" in the trend toward great interdisciplinary integration, the Cambridge Applied Psychology Unit, is fully involved in stimulating the new field of cognitive neuropsychiatry. This may lead to treatments of patients with certain cognitive deficits, which reflect research collaboration between neurologists, cognitive psychologists, and psychiatrists. English psychology is also continuing to contribute to the wider scientific arena within Britain. Research into many fields of psychology, such as aging and stress at work, are reported at the annual meetings of the British Association for the Advancement of Science. An interesting part of the psychology section of the annual conference is devoted to young persons about to leave school for university and the world work and who might wish to know more about the subject.

Persual of the proceedings of the British Psychological Society conferences and *The Psychologist*, the society's monthly bulletin, shows that since the late 1980s English psychologists have not been slow to reflect on the state of their subject. For instance, within educational psychology there is growing doubt about what role the subject has in the preservice and in-service training of teachers in the light of government policy on teacher accreditation and training, which gives more professional control to schools than was the case before 1988. Tony Gale, former professor of psychology at the University of Southampton and who gave the annual C. S. Myers Lecture in 1996, raised the issue of making British psychology more responsive to its growing popularity among university students and its consequent expansion within the United Kingdom.

Gale spoke about the need for the reconstruction of British psychology, by removing barriers such as the distinction between basic and applied research, the gulf between the university and wider community, and between professionals and academics. It is these and other hurdles that impede the development of psychology as a well-integrated, effective, and relevant discipline.

In effect, Gale is reinforcing the theme of integration and the cross-fertilization of ideas and views already beginning to take place across many fields in psychology, as we have seen, and which is part of the present renaissance within English psychology. The next step would be for English psychologists to pool their expertise and intellectual and academic traditions to be part of a wider international body of psychological theory and practice.

[See also British Association for the Advancement of

Science; British Psychological Society; Northern Ireland; Republic of Ireland; Scotland; and Wales.]

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Elwyn Thomas

ENURESIS is classified under Axis I in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; American Psychiatric Association, 1994) as an elimination disorder usually first evident in infancy, childhood, or adolescence. Four diagnostic criteria must be met: (1) repeated voiding of urine, either involuntary or intentional, into clothing or bedding; (2) a frequency of twice a week for a minimum of three consecutive months or evidence of impairment in important areas of functioning, such as social, or evidence of clinically significant distress; (3) a chronological or equivalent de-

velopmental level of 5 years; and (4) the behavior is not caused exclusively by a substance such as a diuretic or a general medical condition such as diabetes.

There are three subtypes of enuresis: nocturnal, voiding during the night; diurnal, voiding during the day; and a combination of the two. Enuresis is classified as primary if continence has never been achieved or secondary if the enuresis developed after continence had been achieved and maintained. The primary versus secondary distinction does not appear to have prognostic validity (Doleys, 1977). Primary enuresis represents 85% of all cases.

Enuresis can effect a child's self-esteem, result in peer social ostracism, and create anger and resentment in parents. These problems become worse as the child ages. Parental punishment and rejection are not uncommon. The problems associated with daytime wettings appear to be more severe because parents are more likely to regard it as an act of disobedience and thus may be more extreme in both their reactions and measures employed in responding to it (Berg, 1979). Perhaps the major difference between the two is simply that diurnal enuresis is more easily detected by individuals outside the family and hence is more embarrassing for both the child and parents. However, nocturnal enuresis may result in a loss of opportunities for camp or sleepovers with friends. Urinary tract infections are sometimes present.

The overall prevalence of enuresis at age 5 is 7% for males and 3% for females, whereas it is 3% and 2%, respectively, at age 10 (Erickson, 1987). The disorder occurs in about 1% of adults.

Diurnal Enuresis

At age 2, 50% of U.S. children have achieved daytime continence, and by age 4, 90% have done so. Surprisingly little has been written on diurnal enuresis, whereas there is a vast literature on the nocturnal type. Forsythe and Redmond (1974) studied over 1,000 nocturnal enuretics and found that 28% also had daytime wetting problems. Diurnal enuresis also has been found to be associated with encopresis. Successful treatment has been behaviorally based (Azrin & Foxx, 1974; Foxx, 1986).

Nocturnal Enuresis

Approximately 12 to 15% of nocturnal enuretics stop bed-wetting each year, although there are no valid predictors for selecting which children will become dry without treatment (Doleys, 1977). Also, there appears to be a hereditary predisposition toward enuresis. Most enuretic children have a parent who was enuretic, and concordance is higher in monozygotic twins than in dizygotic twins.

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Science; British Psychological Society; Northern Ireland; Republic of Ireland; Scotland; and Wales.]

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No definitive etiologic factor has been identified, although several have been suggested. They include al-

lergies, smaller functional bladder capacities, urine production exceeding bladder capacity during sleep, abnormal sleep patterns, a lack of antidiuretic hormone secretion, gaining attention, urinary tract infections, and coexisting mental and other developmental disorders. When a enuretic child has emotional problems, they are often the outcome of enuresis rather than its cause. There is not strong evidence supporting enuresis as a sleep arousal disorder.

There have been a number of treatments recommended and attempted. Short-term psychotherapy has been shown to be no more effective than no treatment. Well-controlled studies have failed to demonstrate either the relationship between bladder capacity and enuresis or the utility of urine-retention control training (Christophersen & Edwards, 1992).

Imipramine, a tricyclic antidepressant, has been the drug most commonly used to treat enuresis. Although effective in about 60% of cases, it has serious side effects and high relapse rates. Desmopressin has been used to control high urine output during sleep and was successful in up to 70% of cases. However, it also has high relapse rates, side effects, and is costly.

The most successful treatment has been behavioral, beginning with the bell and pad (urine alarm) procedure (Mowrer & Mowrer, 1938) and continuing with dry-bed training (Azrin, Sneed, & Foxx, 1974). Success with urine-alarm-based programs has ranged between 70 and 90%, with treatment lasting 5–12 weeks. Relapse is common (46% of cases), but reinstituted training typically produces a complete cure (Christophersen & Edwards, 1992). The Mowrers attributed programmatic success to classical conditioning, whereas most researchers now suggest that avoidance learning is responsible.

[See also Sleep Disorders.]

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Richard M. Foxx

ENVIRONMENTAL DESIGN RESEARCH. The field of environmental psychology originated, in part, from a desire among psychologists to generate information that would help improve the quality of the designed environment. To meet this goal, psychologists joined design professionals and other social scientists to develop a perspective and conduct research that differ substantially from mainstream psychology. This growing body of work is often called *environment-behavior studies* or more inclusively *environmental design research*.

The perspective of environmental design research is necessarily interdisciplinary: relevant material is drawn from many fields and collaboration among members of different disciplines is pursued. Links are made to geography, human ecology, psychology, anthropology, sociology, history, urban planning, urban design, architecture, and landscape architecture.

Attention is given not only to the individual and intrapersonal phenomena, but also to groups, communities, and organizations and to a wide range of behavior and experience. The places studied are indoors and outdoors, and vary in scale from rooms or parts of rooms to buildings and discrete outdoor spaces to neighborhoods and even entire cities. Researchers often focus on categories of places, such as offices, schools, hospitals, housing for the elderly (Howell, 1980), housing for single parents (Sprague, 1991), urban plazas or other outdoor spaces (Carr, Francis, Rivlin, & Stone, 1992; Wekerle & Whitzman, 1994; Whyte, 1980), and farmers' markets (Sommer, 1983), or on categories of people including the elderly, children, teenagers, or people who do wage work at home.

Human behavior and experience may be viewed not only in physical and social contexts, but also in cultural, political, and historic ones. The physical environment is not seen as determining certain behaviors and attitudes, but as supporting or constraining them. Furthermore, the relationship between people and environments is fluid and reciprocal; each changes and each influences the other. Because the focus is on people pursuing activities in environments, a variety of naturalistic research methods, rather than controlled experiments, is needed. Many envi-

lergies, smaller functional bladder capacities, urine production exceeding bladder capacity during sleep, abnormal sleep patterns, a lack of antidiuretic hormone secretion, gaining attention, urinary tract infections, and coexisting mental and other developmental disorders. When a enuretic child has emotional problems, they are often the outcome of enuresis rather than its cause. There is not strong evidence supporting enuresis as a sleep arousal disorder.

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ronmental design researchers seek types of publications and ways of presenting information that will reach professionals and students in design and planning fields.

Several Key Concepts

Environmental design researchers often examine a variety of everyday activities, experiences, and attitudes to determine how particular environments meet the needs of occupants. Such research may draw upon several concepts that have been developed to shed light on people-environment relationships from a behavioral perspective. Many of these concepts refer to the spatial and physical dimensions of behavior or to environmental knowledge and attitudes.

One of the earliest spatiophysical dimensions was noted by Henry Osmond who distinguished sociopetal space that tends to push people apart, from sociopetal space that encourages social interaction. A row of chairs all facing in the same direction, as in an airport, for example, creates a sociopetal space, whereas chairs placed in a circle facing inward, creates a sociofugal space. Additional physical characteristics of hard surfaces, fixed furniture, resistance to change, and a stark, institutional atmosphere can also discourage interaction (Sommer, 1983).

The concepts of privacy, personal space, and territoriality are all used to understand person-environment relationships and to make recommendations for design. Privacy is a process by which individuals and groups make themselves available for interaction with others; personal space and territoriality can then be viewed as mechanisms for achieving degrees of privacy (Altman, 1975). Personal space is person-centered, moving with the person, and is not delimited by any visible boundary, whereas a territory is a fixed, visibly marked region that may be associated with a person, a household, or a group of people.

The activity of decorating or modifying a territory, called *personalization*, enables people to express feelings of self, group, and cultural identity in the built environment and to accommodate their lifestyle. As a consequence, they may develop feelings of attachment and responsibility for their surroundings, particularly in residential settings (Cooper Marcus & Sarkissian, 1986; Newman, 1972). The degree and permanence of the markers vary with the kind of territory. Primary territories, including homes or bedrooms, are occupied for longer time periods, are more central to people's lives, can be more fully personalized than secondary territories that are more accessible to other people, but are still subject to some degree of control (Altman, 1975). A space in a public place, such as a seat on a bus or a table in a restaurant, can also be marked with a coat or other personal belongings, but only temporarily.

The connections between place and self-identity or place and group identity can be quite strong, as suggested by the concepts of place identity and place attachment. Places come to serve as repositories of memories as well as representations of one's self and one's group. Home and neighborhood figure prominently; changing one's dwelling either by moving or by significant modifications may reflect and encourage personal growth (Cooper Marcus, 1995).

Conceiving of spaces as part of a sociospatial hierarchy is very useful in conducting environmental design research and in making design recommendations. Newman (1972) observed that the clear delineation of a hierarchy of zones with real and symbolic barriers encouraged residents in public housing to use and to appropriate the private and semiprivate spaces, and was a clear indication to outsiders of where they could enter. Sprague (1991) used a nested, four-zone hierarchy of person, household, community, and neighborhood to compare the spatial arrangements and patterns of use evident in various cases of conventional and special needs housing.

People's use of an environment is facilitated by their understanding of its spatial organization; this understanding in turn is facilitated by cognitive images that often take on the characteristics of a mental map. Analysis of the mental maps that people drew of cities suggested to Lynch (1960) five elements in the urban environment that people use to structure their images: paths, edges, landmarks, nodes, and districts. Paths are routes people travel along; edges are boundaries between parts of city or town that act as boundaries; landmarks are significant buildings, monuments, or discrete and notable locations; nodes are points of intensive activity; and districts are areas that have a distinctive character. The elements of some cities, such as New York, make their layout more legible, or more easily learned and remembered than the elements of other cities, such as Los Angeles. Orientation and way finding in smaller scale settings, such as buildings, is influenced by other features that include physical cues that distinguish spaces from each other and visual access from one space to another.

Visual access plays a role in other environmental behaviors as well. Being able to see into a public or semipublic space before entering it allows more freedom of choice as to whether or not to enter, and may increase the use of the space (Howell, 1980; Whyte, 1980). Visual access to spaces outside the private dwelling often increases people's sense of responsibility for the spaces and provides a greater degree of safety (Newman, 1972). In other cases, people's ongoing surveillance of a shared space may feel intrusive to other occupants, as in the lobbies of housing for the elderly (Howell, 1980).

Research Methods

A rich variety of research methods is available to environmental design researchers. The conventional tools of standardized questionnaires for surveys or personal interviews, as well as focused interviews with groups or individuals, can all be developed to address environmental topics. Other specialized techniques, which may involve visual cues and responses, can be incorporated or used independently.

Photographs or slides may be used in questions on preferences or sorting tasks. Respondents can also be given cameras to take pictures on assigned topics in their own homes or neighborhoods. In cognitive mapping, respondents are asked to draw a quick sketch map of a city or an area as they would describe the place to a visitor. Respondents' maps can be compared with researchers' observations of the significant features of the location to determine what physical elements are used to form mental images and to see how images differ among groups (Lynch, 1960).

Respondents can also be shown floor plans of buildings or base maps of their communities and asked to indicate the routes they take, places where they feel safe or unsafe, places where they feel at home, or the boundaries of their neighborhoods. In exploring people's ideals of a home, a school, or other types of places, researchers may ask respondents to draw a picture of their ideal house or school, as well as the one they currently occupy. Respondents may also draw and describe previous homes and neighborhoods or places they loved best or visited when they wished to be alone.

Such drawings may be part of an environmental autobiography in which respondents recall and describe the various places they have lived and what those places felt like. To explore people's emotional bonds with their homes further, Cooper Marcus (1995) developed a Gestalt role-playing technique in which respondents "speak" to their homes about their feelings toward them and then take the role of the home and respond. Such dialogues may arouse deep emotions and surprising insights, leading to renovations, decisions to move, or recognition of the features desired in a new home.

Emotional, cognitive, and attitudinal factors are important, but so are the actual activities that take place in designed environments. These can be described in self-reports, but they can also be documented in more detail and more reliably through various kinds of on-site observations. Observers may make notes, possibly on base maps or diagrams of the setting, or they may use precoded checklists as in behavior mapping. This is a systematic technique for recording the precise location, activity, props, number, and characteristics of participants of ongoing activities and any other significant conditions (such as the weather in outdoor observa-

tions). The categories of information and the appropriate coding are defined in advance and observers are trained to conduct the observations at prescribed times. Time-lapse photography can also be used to record behavior over time. Whyte's (1980) analysis of the data from such films of urban plazas helped him determine the physical and social features that attract users; this information helped shape revisions to the New York City zoning ordinance.

Base plans of the setting can also be used to draw the location, size, and type of furniture, and to note other physical features pertinent to the research project. Howell's (1980) documentation of the size and type of furniture of elderly residents led to design recommendations for accommodating such furniture in the future. Additional observations can be noted, on plans or with photographs, of the evidence of people's past activities, such as paths made across a lawn, litter or toys left outside, or decorations on a door (Zeisel, 1981). Both recording ongoing activities and recording such physical traces indicate how an environment is used and adapted, and may indicate advantages and problems with particular features. The observations may also generate questions that require further investigation. Zeisel's observation of open containers of food on the window ledges of a veteran's residence led him to discover that residents enjoyed their own snacks apart from the regular meals provided in the common dining room.

Documentation of the physical features and traces in a setting can take place on a tour led by persons familiar with it. Frequent users of an environment can point out significant design, management, or other features. Information collected from tours of public places conducted with women in Toronto, called *safety audits*, contributed to design guidelines for increasing public safety for all (Wekerle, 1994).

Visual and written documents, records, and other archival material provide additional sources of useful information to environmental design researchers. Architectural floor plans of a building or site plans of the grounds can be analyzed from a behavioral point of view to note physical design characteristics that may have an impact on patterns of use (Zeisel, 1981). Records kept by institutions, for example, on crime, vandalism, maintenance problems, or complaints, may reveal variations in problems by location or time. Newman (1972) used crime reports kept by the New York City Housing Authority to analyze differences in type and frequency of crime among housing developments with different physical and social features. Information from newspapers, books, and magazines can add historical and cultural dimensions to contemporary environments, conditions, or attitudes. Photographs of chairs and people in different postures contributed to Cranz's (1998) understanding of the cultural influences

on chair design and use in contemporary Western society.

Kinds of Work

Much environmental design research is directed to those people who make decisions about the design, use, and management of built environments: architects, interior designers, landscape architects, planners, urban designers, facility managers, policy makers, clients of design or planning projects, and students in the design and planning fields, as well as everyday building occupants. Two kinds of studies particular to environmental design research are analyses of user needs and postoccupancy evaluations.

An analysis of user needs may be conducted as part of the programming process prior to the design of an environment. During this process the spatial, physical, and environmental requirements that the building must meet are determined by the architect and the client. Information about the users and their needs will suggest particular requirements to be met and will help inform subsequent design choices. The information on needs can be taken from a review of existing research, or research can be conducted specifically to determine the needs of the future occupants (Sommer, 1983).

In participatory design and planning, occupants are directly involved in the programming and design process, usually in a series of meetings and hands-on workshops, which may include tours of similar sites, generation of rough plans, and manipulation of take-apart models (Sanoff, 1989). In a fully collaborative process, professionals engage in a dialogue with occupants, and the knowledge of each person is valued and shared (Schneekloth & Shibley, 1995).

Postoccupancy evaluation determines how a designed environment does and does not meet occupants' needs. The researcher may compare environments of a similar type, or may determine how one building meets the intentions of the architect and the needs outlined in the architectural program. Evaluation research may also be generative, providing information and ideas that can be used in different ways in future planning and design, thus overlapping with user-needs analysis (Werner, 1989).

In addition to technical research reports directed to architects and other professionals who have commissioned the research or to granting agencies, environmental design researchers also write various kinds of design guidelines to explain the ways and reasons why particular environments work or don't work, and how they can best be designed in the future. Sometimes research has been done specifically to help generate the guidelines (Howell, 1980; Newman, 1972; Sprague, 1991; Wekerle & Whitzman, 1994; Whyte, 1980), and sometimes a wider body of existing work is drawn upon and presented as the basis for discussion and guidance

(Carr et al., 1992; Cooper Marcus & Sarkissian, 1986). Publications may also include techniques that can be used for evaluating environments of that type (Howell, 1980; Wekerle & Whitzman, 1994). Other books focus on research methods (Zeisel, 1981), the practice of participatory design and planning (Schneekloth & Shibley, 1995), or a combination of both (Sommer, 1983). If research is to reach the everyday occupants of environments and enable them to make choices about environments, design features, or ways of living, more popularized books are appropriate such as those by Cooper Marcus (1995) and Cranz (1998).

An Evolving Field

Some tension exists within environmental design research between the values and needs of designers and those of social scientists. Whereas designers emphasize types of places and their design features, social scientists emphasize human behavior and experience. Designers need information they can understand easily and translate fairly quickly into design decisions. Social scientists are trained to conduct rigorous and time-consuming research, and to present findings in a manner particular to their disciplines. As the field of environmental design has evolved, researchers have increasingly conducted studies on types of places, which accommodates designers' needs, and have learned to make research findings and their implications more accessible to design audiences.

These developments reflect a strengthening of the normative stance of environmental design research. Not only is research more clearly directed toward ways of improving the built environment, but researchers may also serve as advocates for the occupants of the environments they study. In outlining the human dimensions of public urban space, Carr et al. (1992) explored and presented a series of user rights as well as needs; improving the equity of access to public space is a key theme in their work. The aim of Schneekloth and Shibley's (1995) practice of participatory planning is to reveal and question the underlying meanings of a place and then to facilitate, with the occupants, its desired social and physical transformation.

Recommendations for change may be directed not only at physical features of the designed environment, but also at patterns of use and belief and how they might best evolve. In addition to making recommendations for understanding human physiology and changing furniture design to improve people's health and well-being, Cranz (1998) suggested the adoption of postures and movements in the workplace and in the home that are radically different from those presently acceptable in Western society. As researchers explore how much the environment is a consequence of human actions and not only an antecedent to them, the significance of cultural and historic influences in shap-

ing the physical environment and our relationship to it is clarified. It is becoming increasingly clear that in order to make substantial changes in the design of environments to improve our well-being, cultural changes must also occur.

[See also *Environmental Psychology*.]

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Karen A. Franck

ENVIRONMENTAL PSYCHOLOGY examines the dynamic transactions between people and their everyday, sociophysical environments. Whereas many areas of psychological research (e.g., those rooted in theories of learning, perception, and social influence) are fundamentally concerned with relationships between environmental factors, intrapersonal processes, and behav-

ior, environmental psychology is distinctive in several respects.

First, environmental psychology gives greater attention to molar units of the environment, such as people's homes, neighborhoods, and work and community settings than other areas of psychology, which have focused more exclusively on micro-level stimuli and events.

Second, in keeping with Kurt Lewin's "action research" orientation (1946), research in environmental psychology integrates the scientific goals of analyzing and explaining the nature of people-environment transactions with the more practical goal of enhancing—and even optimizing—people's relationships with their everyday environments through more effective urban planning and environmental design.

Third, because of its dual emphasis on analyzing and improving the quality of people's relationships with their environments, environmental psychology brings a multidisciplinary approach to the study of environment and behavior, incorporating the perspectives of architecture, urban planning, psychology, anthropology, sociology, geography, and other fields.

The multidisciplinary orientation of environmental psychology has contributed to its innovative and eclectic qualities, but has also resulted in a more diffuse and less easily circumscribed identity for the field as a whole. Environmental psychology cannot be neatly categorized as a singular paradigm or research tradition. Rather, it encompasses a disparate set of research areas and perspectives, spanning multiple disciplines, which are linked by a common focus on people's relationships with their sociophysical surroundings. Although environmental psychology can be viewed as a branch of psychological research, it is more accurately characterized as part of a multidisciplinary field addressing environment and behavior and combining the conceptual and methodological perspectives of several disciplines. Thus, the terms *environmental psychology* and *environment-behavior studies* are used synonymously here in recognition of the multidisciplinary orientation of the field.

Social and Academic Origins of Environmental Psychology

The emergence of environmental psychology as a scientific field during the late 1960s can be traced to both social events and academic developments. On the social level, the environmental crisis of the 1960s raised public awareness about the adverse health and social impact of overpopulation, environmental pollution, inter-racial tensions, and urban conflict. During the 1970s and 1980s, the widely publicized technological disasters in the community of Love Canal, New York, and those that occurred at the Three Mile Island and Chernobyl nuclear power plants (in Pennsylvania and Ukraine, re-

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The emergence of environmental psychology as a scientific field during the late 1960s can be traced to both social events and academic developments. On the social level, the environmental crisis of the 1960s raised public awareness about the adverse health and social impact of overpopulation, environmental pollution, inter-racial tensions, and urban conflict. During the 1970s and 1980s, the widely publicized technological disasters in the community of Love Canal, New York, and those that occurred at the Three Mile Island and Chernobyl nuclear power plants (in Pennsylvania and Ukraine, re-

spectively) reinforced the public's concern about environmental problems. At the same time, dramatic examples of "dysfunctional architecture," exemplified by the 1972 demolition of the Pruitt Igoe low-income housing project in St. Louis, Missouri (built in 1956 and containing 2,870 dwelling units in 33 eleven-story buildings), highlighted the failure of many residential and neighborhood environments to support the behavioral and social needs of their occupants.

Within academic circles, scientific analyses of population density, air pollution, energy conservation, and racial conflict prompted the development of broader-gauged theories and methodologies for studying the transactions between people and their everyday environments. In psychology, researchers turned their attention to the molar, sociophysical environment and its influence on cognition, social behavior, life-span development, and well-being. During the late 1960s and early 1970s, these developments in psychology, and similar concerns about the behavioral impacts of large-scale environments in sociology, anthropology, geography, and urban planning, led to the formation of new academic journals, professional organizations, and graduate training programs focusing on environment and behavior.

Scientific Foundations and Contributions of Environmental Psychology

The scientific foundations of environmental psychology are rooted in both the behavioral sciences, as well as the design and planning professions. Architects and urban planners, for example, played a major role in establishing the Environmental Design Research Association (EDRA), the largest and longest-standing professional organization in the environment and behavior field. Design and planning professionals also played key roles in establishing additional, international organizations to promote environmental design research, that is, the International Association for People-Environment Studies (IAPS), based in Europe; People and Physical Environment Research (PAPER), based in Australia and New Zealand; and the Man-Environment Research Association (MERA) of Japan.

The first EDRA conference was organized in 1969 by two architects, Henry Sanoff of the School of Design at North Carolina State University and Sidney Cohn of the Department of City and Regional Planning at the University of North Carolina, Chapel Hill. Since its inception, EDRA has held yearly conferences focusing on environmental design research and has published their proceedings, from 1970 to the present time. A key goal of EDRA is to foster the design of environments that effectively support users' needs, through greater collaboration between design professionals and behavioral scientists. The membership of EDRA, like those of IAPS,

PAPER, and MERA, includes researchers and practitioners from the fields of architecture, facilities management, urban planning, psychology, sociology, anthropology, geography, and natural resources management.

The influence of the design and planning professions on the directions of environmental psychology is reflected in the derivation of behaviorally based guidelines for improving the fit between occupants' needs and activities on the one hand, and the physical and social attributes of their environments (e.g., homes, workplaces, and public spaces) on the other. In their landmark volume *A Pattern Language* (1977), Christopher Alexander, Sara Ishikawa, Murray Silverstein and others presented 253 guidelines, derived from psychological, social, and aesthetic principles, for optimizing the comfort, attractiveness, and overall quality of physical environments. Similarly, Clara Cooper Marcus and Wendy Sarkissian (1986) offered 254 site-design guidelines for enhancing the quality of residential environments. Also, Stephen Carr, Mark Francis, Leanne Rivlin, and Andrew Stone (1992) outlined several criteria for the design of effective public spaces.

Another long-standing concern of environmental design research has been the development of post-occupancy evaluation (POE) strategies for determining how well buildings and other designed environments work or support the needs and activities of their users (Preiser, 1989; Zeisel, 1981). POE is closely related to predesign research (PDR), which is conducted prior to the design and construction of built environments to ensure that occupants' needs are considered by design professionals and incorporated into their plans for future developments (Bechtel, 1997).

The directions of environmental psychology also have been shaped by theoretical and methodological perspectives drawn from the behavioral sciences. During the 1970s, the Division of Population and Environmental Psychology was established within the American Psychological Association. Also, the Environmental Section of the Canadian Psychological Association, and the Environment and Technology, and Community and Urban Sociology, sections of the American Sociological Association were formed. An edited text, *Environmental Psychology*, was published (Proshansky, Ittelson, & Rivlin, 1970), and doctoral training programs in environmental psychology, environment-behavior studies, and social ecology were established at the City University of New York, the University of Wisconsin, Milwaukee, and the University of California, Irvine, respectively. Major reference works and monograph series were published, including the *Handbook of Environmental Psychology* (Stokols & Altman, 1987), *Human Behavior and Environment—Advances in Theory and Research* (Altman & Wohlwill, 1976), *Advances in Environmental Psychology* (Baum, Singer, & Valins, 1978); *Advances in Environ-*

ment, Behavior, and Design (Zube & Moore, 1991). Also, periodic chapters summarizing developments in environmental psychology have been published in the *Annual Review of Psychology* since 1973. At the same time, several journals focusing on environment-behavior studies were established, including *Environment and Behavior* (Sage Publications), the *Journal of Environmental Psychology* (Academic Press), and the *Journal of Architecture and Planning Research* (Locke Science Publishing Company).

Over the past three decades, a number of topics have received extensive theoretical and empirical attention among environment-behavior researchers. The role of physical space in regulating social behavior was one topic widely studied by sociologists, anthropologists, and psychologists during the early phase of environment-behavior research. For example, the effects of spatial proximity on the development of neighbors' friendships, their political attitudes, and consumer behavior were documented in a study of graduate student housing at MIT conducted by Leon Festinger, Stanley Schachter, and Kurt Back (1950). Edward Hall's anthropological research (1966) later demonstrated important cross-cultural differences in how people use space in social situations. His work was extended by Robert Sommer's experimental studies of personal space (1969), and Irwin Altman's theoretical model of the relationships between privacy, personal space, territoriality, and crowding (1975). Sommer's and Altman's studies were rooted in social psychology, whereas Oscar Newman's (1973) theory of defensible space offered a sociological inquiry into those features of housing design that either facilitate or constrain residents' surveillance and control over their apartment buildings and neighborhoods.

A major influence on the course of environment-behavior research was Roger Barker's (1968) theory of behavior settings, that is, systemically organized environmental units that occur at particular times and places and consist of both physical components and a behavioral program. The behavior-setting concept provided a more molar and dynamic unit of environmental analysis than the micro-level stimuli and short-term situations emphasized in earlier psychological theories. Through a series of programmatic studies, Barker and his colleagues charted the diversity and distribution of behavior settings in whole communities and identified systemic processes (such as under- and overstaffing) that regulate the stability and growth of particular settings (Barker & Schoggen, 1973; Wicker, 1979). In a separate research program, Rudolph Moos (1976) presented a theoretical analysis of the social climate within organizational and institutional environments. He also developed a battery of questionnaires designed to measure the dimensions of social climate and their influence on psychological and social outcomes in res-

idential, educational, and occupational settings.

The increasing emphasis on multiple levels and molar units of environmental analysis, clearly evident in Barker's work, was reflected in several other programs of environment-behavior research. In the areas of perceptual and cognitive psychology, distinctions were drawn between environmental and object perception (Ittelson, 1973), and between fundamental and macrospatial cognition (Moore & Golledge, 1976). Also, sketch maps, way finding, and photographic-recognition tasks were devised to measure the imageability of urban environments (Lynch, 1960; Milgram & Jodelet, 1976). This research on environmental cognition extended earlier studies that had examined perceptual and cognitive processes associated with discrete stimuli and objects, but not in relation to larger-scale physical settings. Similarly, Urie Bronfenbrenner (1979) presented an ecological theory of human development highlighting the developmental significance of large-scale environments, that is, the microsystem, mesosystem, exosystem, and macrosystem, while Powell Lawton and Lucile Nahemow (1973) contributed an ecological analysis of environmental competence in older adults. In addition, Kenneth Craik (1976) offered a conceptualization of environmental dispositions, or people's response tendencies toward urban and natural environments, which took their place alongside the traditional trait constructs of personality psychology.

At least three other areas of inquiry have generated sustained research programs and cumulative scientific contributions to the study of environment and behavior. First, environmental assessment studies contributed new methodological tools, including perceived environmental quality indices (Craik & Zube, 1976) and environmental simulation techniques (Appleyard & Craik, 1978; Marans & Stokols, 1993). These methods have been used to evaluate people's reactions to existing or imagined settings, such as residential, recreational, and health-care environments. Also, behavioral mapping protocols (Ittelson, Rivlin, & Proshansky, 1976) and behavior-setting surveys (Barker & Schoggen, 1973) were developed for recording individuals' and group's activity patterns within buildings, public parks, and whole communities.

Second, in their pioneering studies of environmental stress, David Glass and Jerome Singer (1972) revealed the behavioral aftereffects of exposure to unpredictable and uncontrollable noise. They also extended Lazarus's prior analysis (1966) of psychological stress (arising from perceived environmental threats) to the study of "urban stressors." These and subsequent stress studies have employed a variety of observational, self-report, and physiological probes to measure people's reactions to such environmental demands as aircraft noise in residential communities, traffic congestion on urban roads, technological disasters, and prolonged periods of

overtime work in occupational settings (Baum & Fleming, 1993; Evans, Bullinger, & Hygge, 1998; Frankenhaeuser, 1980; Stokols, Novaco, Stokols, & Campbell, 1978). As an antidote for environmental stressors, "restorative environments," such as wilderness and garden areas, have been conceptualized as places that alleviate stress by affording opportunities for spontaneous, as well as voluntary, attention and for "getting away" from one's normal routine (Kaplan & Kaplan, 1989; Korpela & Hartig, 1996; Ulrich, 1984).

Finally, studies of environmentally protective behavior have applied psychological theories to the analysis of resource shortages, pollution, and conservation. For example, Peter Everett (1974) and his colleagues at Pennsylvania State University developed token reinforcement strategies for modifying travel behavior. These procedures were found to be effective in several field experiments as a means of increasing community levels of bus ridership. Also, cash rebates, social praise, and feedback about the consequences of environmentally supportive behavior have proven effective in changing patterns of household energy consumption, waste disposal, and recycling (Scott Geller, Richard Winett, & Peter Everett, 1982). More recently, Paul Stern (1992) contributed an important analysis of the behavioral underpinnings of global environmental change.

Future Directions of Environmental Psychology

The scientific developments outlined above suggest that over the past three decades environmental psychological research has yielded several new conceptual and methodological tools for expanding our knowledge of people-environment transactions. Environmental psychology is a distinctive area of behavioral research, owing to its emphasis on: (1) the influence of physical and social features of large-scale, everyday environments on human behavior and well-being; (2) the dynamic, reciprocal transactions that occur among individuals, groups, and their sociophysical surroundings; (3) the behavioral and psychological influence of both natural and built environments; (4) the behavioral consequences of both objective and subjective (perceived) qualities of the environment; (5) the multidisciplinary and interdisciplinary nature of the field; and (6) the dual emphasis on basic research and theory development, as well as community problem-solving and environmental design, reflecting the "action-research" orientation of the field (Lewin, 1946).

Looking toward the future, it appears that the basic and applied research directions of the field will be strongly influenced by at least five major social concerns that have arisen in recent decades and are likely to become even more salient during the twenty-first century: (1) toxic contamination of environments and

rapid changes in the global ecosystem; (2) the spread of violence at regional and international levels; (3) the pervasive impact of information technologies on work and family life; (4) escalating costs of health-care delivery and the growing importance of disease prevention and health promotion strategies; and (5) processes of social aging in the United States and other regions of the world (Stokols, 1995). In the coming decades, environmental psychologists will continue to play an active and influential role in developing innovative theoretical and empirical analyses of these community problems, and in formulating effective environmental design and public policy strategies for ameliorating and resolving them.

[See also Environmental Design Research.]

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ENVY. See Jealousy and Envy.

EPIDEMIOLOGY is the study of the spatial, temporal, social, and ecological distribution of symptoms, illness, disease, disability, and other health-related states or events in human populations. Typically, epidemiologists measure the characteristics of individuals from samples

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of populations and use statistical methods to partial out the effects of specific variables on health outcomes and to extrapolate from random or representative samples to a larger population.

The goal of epidemiological research may be descriptive (to characterize the nature and prevalence of a problem) or substantive (to identify causal factors or assess the effectiveness of interventions). Descriptive epidemiology can establish the incidence (the rate of new cases) and prevalence (the rate of active cases) of a disease or disorder. Substantive epidemiology is designed to identify risk factors that increase the likelihood that an individual or group will contract a health problem, and protective factors that reduce risk.

These goals of epidemiological research may be closely related. For example, mapping the geographic distribution of occurrences of a disease may reveal an association with a specific location, which in turn may suggest a specific local causal factor. The influence of a potential cause then may be tested by examining the effect of exposure to that factor on the likelihood of contracting the disease. Statistical analyses are used to quantify associations (often in terms of the relative risk or odds of an adverse outcome) and to adjust for the effects of factors that confound relationships (distort or nullify the extent of true associations). Factors contributing to the cause and influencing the course of disorders may be studied with longitudinal studies of cohorts that allow stronger conclusions about the direction of causality among correlated variables based on their temporal priority. Through such studies, epidemiology can contribute directly to knowledge of basic mechanisms of pathology and recovery. Epidemiological studies also are used to identify health service needs and patterns of utilization related to different arrangements of the health care system.

Clinical epidemiology examines groups of patients in treatment settings. This allows the study of disorders that are uncommon in the general population but may be concentrated in specialized clinics. However, studies based on clinical populations may confound factors related to help seeking with those intrinsic to a disorder (the result of this confounding is termed "Berkson's bias"). Clinical epidemiology includes the design and conduct of clinical trials to evaluate the effectiveness of diagnostic and treatment modalities. Randomized controlled trials, in which subjects are randomly assigned to treatment or control (or other treatment) groups without the subjects' or investigators' knowledge, are considered the gold standard of such approaches. Clinical practice and decision making based on systematic appraisal of research data is termed "evidence-based medicine."

Epidemiological research on psychiatric and psychological disorders has faced special problems in establishing the reliability and validity of diagnoses based

entirely on clusters of symptoms and behaviors, in the absence of discrete biological markers. Three generations of studies in psychiatric epidemiology can be distinguished in recent history: (1) an early period associated with asylum or hospital-based studies of major mental disorders and with the use of institutional records or key informants to ascertain diagnosis (1900–1950); (2) population surveys utilizing self-report scales of generalized distress or clinical assessments based on nonoperationalized diagnostic criteria (1950–1980); (3) clinical and population surveys using standardized highly structured interviews designed to collect data sufficient to make specific diagnoses according to operationalized criteria (1980–).

The advent of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association) in 1980 was associated with an effort to improve the reliability of psychiatric diagnosis and to conduct large-scale population surveys. Determining the prevalence of specific disorders should give a better estimate of the actual service needs of the population as well as advancing research in psychopathology. This led to the development of the U.S. National Institute of Mental Health Diagnostic Interview Schedule (DIS), which allows trained lay interviewers to collect data sufficient to make diagnoses according to *DSM-III* criteria. The DIS was used with some 20,000 respondents in the U.S. Epidemiological Catchment Area Study from 1980 to 1984.

In the 1990s, the structure of the DIS was adapted to produce the Composite International Diagnostic Interview (CIDI) for the World Health Organization. The CIDI includes items to address the criteria of *DSM-IV* and the 10th edition of the *International Classification of Disease (ICD-10)*. In addition to instruments like the DIS and the CIDI, there are structured instruments designed for the use of clinicians including the Structured Clinical Interview for *DSM-IV* (SCID) and the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) for *ICD-10*, which evolved out of the earlier Present State Examination (PSE). The availability of translated versions of these standardized instruments has allowed large surveys in many countries permitting systematic cross-national comparisons for many psychiatric disorders. The development of structured diagnostic interviews in psychiatry has been adapted to other areas in medicine such as functional gastrointestinal syndromes and rheumatological disorders. Other epidemiological instruments have been developed to assess level of functioning, disability, quality of life, and needs for specific services.

The recent emphasis on increasing diagnostic reliability and specificity with structured instruments has raised concern about a lack of attention to the validity of diagnostic constructs. This has prompted reconsideration of dimensional approaches to psychological dis-

tress that allow for a continuum of levels of severity and that do not impose a priori diagnostic categories or cutpoints.

Genetic epidemiology involves the use of survey methods in concert with genetic techniques to identify the familial distribution, heritability, and manifestations of genetic variations. Although many neurological conditions have been localized in this way, the study of psychiatric disorders has been limited by the fact that the genetic contribution to most involves multiple genes interacting in a complex fashion with varying environmental circumstances. Genetic epidemiology can be used not only to identify the genetic contribution to disorders but equally to establish the contributions of familial (shared) and individual environmental experiences.

[See also Psychiatry.]

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EPILEPSY is a complex disorder that has long intrigued investigators of human behavior. Epilepsy is not a disease, but rather a disorder characterized by a tendency for recurrent seizures. The impact of epilepsy goes well beyond the direct effects of seizures and includes many factors which may lead to disability and impaired quality of life. Seizures result from unprovoked cerebral discharges that may be manifested as alterations in sensation, motor functions, and/or consciousness. Behavioral changes resulting from seizures have many forms, ranging from brief lapses of consciousness to full convulsions. Other seizures are characterized by unusual behavioral manifestations and stereotypic motor movements. The confusing terminology used to describe seizures in the past has been replaced by a formal classification system.

Approximately 1 to 2% of the population is affected by epilepsy, making it one of the most common neurological conditions. In the United States alone, more than two million individuals have epilepsy and hundreds of thousands develop epilepsy every year. Rates of epilepsy are slightly higher in men than in women. The condition develops most commonly among individuals under 20 years of age. Increased rates are also seen in those over 60 years. Many epileptic syndromes are associated with specific age groups, such as the neonatal seizures, infantile spasms, and febrile convulsions observed in young children. When developing in adults, epilepsy is often seen as a consequence of brain tumors, stroke, or traumatic brain injury. Epilepsy occurs at higher rates in individuals who are mentally-retarded or have some form of developmental disability. Some studies have indicated higher rates of epilepsy in minority populations, though this may reflect a confound of socioeconomic factors rather than ethnicity.

The diagnosis of epilepsy is made by obtaining a comprehensive medical history in conjunction with electroencephalography (EEG). The history includes a medical background and details about the seizures, including the changes behavior seen before, during, and after them. The EEG provides a method for documenting the underlying electrical brain activity associated with the seizures. Many seizures are characterized by specific patterns of electrical abnormality. Abnormal electrical discharges can also be detected when patients are not having seizures. Many patients require comprehensive monitoring with simultaneous EEG and video recording for proper diagnosis. This enables physicians to observe the correspondence between behavioral changes and underlying abnormal brain activity.

Many forms of epilepsy have an identifiable cause, such as the presence of a tumor or some other identifiable brain lesion. Other forms may be the result of genetic or systemic factors, such as the lack of a certain enzyme. Many cases previously labeled as idiopathic epilepsy are now found to be associated with a subtle underlying brain abnormality. The increased detection of these abnormalities has been a result of advances in structural brain-imaging techniques such as magnetic resonance imaging (MRI). Functional brain-imaging methods, such as positron emission tomography (PET), single photon emission computerized tomography (SPECT) and functional MRI (fMRI) have also advanced our ability to localize and understand the brain and the behavioral abnormalities associated with epilepsy.

Anticonvulsant drugs provide the most common and effective form of treatment. These act by altering the potential for abnormal cerebral discharge. Their goal is to reduce seizure activity and to improve quality of life. The number of drugs available to treat epilepsy has more than doubled over the past ten years. While many patients may require more than one anticonvul-

tress that allow for a continuum of levels of severity and that do not impose a priori diagnostic categories or cutpoints.

Genetic epidemiology involves the use of survey methods in concert with genetic techniques to identify the familial distribution, heritability, and manifestations of genetic variations. Although many neurological conditions have been localized in this way, the study of psychiatric disorders has been limited by the fact that the genetic contribution to most involves multiple genes interacting in a complex fashion with varying environmental circumstances. Genetic epidemiology can be used not only to identify the genetic contribution to disorders but equally to establish the contributions of familial (shared) and individual environmental experiences.

[See also Psychiatry.]

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Anticonvulsant drugs provide the most common and effective form of treatment. These act by altering the potential for abnormal cerebral discharge. Their goal is to reduce seizure activity and to improve quality of life. The number of drugs available to treat epilepsy has more than doubled over the past ten years. While many patients may require more than one anticonvul-

sant drug for optimal seizure control, the goal is to limit the number of drugs to reduce possible side effects. Approximately 30% of those treated do not respond adequately to drug management. Many of these individuals benefit from treatment with epilepsy surgery, which involves removing the abnormal portion of the brain that has been found, through extensive presurgical testing, to be causing the seizures. Alternative methods for treating epilepsy are available, though their efficacy remains less established. Individuals with some forms of epilepsy may benefit from changes in diet. Some have shown a reduction in seizures after surgical implantation of a special electrical device that is used to stimulate the vagal nerve. Others exhibit a reduction in seizure frequency after receiving focused behavioral treatment.

While many individuals with epilepsy lead normal, healthy lives, many studies have found increased rates of psychopathology in patients with epilepsy. Higher rates of psychosis, depression, anxiety, personality disorders, and sexual dysfunction have all been reported. Questions remain as to whether the rates of psychiatric disturbance are higher in individuals with epilepsy in comparison to populations with other chronic medical conditions. Some studies have reported up to a sevenfold increase in the rate of psychosis in patients with epilepsy, although these studies are typically conducted on patients appearing at specialized centers for treatment of the most severe forms of epilepsy. Questions about the rates of psychopathology in epilepsy need to be addressed through formal epidemiologic studies using accepted methods for diagnosing seizures and diagnosing the presence of psychiatric disturbance.

There are a number of striking parallels between behaviors resulting from seizures and symptoms associated with various psychiatric conditions. For example, some of the hallucinations and perceptual alterations resulting from temporal lobe seizures are very similar to some of the symptoms experienced by patients with schizophrenia. These observations suggest that the cerebral mechanisms underlying epilepsy might provide a valuable model for understanding the biology of schizophrenia and other psychiatric illnesses. Epilepsy has been used as an analog for understanding the neural substrate of aggression and the cyclical disorders of mood and behavior. Controversies exist over whether some forms of aggressive behavior may actually represent the effects of "subclinical" seizures.

Epilepsy is often thought to affect mood and personality. Some investigators have reported that patients with temporal lobe seizures are prone to changes in personality reflecting increased electrical activity in the limbic region. This may be manifested by increased writing behavior, higher levels of emotionality, and changes in sexual behavior. Depression is commonly experienced as a result of biological factors and as a psy-

chological reaction to chronic illness. Individuals with epilepsy commonly experience "learned helplessness" resulting from their response to a condition characterized by an intermittent and abrupt loss of control. Other patients are known to exhibit recurring seizures without any underlying brain abnormality. These "nonepileptic" seizures are often the result of complex psychological factors that may include conversion reaction or attempts to obtain secondary gain. Psychotherapy appears to be the most effective method for treating nonepileptic seizures.

A number of cognitive abnormalities have been documented in patients with epilepsy. Results from early studies showed decreased levels of intellectual functioning in patients with generalized seizures or with frequent seizure activity. Increased rates of learning and behavioral problems are commonly seen in children with epilepsy. Many individuals with epilepsy experience mild impairments in memory and attention that may be a result of the seizures, an underlying brain abnormality, or the side effects associated with anticonvulsant medications. Patients with seizures arising from focal brain regions may exhibit specific patterns of cognitive dysfunction. For example, it is well known that patients with left temporal lobe seizures exhibit relatively specific impairments in verbal memory while their recall of spatial information is less affected. Neuropsychological testing provides the most sensitive and reliable means of identifying these cognitive abnormalities. Studies of patients undergoing surgical procedures such as temporal lobe resection and callosotomy have played major roles in the development of neuroanatomic theories of memory functioning and hemispheric specialization. Information from these studies has contributed significantly to the body of knowledge on brain-behavior relationships.

Many people with epilepsy experience a unique form of stigma resulting from the intermittent nature of their symptoms. Throughout history, those with epilepsy have been labeled holy or possessed as a result of changes in behavior during seizures. In other societies, these individuals were considered "insane" and were placed in asylums. Currently, social attitudes toward epilepsy and disability vary across ethnic and cultural groups. The effects of epilepsy include academic underachievement, chronic emotional distress, and social isolation. There is a significant economic impact on society, which includes not only the high costs of diagnosing and treating epilepsy but the loss of productivity from a significant portion of the population. Despite information showing that seizures do not affect overall job performance, people with epilepsy have higher rates of unemployment and restrictions in their earning power as a result of their condition. Issues of discrimination can be addressed through patient advocacy and changes in public policy pertaining to epilepsy.

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William B. Barr

EPISTEMOLOGY is the discipline concerned with the nature of knowledge, its origins, the conceptual assumptions or grounds out of which knowledge arises and is possible at all, methods of attaining knowledge, and the status of knowledge as real knowledge, that is, a concern for its trustworthiness. Epistemology, along with metaphysics and ethics, has been one of the fundamental and defining disciplines within Western philosophy. The most basic epistemological question is whether it is possible to achieve certain knowledge. Certain knowledge, it is generally understood, would be knowledge of what really is; it would be true for all persons and in all circumstances.

Epistemology and Psychologism

Psychologism is the term used to describe the position that questions of the nature knowledge and the processes by which it is acquired can be reduced to questions of the actual workings of the human mind, or even to the workings of the brain. Thus, epistemological questions will ultimately be answered by the accrual of scientific knowledge about the workings of the mind or brain. Knowledge contingent on the workings of the mind or the brain would not qualify as certain knowledge. Hence, psychologism is a skeptical position.

Among the most influential critics of psychologism in the twentieth century were Edmund Husserl (1859-

1938), Gottlob Frege (1848-1925), and Ludwig Wittgenstein (1889-1951). The fundamental argument against psychologism begins with the recognition that the workings of the human mind or the human brain are contingent phenomena, subject to personal idiosyncracies as well as such environmental and biological conditions as might affect human beings in their contingent, limited, and imperfect state. Therefore, psychologism must regard all knowledge as contingent, obviating the possibility of certainty in any field of inquiry. To accept any psychologistic account of knowledge is to reject the possibility of knowing anything to be true in the strong sense, that is, true in all circumstances. Science would not escape these same limitations on certainty. This same problem of contingent versus noncontingent knowledge lies at the heart of the current confrontation of modernism and postmodernism in psychology.

The Interdependence of Ontology and Epistemology

Epistemology began with the Greek thinkers of the sixth century BCE. Philosophy was able to develop because of the shared assumption among the pre-Socratic Greek cosmologists that there was a rationality to the universe which could be understood by the exercise of the powers of the mind. The same project continued in the classical period in the thought of Socrates, Plato, and Aristotle. Epistemology, grounded in reason and rational order, was integral to Western philosophy and the subsequent pursuit of knowledge.

It is important to note the intimate connection between ontology, which addresses the question of what really is, and epistemology, which examines how or whether what is real can be known. Any claim regarding the fundamental nature of reality requires justification for the claim, and the justification must be as fundamental as the claim—it must be a truth claim. At the same time, every ontological claim will constrain the nature of the knowledge claims used to defend it. Thus, ontology and epistemology have always been inextricably linked, as much in psychology as in philosophy.

Greek philosophy from the pre-Socratic period through the classical period is often characterized by the division of reality into Being and Becoming. The realm of Being is taken to be a noncontingent realm composed of realities independent of the natural processes of change, eternal, perfect, and unambiguously real. On the other hand, the realm of Becoming is taken to be a contingent realm composed of things in the experienced world, which are subject to the processes of nature and change, temporal, imperfect, only real in some sense, and made real by Being.

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Knowledge of noncontingent realities (such as Platonic forms, Being, or the absolute) must be noncontin-

gent—knowledge that can be taken as true across contexts and across time. Such knowledge seemed to the Greeks to be available only through reason and not through the fallible senses or contingent experience. Thus, to postulate the existence of noncontingent realities is to postulate noncontingent knowledge, and to legitimate certain methods, generally reason and logic, as the means of attaining such knowledge. The contingent world known by experience is real, but in a way radically different from noncontingent and necessary truths.

The distinction between the contingent and the noncontingent, and between the two types of knowledge and methods for knowing required by each, produced an important distinction in Greek philosophy—that between knowledge (*episteme*) on the one hand and mere opinion on the other. For Aristotle especially, “scientific” knowledge included causal principles behind things and events. This same concern for causal principles has been preserved in the prescription that genuinely scientific explanations will be in terms of true and general laws. Mere descriptions of the facts of experience, and explanations in terms of the merely contingent and transient, are designated “mere opinion,” while explanations grounded in noncontingent general laws are the hallmark of scientific knowledge. However, out of concern for scientific credibility, contemporary thinking in psychology seeks a type of noncontingent explanation through contingent means—empirical observation.

Epistemology and Explanation

From Greek times to the present, philosophers as well as scientists have inquired as to what constitutes adequate or genuine explanation. In the *Meno*, Plato distinguished “true belief” from knowledge. Persons may hold true beliefs about some state of affairs such that they are able to reach right conclusions and render proper answers to questions. Such beliefs may accrue from experience. However, according to Plato and Aristotle, genuine knowledge (*episteme*), requires knowledge of the grounds for the belief and the conclusion to which it leads. Traditionally, genuine knowledge of a phenomenon has been assumed to entail knowledge of the principles or the reality underlying it. In other words, explanation must reflect what is genuinely the case, and it must reflect true and adequate grounds for itself.

Knowledge of a thing sufficient to render an adequate explanation must be knowledge of the essential nature of the thing. This requires a formalist epistemology, one in which truth claims are ultimately defensible. Aristotle coined the term *first philosophy* to describe the project of metaphysics, the project of understanding and describing a thing in terms of its absolute and necessary qualities. Although Aristotle

also recognized other sciences, practical and political, and granted that the several sciences were to be valued for their contribution to knowledge, first philosophy was in some sense privileged because it could arrive at the more secure grounds of knowledge, as in the axioms of mathematics. This privileging of knowledge as first philosophy continued through the centuries and is manifest in much contemporary scientific thinking and theorizing. The best and adequate explanation of a phenomenon will be given in terms of knowledge of the necessary and fundamental.

In contemporary psychology, this same epistemological concern is seen in the preference for causal explanation and prediction over “mere” description. However, it is prudent to understand that concern for real knowledge over true beliefs does not necessarily map neatly onto concern for causal (scientific) explanation and prediction over description. Causal explanation and prediction by themselves do not have epistemological authority, since they are concerned with and can often arise out of the merely contingent, as when they are based on observations and sensory experience rather than noncontingent foundations. Thus, the question of the contingency versus noncontingency of knowledge is really at the heart of the question of true belief versus knowledge.

Skepticism

While it has been commonly held that genuine knowledge makes truth claims, there has been no shortage of positions skeptical of any such claims. Skepticism has existed as individual doubt and as intellectual movements. As early as the fifth century BCE, skeptics argued against the possibility of arriving at truth through rationality. Skepticism, however, has always been vulnerable to self-refutation, since it cannot both be true in its assumptions and correct in its conclusions.

Although the first skeptics aimed their arguments at the limitations of reason, it did not take long for knowledge gained through experience to be challenged as well. Skeptics held that since experience is constantly changing, knowledge gained through observation or experience is inevitably transitory. Furthermore, since the senses themselves are demonstrably fallible, knowledge gained through observation and experience is fallible. In response to skepticism, it could be argued that demonstrations that a method of acquiring knowledge (reason or experience) is fallible do not establish that the method will *necessarily* fail to reveal genuine knowledge. However, because of the inherently contingent and transitory nature of experience, it would appear unlikely that one could, relying only on experience as the source of knowledge, ever break through mere appearances to the real and attain more than true belief.

In addition to simply defending reason, traditional rebuttals of skepticism have appealed to a record of successes in adapting knowledge in the accomplishment of specific purposes, that is, our knowledge seems to work. Other support for the validity of knowledge revolves around correspondences of, for example, the natural world to the principles of abstract mathematics. If all knowledge claims are suspect, these correspondences and successes lack explanation.

Universals and Particulars

An important epistemological question that particularly occupied medieval philosophers was whether universals really exist or whether only particular instances are real. To a universalist view, universals have existence, and therefore knowledge must be grounded in the universals which make the particulars what they are, and thus render them understandable. Universalist views tend to be rationalist because the universals and knowledge of them are accessible through the exercise of the rational powers. Particulars are then understood through a process of deduction from the knowledge of the universals. To a nominalist (particularist) view, since only particulars are real, knowledge must begin with experience of particulars. Such views tend to be empiricist, emphasizing the importance of sensory experience and observation. Based on knowledge of particulars, it is possible to generalize knowledge and create abstractions through induction. However, nominalists remind us that the abstractions are simply products of mental processes and have no ontological status of their own.

In psychology, deduction and induction are usually discussed as parts of the scientific process. However, the deeper question underlying the contrast between deduction and induction is that of the possible grounding for genuine knowledge. Because of the contingent nature of particulars, knowledge based purely on induction seems unlikely to produce more than contingent knowledge, lacking certainty. On the other hand, deduction is a source of certain knowledge only if universals are real, and can be truly known through rational powers.

William of Ockham (1285–1347) articulated the nominalist argument in terms of what has come to be called “Ockham’s Razor,” often interpreted as the forbear of the “Law of Parsimony.” Since the purest knowledge comes from experience of the world of particulars, abstractions are mental creations and should not be taken to be more real than the particulars from which they are derived, and thus should be used judiciously in explanations. They may be used, however, and seem to be required for noncontingent knowledge. St. Thomas Aquinas (1225–1274) had earlier argued that even if universals are products of the mind, they may be valid nonetheless.

Certainty and the Privatization of Knowledge

During the centuries following Ockham, confidence in rationalism waned. In the seventeenth century, however, rationalism experienced a revival of sorts in the work of René Descartes (1596–1650). Descartes, in a sense, shifted the grounds of epistemology from the “other world” of forms and ideals to the individual mind. In an attempt to save knowledge from skepticism, he effected a major reconceptualization of knowledge itself. Real knowledge consisted of clear ideas. Of these ideas, certainty was possible, and certainty was defined as that which could not be (reasonably) doubted.

The certainty pursued by Descartes required a privileged perspective from which to reason. This was achieved through the method of systematic doubt. Descartes doubted everything that could be doubted until he arrived at something he could not reasonably doubt—that he was doubting, and thus, that he existed. From this unassailable truth he then deduced other truths, including the existence of God. Descartes’s method and his philosophy did not go unchallenged by his contemporaries. His work, however, had a major defining influence on modern epistemology. It marks the beginning of the modern period in philosophy.

Several important implications of Descartes’s work have direct relevance for psychology. Whether Descartes himself intended it or not, his work had the effect of grounding certainty and knowledge in the individual mind. An individual mind was capable of achieving certainty by critically examining its own operations. This represented a departure from more ancient thinking, in which knowledge might require dialogue or enlightenment from another realm. Furthermore, that which could be directly and best known (clear ideas) was the contents of one’s own mind. Descartes’s philosophy thus provides support for epistemologies based on intuitive knowledge, or on that which can be known by disciplined reflection.

Descartes’s distinction between mind and “extended matter” provided the foundation for a sharp distinction, drawn by later thinkers, between the inner subjective world and the outer objective world, paralleling the bifurcation of mind and body. It has been an important tenet of epistemological thinking that mind (the mental) and world (the physical) constitute separate and irreconcilable ontological realms. This dualist ontology is the foundation of much of the contemporary criticism leveled at “Cartesianism,” although it may not adequately reflect Descartes’s own position on the subject.

Granting this dualistic perspective, the acquisition of knowledge requires some way of getting what is outside the mind into it, or, conversely, of getting the ideas of

the mind arrayed outward as organizing principles for making sense of the world. When reality is divided into the inner and the outer, the problem of "other minds" presents itself. If the mind is subjective and interior, and its own contents are all it can directly know, then from the perspective of any mind all other minds are unknowable. Because they are immaterial, they cannot be the objects of any other's experience. Since they are others' minds, they are not directly knowable by any but those others. How then can one mind be confident that other minds exist at all? This and other issues have been at the center of concern for the public validation of knowledge and the role of intersubjectivity in knowledge and meaning.

For Descartes, knowledge is based in truths that can be known intuitively. These truths, perhaps exemplified best by mathematical axioms, are sometimes referred to as innate ideas. These truths are not, nor can they be, given by experience. But from such truths other knowledge can be properly and safely deduced. Innate ideas are not contingent, and thus constitute a firm grounding for knowledge. Innate ideas are not to be thought of as fully formed bits of information. They are ideas or principles that can be immediately perceived as true by rational beings.

Rationalism and Empiricism

Perhaps no epistemological issue has influenced psychology as directly as rationalism versus empiricism. The difference between (Continental) rationalism and (British) empiricism is captured succinctly, if oversimply, in the contrast between Descartes's contention that the two principal sources of knowledge are intuition and deduction, and the suggestion of Thomas Hobbes (1588–1679) that the two sources are observation (or experience) and deduction. Neither classical rationalists nor empiricists deny the existence nor the importance of reason. The disagreement centers around the foundation of knowledge. On this issue, the two positions are irreconcilable.

Classical empiricism, in the work of John Locke (1632–1704), George Berkeley (1685–1753), and David Hume (1711–1776), is a radicalization of the empiricism of Aristotle and other classical and medieval thinkers. It holds that all knowledge comes originally from sensory experience. Thus all knowledge is contingent. Empiricism is also psychologistic, since knowledge is produced by the senses and the combining, separating, and abstracting functions of the mind. To hold that all knowledge comes from experience is to hold that there are severe limitations on knowledge because there are severe limitations on experience. Furthermore, many things we know or claim to know, such as the self, causes, and other abstractions, cannot be directly experienced. Thus, modern empiricism, particularly in the work of David Hume, is often seen as the beginning

of modern skepticism and epistemological and moral relativism.

Classical empiricism has been extremely influential in psychology as the philosophical grounding for behaviorism and many other related approaches. Empiricism has also been influential as a foundation for empirical scientific methods. However, it is arguable whether the use of so-called empirical methods requires any prior commitment to the epistemology of classical empiricism.

Modern rationalism is often traced to the work of Descartes, but has been, in one form or another, the major epistemological position throughout the Western philosophical tradition. Rationalism was given perhaps its most complete and comprehensive form in the work of Immanuel Kant (1724–1804). Kant undertook a response to, among other things, the work of Hume and the implications that followed from the assumption that all knowledge is grounded in experience, and the contention that causality and identity, as well as moral principles, were artifacts of habitual modes of thought. The concern of classical rationalism is for the noncontingent foundations of knowledge. It is argued that certain preconditions must exist for knowledge, including knowledge gained from experience, to be possible at all. Rationalism suggests that there must be some universal and a priori grounds for knowledge, perception, cognition, and ethics. Kant postulated the existence of "pure intuitions of time and space" as the necessary preconditions for all experience, and the "pure categories of the understanding" as the necessary preconditions of all knowledge. These function as innate organizing principles without which neither experience nor knowledge could be formed.

For Kant, ethics required an epistemology in which there were noncontingent grounds for ethical principles and comportment. He formulated the "categorical imperative" as the central element of all morality. Ethical systems derived from Kantian forms of rationalism are deontological, that is, nonrelativistic, absolute, and principle based. Rationalism has been influential in psychology as well, though often unacknowledged. Its influence can be discerned in the work of personality theorists such as Sigmund Freud, Carl Jung, Alfred Adler, and George Kelly, in developmental theories such as that of Jean Piaget, and to a certain extent in Gestalt psychology and modern cognitive theories.

The epistemological issue of rationalism versus empiricism is substantive and central to psychology. It cannot be resolved by psychology (unless psychologism is true) because the issue itself forms the ground out of which any psychology must arise. Furthermore, the two positions are irreconcilable since they represent alternative claims about the originative grounds and status of knowledge, and differing claims about the nature of explanation in any psychology.

Epistemology and Science

Psychology's primary methodological commitment has been to a version of scientific method adopted in the late nineteenth century, influenced by an intellectual movement known as positivism. The hope has been that a commitment to this scientific method is a sufficient response to epistemological concerns. Logical positivism combined a confidence in formal logic, a fairly radical empiricism, and psychologism. Logical positivists held that only that which could be framed and validated in observational terms could count as scientific knowledge.

The positivists strongly influenced the development of psychology in the first half of the twentieth century and continued to be influential long after their tenets had been more or less abandoned in philosophy and the other sciences. Nevertheless, this methodological and epistemological perspective is still taken by some to be essential to the project of any scientific psychology. Indeed, the tenets of logical positivism are sometimes taken to be science itself. The legacy of logical positivism is perhaps most evident in the model of scientific explanation formulated by Carl Hempel (1905–1997), the so-called nomological-deductive model.

When science is taken to be an epistemology—a response to questions of the origin and quality of knowledge—several issues become important. The problem of verification centers around the ability of the methods of science to validate theories or hypotheses, and therefore to settle questions of truth. Though not widely acknowledged in psychology, it has been widely understood in philosophy that all theories are underdetermined by data. The Duhme-Quine thesis points to this by noting that any theory can, given sufficient alteration, be shown to be compatible with any body of data. Karl Popper (1902–1994) drew attention to the difficulty in verifying universal laws by means of finite observations. Such verification would require an infinite number of observations. Popper's "falsificationist" criterion was part of his larger critique of many of the assumptions of logical positivism. It is a common fallacy to assume that when a theory cannot be falsified it is somehow verified by default. It is also a genuine question whether scientific method can, in principle, arrange any crucial test of a theory sufficient to falsify it. If not, falsification is also refuted.

Imre Lakatos (1922–1974) proposed a modification of falsificationism, suggesting that it can take place only with limited "programmes of research." Thomas Kuhn (1922–1996) and others in the so-called *Weltanschauung* perspective have argued that social forces influence scientific theories, questions, and methods, and that scientific progress takes place within paradigms, but also in dramatic and revolutionary paradigm shifts. Other philosophers of science, notably Paul Feyerabend

(1924–1994), have been more critical of theories that emphasize smooth paradigmatic advance, arguing that a type of "anarchy" is the best guarantee that science will achieve its ends.

Given the currency of various views of the nature of science, each one making some different epistemological assumptions, science itself is not a sufficient response to epistemological questions. Hans-Georg Gadamer (1900–) has argued that no method can provide an adequate epistemology because prior understandings of truth (epistemological assumptions) will underlie the development and deployment of any method.

Explanation and Understanding

The late nineteenth and early twentieth century saw the emergence of a post-Kantian tradition which emphasized the difficulty in applying the same methods and epistemological criteria in understanding the human world as may be applied to the natural world. This is sometimes referred to as the *Verstehen* tradition, after the German word meaning "understanding." Wilhelm Dilthey (1822–1911) made an important distinction between the natural sciences and the *Geisteswissenschaften*, often translated as "human sciences." While the natural world could be accounted for by causal explanations, human beings must be "understood." This understanding is a more sympathetic and intersubjective understanding, a respect for the subjectivity of the subject of study, and a recognition that, in important ways, human beings are not part of the natural world. Two different epistemologies are thus required by two different ontologies. This tradition is importantly related to the phenomenological and hermeneutic traditions descending from the work of Edmund Husserl (1859–1938), and it is an influential precursor to the contemporary "human science" tradition in psychology. Likewise, this historical concern for "understanding" is manifest as a broader interest in qualitative research methods. A fundamental claim of these positions is that traditional explanation and scientific methods impose constructs on human phenomena, while understanding requires allowing knowledge to emerge from the phenomena themselves.

Pragmatism

One response to the modern loss of confidence in method and in noncontingent knowledge is pragmatism. Pragmatism entered contemporary psychology through the writings of William James (1842–1910) and Charles Peirce (1839–1914). It is an epistemology because it is a response to questions of truth and meaning. For pragmatism, the meaning and truth of propositions, theories, or practices are found in the examination of their consequences. Relevant consequences include the experiential, observable, conceptual, as well as the moral. As a response to the perceived failure of

method and the loss of faith in the noncontingent, pragmatism has taken many forms, some incompatible with each other, ranging from strict empiricism, wherein only observable consequences count as knowledge, to complete relativism, wherein anything that works for an individual can be assigned the status of "truth."

Pragmatism is an incomplete and thus unsatisfactory solution to the epistemological questions, which lead many to embrace it because criteria are always necessary for the evaluation of consequences. Thus, in its more facile forms, pragmatism simply begs the question. In its more sophisticated forms, as for James and Pierce, it harkens back to traditional epistemologies.

Knowledge in the Postmodern Age

The last half of the twentieth century has seen the development of a number of philosophical positions loosely allied in their opposition to traditional epistemological and ontological perspectives. Likewise, there has been a decided decline in confidence in any method of achieving absolute truth. Two traditions have been markedly influential in this development: the "ordinary language" movement in philosophy, taking its lead chiefly from the later philosophy of Ludwig Wittgenstein (1889–1951), and the phenomenological movement following the work of Edmund Husserl.

Much work in modern analytical philosophy is dedicated to the problem of the relation of propositions, understood as knowledge claims, to actual states of affairs. This overarching project has some commonality with the work of the logical positivists, and in its modern manifestations, at least in the social sciences, it has been in part aimed at preserving traditional positivistic conception of science. The central tenet of this approach is that a proposition is true if what it asserts is actually the case. The central problem that continues to present difficulties for this linguistic or propositional approach to epistemology is that of verification. A related and important issue is whether human knowledge is ever of the world itself, or merely of propositions.

Perhaps the most optimistic approach to the verification problem was the "logical atomism" developed in the work of Bertrand Russell and in the early work of Ludwig Wittgenstein. This doctrine held that every true statement could be reduced to some sort of empirical experience that validated it. Although the doctrine proved to be untenable, the search for a solution to the verification problem continues in softer versions of positivism and other contemporary philosophical approaches. The issue central to all these approaches was articulated by Wilhelm Leibniz, who distinguished between truths of reason, which do not rest on verification through experience, such as $A = A$, and truths of fact. Truths of fact can be established by correspon-

dence, which in turn rests on experience with the world. If experience is insufficient to verify some belief or proposition, the fallback position is to equate truth with suitability as a basis for a course of action, i.e., pragmatism.

All attempts to verify propositions through experience ultimately rest on inductive processes. Substantial attention has been devoted to the possibility of achieving genuine knowledge inductively. "Gettier problems," from the work of Edmund Gettier, are demonstrations that it is possible to have justified true beliefs but without genuine knowledge, that is, one may be correct to believe "that p," based on one's experience, and it may indeed be the case "that p." However, it may be that p is the case for reasons other than those given by experience and on which the belief is based. There may be other factors that make p the case, or it may be incidentally the case. Experience could not establish one's belief in proposition p as knowledge rather than as mere coincidence.

Other lines of analysis have been developed to expose the limits of induction. One such approach, known as "Goodman's paradox" from the work of Nelson Goodman, holds that induction from experience can never produce genuine knowledge. It may be the case that all observations up to the present (t_1) verify that p is true of the world; however, it may also be the case that at a future time (t_2) the nature of the world may be such that p is no longer true, and our observations will be different. Thus, past and present observations cannot constitute a foundation for noncontingent knowledge. Other contemporary thinkers have argued that decisions about the knowledge status of ideas or propositions derived from experience, i.e., their truth, will always be made on grounds of believability not derivable from experience itself. This argument is similar to Plato's much older argument, developed in the *Meno*, concerning the dependence of knowledge on conceptually a priori knowledge.

Another line of analysis relevant to the criterion problem concerns "possession" of knowledge. It is held that to possess knowledge, a thinker must find certain inferences compelling while the inferences are not based on information. Such inferences will depend necessarily on the perceptions and relationship of the possessor with the environment, not on purely sensory information. Since humans uniquely can make such inferences, only humans can be said to possess knowledge. Human knowledge, since it is derived from relations with the world, is always "about something": To know is to know about something. Such "aboutness" is a defining characteristic of human knowledge. This argument harkens back to earlier work on intentionality in the work of Franz Brentano. The analytical philosopher John Searle articulated a similar position, argu-

ing that knowledge claims come from "aspects" of experience, but since there is more to experience than aspects, and since the aspects are derived from resources apart from experience, experience can give aspects but not certain knowledge.

This work on the limitations of knowledge derived from experience poses significant problems for any project of verification of knowledge by means of experience. The problem of verification arises from the claim that knowledge is really always of propositions rather than of the world. The response of some in this position has been to abandon the idea that knowledge is innately propositional. These thinkers, notably J. L. Austin and G. E. Moore, moved toward a position on knowledge reminiscent of the Common Sense philosophy of Thomas Reid—that knowledge of the world is tied to experience, not of the sort that verifies propositions but of a more immediate, direct sort.

Another more radical version of the linguistic approach to knowledge and truth has emerged from the difficulties intrinsic to the work on propositional knowledge and verification. The primary epistemological contribution of the various perspectives descendant from the so-called ordinary language movement is that the analysis of knowledge is integrally bound up with the analysis of language. It is argued that since meaning is achieved through an essentially discursive process by persons situated in cultural contexts, knowledge thus achieved is likewise situated. This general thesis about knowledge and language has been adopted in psychology in various movements, including social constructionism, discursive psychology, and a number of other narrative approaches.

Although Husserl is in the minds of many as the last of the classical rationalists, his conclusions are radical enough to cast the issue of knowledge in a new light. Husserl's phenomenology, and the phenomenological psychology that descends from it, pursued a form of essential, or apodictic, knowledge through a method of reduction in which the merely contingent is suspended and consciousness achieves a pure seeing of its objects in terms of their intentional meaning. Husserl's work inspired others to take different directions. The modern hermeneutic movement, exemplified in the work of Martin Heidegger (1889–1976), Maurice Merleau-Ponty (1907–1961), Paul Ricoeur (1913–), Jürgen Habermas (1924–), and Hans-Georg Gadamer (1900–), has been influential in psychology in the last half of the twentieth century. Existentialism, exemplified in the work of Jean-Paul Sartre (1905–1980), is closely related to hermeneutics, and has influenced psychology as well.

Existentialism, most obviously in its Sartrean form, is characterized by a radical subjectivism, leading to a radical view of human freedom and a subjectivist epis-

temology. Such a view surrenders hope of noncontingent knowledge and inclines toward epistemological relativism and even solipsism. Although, on a hermeneutic view, knowledge is contextual, interpretive, and always instantiated in language, the hermeneutic movement has been less inclined than existentialism to move in the direction of subjectivity. Indeed, in its approach to the question of knowledge, it seeks to transcend the traditional categories of contingent and noncontingent. Habermas seeks to retain a grounding for knowledge in a modified rationality, while Gadamer proposes to anchor truth in "effective historical consciousness." Merleau-Ponty emphasizes the role of the lived body in the project of knowing and understanding. Heidegger argues that the proper response to epistemological questions will be possible only after a richer hermeneutic understanding of being itself.

In contrast to conventional approaches to knowing, Heidegger offers an analysis of various "modes of engagement." The type of knowledge traditionally sought in philosophy and epistemology emphasizes a reflective mode of involvement with the world, which preserves the traditional subject-object dichotomy. This he terms the "present at hand" mode. However, Heidegger suggests that knowledge can also be understood in terms of a more natural, unreflective, and intimate mode of engagement with the world, the "ready to hand," in which the subject-object dichotomy is entirely in the background and knowledge takes the form of projects and performances that have meaning in the interpretive world, where human beings exist. This approach to knowledge is neither rationalist nor empiricist.

The postmodern movement has spawned a number of other positions related to the traditions mentioned here, including critical theory and many feminist theories, all sharing epistemological commitments. Some of these depart more and some less radically from traditional epistemological concerns. All attempt some new understanding of knowledge in terms of human actions rather than the products of mental activity or sensory input. It remains to be demonstrated whether postmodern approaches to knowledge can evade the problems that have pursued epistemology through the centuries while making possible some standard of knowledge which permits both science and meaning in human life.

The Importance of Epistemology for Psychology

Human beings are distinguished from other living beings by virtue of an enlarged capacity for knowledge as well as the types of knowledge of which they are capable. Any attempt to study and understand human beings must take these singular and defining human

characteristics into account. Any satisfactorily comprehensive theory of human functioning must offer some account of the nature of human knowledge as well as its origins. The link between knowledge and behavior is one of the most important and enduring psychological questions. Furthermore, psychological theories will necessarily offer differing explanations of human behavior and human potential, depending on whether it is presumed that persons acquire knowledge passively and only from experience or whether they possess active and a priori powers of knowing. Epistemology is a watershed issue for theorizing about human beings.

Some branches of psychology set out to map the processes by which knowledge, however defined, is acquired and how it affects behavior. While some models of learning and cognition are never meant to be more than working models of the processes of knowing, never claiming to make ontological claims about knowledge, there are epistemological assumptions and implications imbedded in every such model, however modest its claims.

Epistemology is relevant not only to the question of how human beings can know generally, but also to the question of the validity of claims of knowledge made by scientists. Science, and all scientific methods, are grounded in epistemological commitments and make epistemological claims. Science distinguishes itself as science by virtue of its claim about the trustworthiness of scientific knowledge compared to other kinds of knowledge. The status of psychology as science finally rests on the adequacy and validity of its epistemological commitments.

[See also Epistemology of Practice; Philosophy, *article on* Philosophy of Science; Psychology, *articles on* Classical Antiquity, Middle Ages, Renaissance through the Enlightenment, and Nineteenth Century Through Freud.]

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Richard N. Williams

EPISTEMOLOGY OF PRACTICE refers to an interdisciplinary theoretical and philosophical discussion across a wide variety of professions concerning the nature of practical knowledge (knowing what to do and how to do it in the real world), and its relationship to theoretical or scientific knowledge (knowing the conceptual principles that explain the nature, structure, and functioning of the world). In their seminal work on this topic, Argyris and Schön (1974) observed that the relationship of scientific theory to professional practice became a point of considerable tension within

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those professions that sought to incorporate their free-standing professional schools (e.g., psychology, nursing, engineering, education, business and management, dentistry, medicine, architecture, etc.) into the modern American university. In exchange for the legitimacy offered, the university exacted a commitment to the epistemological and academic primacy of the liberal arts and sciences in the training programs or admissions requirements of these professions.

In psychology, this could be seen after World War II in the development of the new training programs in clinical psychology. The Boulder-Model maintained that practitioners were to be trained first and foremost as scientists and that a high level of professional competence would result. Practitioner knowledge was seen as applied science. Science, conceptualized in classical logical positivist terms, would reveal what caused people to have psychological problems, and it would also demonstrate what caused those problems to be ameliorated. Practitioners armed with this knowledge would prevent the problem by removing from the world the antecedent causal conditions, or treat the problem by introducing those variables shown to produce change into a clinical situation. It was a model of brilliant clarity and simplicity that also served to assert the hegemony of scientific knowledge over practical knowledge.

The model directly challenged clinical practitioners who often looked to their own accumulated clinical experience, or that of their colleagues in clinical psychiatry and social work, as creating a relatively autonomous base of experience on which to formulate theories of practice. Scientists rejected this clinical knowledge base as anecdotal, riddled with subjective biases, and as offering causal assertions supported by unsystematic uncontrolled observations. Practitioners countered by asserting a kind of epistemological privilege that exempted their theories from verification via the scientific method. They claimed that clinical practice was based on intuition, empathic understanding, wisdom, and a kind of artistic virtuosity that set it apart from scientific scrutiny. In 1954, Paul Meehl attempted to resolve the controversy by statistically comparing actuarial and clinical predictions. He showed that simple multiple regression equations consistently outperformed seasoned clinicians in predicting a variety of clinical outcome criteria. He was startled to discover that rather than settling the matter, his literature review and analysis only fanned the flames of dissension between scientists and practitioners.

The Vail Conference on clinical training in psychology encouraged a more practice-based approach to the training of clinical psychologists. Donald Peterson, who was a leader in the development of the doctor of psychology degree (Psy.D.) movement, offered an alternative conceptualization of the profession's knowledge base that he referred to as disciplined inquiry (Peterson,

1968). By describing the way various theories are applied to and tested against clinical experience in a systematic and objective fashion, Peterson began the process of demystifying clinical wisdom, intuition, and the art of practice, and he did this without reducing clinical problem-solving to applied science or rejecting the value of scientific psychology, *per se*.

In 1974, Chris Argyris and Donald Schön, examining the issue of practitioner knowledge across a wide variety of professions, argued that practitioner knowledge is generated from a pragmatic reflection-in-action. The practitioner engaged in a real-life problem develops a relationship with those in need of help, gathers information, conceptually reformulates the problem in such a way as to generate novel possible solutions, and then proceeds to evaluate the solutions until a feasible one emerges. The test of the adequacy of the practitioner's problem formulation and solutions is whether or not the problem is solved to the satisfaction of the parties involved. Good theories and good practitioners get the job done.

The formulation of the problem and the testing of solutions are analogous, but not identical, to the development and testing of scientific theories. Practitioners are forced to consider a situation in all its complexity in order to find a specific solution to a specific problem in a specific historical-social-political context. The conceptualization of the problem must stay fluid, flexible, and tentative until a solution is found. On the other hand, the scientist's goal is to find a way to restrict a problem to a very limited and clearly defined set of variables that hopefully will be causally relevant across a wide variety of situations and social contexts.

Differences such as these, led Murray Levine (1974), William Runyon, (1982), Dennis Bromley (1986), Lisa Hoshamond (1992), and Daniel Fishman (1999) to suggest that case study research conducted in a comprehensive and systematic fashion was the proper way to establish a quasi-judicial case-law knowledge base for professional practice in psychology. This view had been advocated 50 years earlier by Gordon Allport and Henry Murray, but it lost favor during the heyday of behaviorism and positivism.

Working out of a Continental philosophical tradition of epistemology and ontology, Donald Polkinghorne (1988) reached a similar but more radical conclusion by considering the narrative nature of all psychological phenomena. Relying on a hermeneutic approach to human behavior originating in the German Idealism of Immanuel Kant, G. W. F. Hegel, Martin Heidegger, and more recently Hans Georg Gadamer and Jurgen Habermas, Polkinghorne argued that both professional practice and basic research in psychology are primarily about interpreting the meaning of our own and other's experiences. Clinical knowledge is an intersubjective,

self-reflexive, contextual process of finding and making meaning in the world. It is not in conflict with scientific knowledge because, on the hermeneutic account, all psychological knowledge is concerned with this sort of understanding of our world (*Verstehen*), and not about explaining the universal laws of nature.

In all accounts of the epistemology of practice there is an either explicit or implicit recognition that professional practice is a thoroughly value-laden enterprise (Miller, 1992). For Aristotle, any action in the world required not only theoretical or scientific knowledge, but what he called *phronēsis*, "practical wisdom." Professional practice is a moral undertaking that attempts to make at least one small corner of the world a better place to live. Consequently, the warrant for such practical knowledge claims may lie in part in the moral principles that serve as a foundation for practice.

[See also Epistemology.]

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Ronald B. Miller

EQUIVALENCE. See Bias and Equivalence.

ERGONOMICS. See Human Factors Psychology.

ERIKSON, ERIK H. (1902-1994), American psychologist and personality theorist. Erik Erikson's theory of personality development is one of the most influential bodies of work in psychological theory of the twentieth century. Erikson based his work initially on the psychoanalytic theory of Freud, but eventually moved far beyond it as he formulated his own developmental approach to personality. Erikson's contributions to psychology, particularly to the study of personality, can be divided into four major areas: (a) his emphasis on the importance of the entire life cycle in personality change; (b) the psychosocial origins of personality; (c) the centrality of self-identity in personality development; and (d) the importance of life histories for personality study.

The Life Cycle Approach to Personality Development

Erikson's theory charted changes in personality over the entire life cycle, rather than focusing on the early childhood years as critical to all later personality functioning. As a result, his work has had a major influence on the field of developmental psychology, spurring the trend away from a narrow consideration of child development toward studying life span developmental psychology.

Erikson proposed eight stages of human development, each with its own normative crisis, by which he meant not a debilitating conflict, but rather a period of heightened vulnerability and potential. Erikson's life cycle approach placed him among the stage theorists in developmental psychology. He viewed human development as occurring in orderly stages, each with its own special characteristics and its own particular age relationship. The stages always occur in a particular order and cannot be skipped. His stages illustrate what Erikson termed the *epigenetic principle*. Briefly stated, this principle proposes that critical elements of human personality have a ground plan from which they grow, similar to the physical growth principle by which the undifferentiated cells of embryos develop in orderly ways into organ systems. Thus, all human beings will face the normative crisis of trust versus mistrust in the period of infancy. The resolution of this crisis leaves the infant with an abiding sense of either trust or mistrust that will become part of later personality functioning. Each stage builds upon what has gone before and carries elements of itself into future stages. Erikson's eight stages of personality development are listed in Table 1.

The Psychosocial Origins of Personality

Like many of Freud's followers, Erikson believed that too much emphasis had been placed on psychosexual development in Freud's psychoanalytic account of personality formation. Erikson's theory is called a psycho-

self-reflexive, contextual process of finding and making meaning in the world. It is not in conflict with scientific knowledge because, on the hermeneutic account, all psychological knowledge is concerned with this sort of understanding of our world (*Verstehen*), and not about explaining the universal laws of nature.

In all accounts of the epistemology of practice there is an either explicit or implicit recognition that professional practice is a thoroughly value-laden enterprise (Miller, 1992). For Aristotle, any action in the world required not only theoretical or scientific knowledge, but what he called *phronēsis*, "practical wisdom." Professional practice is a moral undertaking that attempts to make at least one small corner of the world a better place to live. Consequently, the warrant for such practical knowledge claims may lie in part in the moral principles that serve as a foundation for practice.

[See also Epistemology.]

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Ronald B. Miller

EQUIVALENCE. See Bias and Equivalence.

ERGONOMICS. See Human Factors Psychology.

ERIKSON, ERIK H. (1902-1994), American psychologist and personality theorist. Erik Erikson's theory of personality development is one of the most influential bodies of work in psychological theory of the twentieth century. Erikson based his work initially on the psychoanalytic theory of Freud, but eventually moved far beyond it as he formulated his own developmental approach to personality. Erikson's contributions to psychology, particularly to the study of personality, can be divided into four major areas: (a) his emphasis on the importance of the entire life cycle in personality change; (b) the psychosocial origins of personality; (c) the centrality of self-identity in personality development; and (d) the importance of life histories for personality study.

The Life Cycle Approach to Personality Development

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ERIK H. ERIKSON. Table 1. Erikson's eight stages of the life cycle

Normative Crisis	Age	Major Characteristics
Trust vs. Mistrust	0-1	Primary social interaction with mothering caretaker; oral concerns; trust or mistrust in life-sustaining care, including feeding.
Autonomy vs. Shame and Doubt	1-2	Primary social interaction with parents; toilet training; beginnings of autonomous will.
Initiative vs. Guilt	3-5	Primary social interaction with nuclear family; beginnings of oedipal feelings; development of conscience to govern initiative.
Industry vs. Inferiority	6-puberty	Primary social interaction outside home among peers and teachers; school-age assessment of task ability.
Identity vs. Role Confusion	Adolescence	Primary social interaction with peers, culminating in heterosexual friendship; psychological moratorium from adult commitments; identity crisis; consolidation of resolutions of previous four stages into coherent sense of self.
Intimacy vs. Isolation	Early adulthood	Primary social interaction in intimate relationship (usually opposite sex); adult role commitments accepted, including commitment to another person.
Generativity vs. Stagnation	Middle adulthood	Primary social concern in establishing and guiding succeeding generation; productivity and creativity.
Ego Integrity vs. Despair	Late adulthood	Primary social concern is reflective: coming to terms with one's place in the nearly complete life cycle, and with one's relationships with others.

Source: Hopkins (1983, p. 74), adapted from Erikson (1968). Copyright 1983 by J. R. Hopkins; permission granted by author.

social theory of personality to reflect the shift of emphasis away from psychosexuality and toward social and cultural influences on human personality development.

Each stage of development in Erikson's model emphasizes a particular social network. In the first three stages, the parents and the nuclear family form the most critical social network. In the fourth stage, peer groups and authority figures outside the home, particularly in the schools, take on greater significance. In adolescence, peer groups, particularly friends and dating partners, become a social focus; in early adulthood, romantic partners achieve prominence in their influence on personality. In middle adulthood, as the shift toward generativity takes place, future generations become the focus for interaction. Finally, in old age, social interaction becomes more reflective, and more restricted to close members of the family. In each of these

stages, reciprocity with others is a key to personality development. Erikson's cultural and anthropological studies, with the Sioux and Yurok Indians, with poor families in Pennsylvania, and his writings on ethnic groups within America, reflect his concern with the psychosocial underpinnings of personality.

The Importance of Self-Identity

In his life cycle scheme, Erikson viewed identity as a central construct, and set the decisive period for its normative crisis in adolescence, moving beyond Freud's focus on early childhood as the critical time for personality development. Erikson is sometimes called "the father of the identity crisis." Historians of psychology refer to this branch of personality study as *ego psychology*, and Erikson was one of the first, as well as one of the most influential, of the ego psychologists. Many contemporary themes in personality research that in-

volve the self in various guises—self-actualization, self-concept, self-efficacy, self-esteem, self-monitoring, and so on—can be traced in part to Erikson's concept of self-identity.

The Importance of Life Histories

Erikson believed that the best source of information about personality development was individual life histories. His works include liberal notes from his clinical cases, as well as personality profiles of historical figures, including British critic and playwright George Bernard Shaw, philosopher-psychologist William James, Nazi dictator Adolf Hitler, and Russian novelist and playwright Maxim Gorky. He also wrote two full-length psychobiographies, about religious reformer Martin Luther and Hindu leader and social reformer Mohandas Gandhi, which have been influential in several academic disciplines as well as popular with the general public. The book about Gandhi won a Pulitzer Prize. His case studies of historical figures were highly influential in the development of the new interdisciplinary fields of psychohistory and psychobiography.

Erikson's Life History

In order to appreciate Erikson's work fully, one needs to understand some important fragments of his own life history. As originator of the term *identity crisis*, he knew a great deal about the phenomenon firsthand. Erikson was born 15 June 1902 near Frankfurt, Germany, where his mother had gone after the breakup of her first marriage. Erikson had been led to believe throughout childhood that his stepfather, pediatrician Theodore Homburger, whose surname he had been given, was his biological father. He did not learn about the circumstances of his parentage until his adolescence: that period of the life cycle where he located identity as the normative crisis. In actuality, his birth had resulted from an extramarital liaison of his mother's, but he was known as Erik Homburger until shortly before he emigrated to the United States in the early 1930s, when he adopted the surname Erikson, literally "son of Erik."

After graduation from his German high school, Erikson decided that he would be an artist. Like many other young people before and since his time, Erikson became alienated from his family and from the context in which he grew up. He wandered for a year or so around Europe, and then enrolled in an art school in Karlsruhe, Germany. At this point, when he was in his mid-20s, Erikson was summoned by his friend Peter Blos (who himself became an important figure in psychoanalytic psychology) to Vienna, to teach in a progressive school for English and American children whose parents were studying with Freud.

During Erikson's Vienna years, 1927 to 1933, he made a number of decisive turns in his life history. He

came to the attention of Anna Freud, Sigmund Freud's daughter, who was then developing her own specialty within psychoanalysis as an analyst of children. She invited Erikson to come into a training analysis with her, conducted almost every day for three years. In addition, Erikson participated in a more general child-analysis seminar led by Anna Freud, with such teachers as August Aichhorn, Edward Bibring, Helene Deutsch, Paul Federn, Heinz Hartmann, and Ernst Kris, all of whom were important figures in the history of psychoanalysis. It was also in Vienna that Erikson met and married Joan Serson, a dancer and artist who was in analysis with Ludwig Jekels, one of Freud's early followers. Joan Erikson was to be his intellectual partner and editor throughout the rest of his life.

The Nazi menace that had gathered in Europe by 1933 prompted many psychoanalysts to leave for America. After trying vainly to acquire Danish citizenship and settle in Copenhagen, Erikson and his wife settled in the United States. Remarkably, within ten years, Erikson had received appointments at premier universities and medical research centers at Harvard, Yale, and Berkeley. As Boston's only child analyst in the early 1930s, Erikson's services were widely sought. He also met Henry A. Murray, one of the most important American personality theorists of the time. Through Murray, Erikson became associated with the Harvard Psychological Clinic, and also enrolled briefly at Harvard as a doctoral candidate in psychology. But Erikson was never one for the discipline required for formal educational certification, and he soon left the program. In fact, he had no earned degrees beyond his high school diploma. Between 1934 and 1936, he studied Harvard undergraduates at the psychological clinic. He was to use many of the insights gathered in this work as he developed his views about the identity crisis of adolescence.

Erikson spent the decade of the 1940s (1939–1950) in California; he was a training analyst working primarily with children in San Francisco, and became associated with the Institute for Child Welfare at the University of California, Berkeley. It was also during this decade that he became an American citizen. In 1950, he resigned his professorship at Berkeley and became a member of the senior staff at the Austen Riggs Center in Stockbridge, Massachusetts, where he remained for the next decade (1950–1960). He also worked periodically in Pittsburgh during this period at the University of Pittsburgh's Western Psychiatric Institute and at the Arsenal Health Center. There his cases included poor mothers and their children, many of them recent immigrants.

In 1960, Erikson was invited back to Harvard as professor of human development, where he remained until his retirement in 1970. In 1987, the Erik Erikson Center was established in Cambridge, associated with Cam-

bridge Hospital and the Harvard Medical School. Erikson, one of the last of the great synthesizers of theory in psychology, the academic stepson who had only a high school diploma, died 12 May 1994, in Harwich, Massachusetts.

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J. Roy Hopkins

Downs Estes and Mona Kaye Estes in Minneapolis, Minnesota, on 17 June 1919. He married Katherine C. Walker in 1942. He received both his bachelor's degree (in 1940) and his doctorate (in 1943) from the University of Minnesota, where he worked with B. F. Skinner. After serving in the Army Air Force during World War II, he began teaching at Indiana University in 1946, where he became Research Professor of Psychology. In 1962, he joined the faculty at Stanford University. In 1968, he moved to Rockefeller University, and in 1979, he went to Harvard University. Finally, in 1999, Estes returned to Indiana University.

Estes is the single individual most responsible for founding the field of mathematical psychology. The method he pioneered involves translating theoretical assumptions and interpretations into a quantitative form, which allows for the deduction of implications that can be assessed by examining observable data and which leads to an appreciation of the interrelationships among the various theoretical elements. Although this method had been frequently employed in the physical sciences, it had been rarely employed in psychology when Estes introduced it in 1950 to the study of learning and memory with his landmark article "Toward a Statistical Theory of Learning." In over 50 dedicated years of painstaking, rigorous research, Estes demonstrated how experimental observations of animal or human behavior can be compared quantitatively and precisely to the predictions of a formal mathematical or computer simulation model describing internal mental processes and states that are not directly observable themselves.

Employing this method, Estes had a profound impact on the field through numerous groundbreaking theoretical and empirical studies on a wide range of topics in learning, memory, perception, choice, and categorization. His elegant models reflect brilliant insights into fundamental psychological mechanisms underlying behavior, formulated both in terms of associations among mental representations of events and in terms of cognitive operations on information. For example, according to his stimulus sampling theory, a given situation can be described for an individual in terms of a population of stimulus elements, each of which is conditioned to one of the possible response alternatives. Only a sample of these elements affects the individual's behavior at any given instant, with a random process governing which stimulus elements are sampled and with conditioning or extinction occurring only to the sampled elements. Elaborations of this theory enabled Estes to account for spontaneous recovery from extinction, for spacing effects in learning, and for the learning and matching of probabilities. For another example, according to his perturbation model of memory, the representations of successive stimulus items are not associated or linked directly, but rather associative links occur between each item repre-

ESTES, WILLIAM KAYE (1919–), experimental and mathematical psychologist. Estes was born to George

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sensation and a control element representing the current environmental context. A reverberatory loop connects each item representation and the control element, with a periodic recurrent reactivation of the items' representations and with a difference in reactivation times reflecting the difference in item input times. Rapid forgetting of order information is explained by random timing perturbations that lead to interchanges in the relative timing of successive item representations. With this theory and elaborations of it, Estes was able to account for a wide range of phenomena in short-term memory and in long-term memory.

Estes's monumental contributions are not limited to theoretical and empirical studies. He also made substantial contributions to experimental methodology. For example, with B. F. Skinner, he introduced the popular conditioned emotional response technique, which is an alternative to the Pavlovian paradigm for studying conditioning. Also, with H. A. Taylor, he introduced the prevalent detection method, which is used to separate effects of perception from effects of memory in tachistoscopic recognition. In addition, he contributed to the understanding and use of statistical methods in psychology.

From 1958 to 1962, Estes was associate editor of the *Journal of Experimental Psychology*; from 1963 to 1968, he was editor of the *Journal of Comparative and Physiological Psychology*; from 1977 to 1982, he was editor of the *Psychological Review*; and from 1990 to 1994, he was the first editor of *Psychological Science*. In addition, from 1975 to 1978, he edited the six-volume *Handbook of Learning and Cognitive Processes* (Hillsdale, NJ).

Estes made immense contributions as a leader of many professional organizations in the field. He was one of the founders of the Psychonomic Society and was chair of the governing board in 1972, the year when the society's journals were started. He was also chair of the organizing group of the Society for Mathematical Psychology and was chair of the society in 1984. Estes helped shape national science policy in his roles as member and chair of numerous committees and commissions of the National Research Council and grant panels of the National Institutes of Health, the National Institute of General Medical Sciences, and the National Science Foundation.

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Alice F. Healy

ETHICS. [This entry comprises four articles. The first article provides an overview of ethics in the field of psychology. The three companion articles provide broad profiles of the ethical issues that pertain to research in psychology (especially with regard to experimentation with human and nonhuman subjects), clinical practice in psychology, and publication in the field of psychology. See also Confidentiality; and Informed Consent.]

An Overview

One of the elements that makes professions distinctive is the duty to abide by standards, primarily those embodied in the profession's ethics code. Ethics in psychology represents two important aspects: striving to the highest standards in the profession and identifying those behaviors that deserve sanction. The first aspect, aspirational ethics, is closest to one of the definitions of "ethics," which is synonymous with "moral philosophy." The second aspect of ethics is concerned with enforcement of a code and generally thought of as stating the minimal expectations. A person who does not behave according to even minimal standards is subject to being investigated and being found to have behaved unethically. A psychologist can deserve sanction for committing a forbidden act, as well as for failing to engage in a required behavior.

History of the APA Ethics Code

The primary ethics document in psychology is the ethics code of the American Psychological Association (APA) found in the Ethical Principles of Psychologists and Code of Conduct (APA, 1992). While the Ethics Committee was formed in 1938 and began informal resolution of ethical problems brought to its attention, the first formal code, Ethical Standards of Psychologists (APA 1953), was not adopted until 1952. That first code was distinctive in that it was developed using the critical incident method. Incidents illustrating ethical situations were solicited from APA members and then developed into ethical rules. That code is still the longest of all APA codes at 171 pages, with 310 rule elements. The APA Ethics Code is available on the APA Web site at <http://www.apa.org/ethics>. Most revisions have made only modest changes to content, and only the 1959 and 1992 revisions altered the format substantially.

Two changes are of historical importance. An emergency revision of the APA Ethics Code was made by APA to produce the "1989 amended" Ethical Principles of Psychologists (1990) as part of a negotiation to end an investigation by the Bureau of Competition of the Federal Trade Commission (FTC) (Consent Order, 1993). The investigation related primarily to advertising and referral fees and was initiated despite major liberalization in the late 1970s of advertising provisions in the APA Code.

An important factor in the revision that led to adoption of the 1992 APA Ethics Code was a court decision (*White v. the North Carolina State Board*, 1990) that found some provisions in the 1981 Ethics Code to be unconstitutionally vague in one state. A fundamental legal principle in enforcing ethics codes is that the rules must provide fair notice to the professional as to what behavior will lead to a sanction. This led to a clearer conceptualization of the aspirational as opposed to the enforceable ethics provisions in the APA code. Descriptions of the history of the APA Code may be found in *Ethics for Psychologists* (Canter, Bennet, Jones, & Nagg, 1994) and *Ethics in Psychology* (Koocher & Keith-Spiegel, 1998).

Other Ethics Codes and Standards

In addition to the APA Ethics Code, there are a number of other codes that are relevant. The Canadian Psychological Association (CPA) adopted its own code in 1986, revised in 1991. The CPA code has used a very different style from the APA code, by incorporating a decision-making process into the code itself and structuring the code by relating each general principle to the more specific provisions. The Association of State and Provincial Psychology Boards (ASPPB) adopted a model code of conduct in 1990. It has been used by a number of state licensure boards but substantially addresses only those areas needed in regulating licensed psychologists.

Of course, ethics codes do not address all the information needed by psychologists in order to do a good job. The 1992 Ethics Code encourages psychologists to "consider other professional materials" when the code alone is not sufficient, and lists as "most helpful in this regard" the many "guidelines and standards that have been adopted or endorsed by professional psychological organizations." The code lists guidelines, such as APA's *General Guidelines for Providers of Psychological Services* (1987). Several new guidelines have been adopted since, and some of those listed have been formally rescinded, are being revised, or are otherwise out of date. It is important to recognize that "such guidelines . . . , whether adopted by the American Psychological Association (APA) or its Divisions, are not enforceable as such by this Ethics Code, but are of educative value to psychologists, courts, and professional bodies." There is often substantial concern by psychologists that in fact, courts or others, may use guidelines as if they are standards. In addition to ethics codes and guidelines, there are also laws that must be considered by psychologists.

The 1992 APA Ethics Code

The 1992 Ethics Code (APA 1992) became effective in December 1992. The Ethics Code contains four basic sections. The Introduction provides an overview and comments on applying the code in relationship to other professional standards and to the law. It also comments

on the use of the code as a disciplinary standard by the APA and by other groups. For example, it notes that the code may be adopted by licensure boards and may otherwise be applied to psychologists who are not members of APA. The Preamble and General Principles state aspirational goals covering a wide range of ethical concerns.

The Standards provide the enforceable rules. The standards are divided into seven groups. Groups one (General Standards), three (Advertising and Other Public Statements), and five (Confidentiality) apply to all psychologists. The other groups (Evaluation, Assessment, or Intervention; Therapy; Teaching, Training Supervision, Research, and Publishing; and Forensic Activities) apply more to some groups of psychologists than others, but it is important for all psychologists to consider the entire code when applying it to actual situations. For example, a clinician doing research on clinical problems must comply with the sections regarding research. A researcher considering problems of confidentiality must consider the confidentiality provisions in the general section as well as in the research section.

The 1992 Ethics Code introduced a number of important features. For the first time in an APA code, aspirational statements were differentiated from those that were to be enforceable. The enforceable statements are also more specific, and for both reasons provisions were more likely to withstand legal challenge. Statements were also organized into functional groups and limited to single behavior "unitary" concepts. New provisions provided explicit guidance regarding sexual involvement with former clients (Standard 4.07) and with certain students (Standard 1.19), barter (Standard 1.18), informed consent to therapy (Standard 4.02), withholding records for nonpayment (Standard 5.11), and forensic services (Standards 7.01–7.06). There were also modified provisions regarding advertising (Standards 3.01–3.03) as well as referrals and fees (Standard 1.27), testimonials (Standard 3.05), and in-person solicitation (Standard 3.06). These were believed to be acceptable to the FTC in place of provisions that were rescinded in the 1989 revision.

Decision Making

Psychologists are constantly confronted with situations in which ethical choices must be made, and several models have been developed that provide guidance (see, for example, Canter et al., 1994; Haas & Malouf, 1989; Kitchener, 1984; and Koocher & Keith-Spiegel, 1998). Important elements of most models include identifying the ethical aspects of the problem; identifying relevant ethical and other standards; determining relevant facts and collecting additional information as needed; identifying options and selecting an action plan; taking the action; and evaluating the results. Models also emphasize strongly the importance of consultation with experts throughout the process. It is generally recom-

mended that psychologists document the process used, factors considered, action taken, and outcome observed. Good ethics education during graduate training and regular continuing education later help psychologist identify ethical challenges before they become problems. Also, being prepared to handle a range of situations is a benefit because many situations that pose ethical problems require immediate action and a formal system cannot be used at the time.

Simple rules or tests are helpful for situations in which action must occur quickly and also for reviewing a tentative action decision. For example, a psychologist may ask, "Is the planned action ethical, practical, and reasonable?" or "Am I acting in a responsible and accountable manner?" A method cited by Haas and Malouf (1989) is for the psychologist to imagine him or herself in a "clean, well-lit room" in order to gauge the acceptability of a planned action taken with the full understanding of colleagues.

How Are Professional Codes Enforced?

Professional codes are enforced in a variety of ways. The most direct method is for an association that adopts the code to conduct an enforcement program. A second way is for an authority, such as a state, to incorporate into licensure legislation a profession's ethics code, in which case, the code, with the force of law, is enforced by the licensure board and/or professional discipline agency of the state. A third method is for a code to be stated as a basis for action regarding professionals working in various settings, such as a hospital medical staff or a university. In that case, action might be taken against a professional on the staff of the facility if the professional violated provisions of his or her profession. A fourth type of enforcement is indirect and includes processes such as malpractice or other civil litigation. Here the code is used as a statement of professional standards. The plaintiff may argue that the code shows that the professional did not perform properly, just as the defendant may use it to demonstrate that appropriate procedures were used.

It is important to recognize that other systems within which the psychologist works may also enforce rules other than a professional ethics code. For example, university or governmental research ethics review bodies may use federal regulations regarding the conduct of research, and these may be similar to or even identical to the requirements of a particular ethics code. Also, a professional may be found guilty of the criminal action of insurance fraud due to violating a law regarding such behavior. This would be true whether or not there was an ethics code provision prohibiting the same behavior.

A concern is often raised as to the possibility of conflict between different codes, but this does not occur as frequently as it appears. Most often, one code simply re-

quires a higher standard and does not require that the other code not be upheld. On the other hand, there are often conflicts between an ethics code and legal requirements.

APA Complaint Procedures

The APA Ethics Committee Rules and Procedures (1996) govern the process for conducting ethics investigations of members. These rules are periodically revised and the changes can have a substantial effect on investigations. For example, the 1996 Rules revision (APA, 1996) resulted in new APA student affiliates being subject to jurisdiction of the ethics committee, limited to review of activities not under the scrutiny of the student's graduate program and of affiliates who join with this understanding. Also, that revision changed the time limit for a member filing a complaint against another member from one to three years. Beginning with the 1992 rules revision (APA, 1992b), the rules include a brief overview that is likely to be included in the future and to be helpful when reviewing future revisions. Interested individuals should ensure that they have the current rules, which may be obtained from APA or are available on the APA Web site, <http://www.apa.org/ethics>.

The APA ethics program experienced a substantial increase in activity beginning about 1986. Between 1985 and 1997, 249 members lost their membership due to unethical behavior. However, this represented action against a very small percentage of APA members. For example, the APA Ethics Committee annual report covering 1997 (Ethics Committee, 1998) indicated that complaints were filed against only 0.14% of members. Most of the serious complaints involve sexual misconduct (110 of the 183 members who lost membership during 1990–1997) and insurance fraud (22 of 183). Of complaints that were received from complainants in 1993–1995, the most frequent complaints were regarding child custody evaluations and confidentiality.

The APA procedures for a number of years have provided for two types of investigations. One is called “show cause” proceedings and provides for review of an APA member's loss of licensure, conviction of a felony, or loss of membership in a state psychological association due to unethical conduct. Because another authoritative body has sanctioned the member, the burden is on the member to convince APA that he or she should not be expelled. (The term comes from the member being given an opportunity to “show cause” why the member should not be expelled.)

The other type of investigation involves a review of alleged unethical conduct. This type of investigation usually begins by an individual filing a complaint and may also be started by the committee acting on its own, called a *sua sponte* review. In these investigations, the burden is on the committee to prove the charges. The

complaint is judged by the ethics code in effect at the time the behavior occurred.

In both types of investigations, members are not allowed to resign membership in APA (directly or by non-payment of dues) while under scrutiny of the committee. There are time limits for filing complaints; nonmembers have 5 years in which to file a complaint, and APA members have 3 years. The time limit can be waived for serious matters, but no more than 10 years after the alleged events occurred. This 10-year limit also holds for APA opening show cause investigations, except that the limit is 20 years for an offense involving a minor.

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Ethics in Research

The ethics of psychological research is not just about following rules but also about promoting value and benefit for all participants. Well-meaning investigators, researching worthy topics, mindful of government regulations and the American Psychological Association's code of ethics, may still overlook the concerns of subjects (I use *subject* rather than *participant* to remind the reader that persons being studied typically have less power than the researcher and must be accorded the protections that render inequality mutually acceptable) and others to the detriment of all. An important element of research competence is understanding of the perspective of the subjects. Harmful or disrespectful research often follows from ignorance of context and of individual sensitivities and from failure to analyze and plan. Legal and professional guidelines for researchers are general in scope and typically written with certain cultures (such as literate members of western society) or species (such as laboratory animals) in mind. They serve their intended purpose only when interpreted appropriately to the context, culture, or ecology of the subjects. For example, the researcher seeking to respect subjects may not realize that some cultures consider eye contact rude, or consider written and signed informed consent meaningless or even insulting (Marshall, 1992). Similarly, the researcher who immediately replaces wet bedding of animal subjects is likely to become as stressed as the animals if that species is one that immediately marks any new bedding with urine. Ethical research practice requires knowledge of principles of research ethics and their sensitive application with special attention to the culture or ecology of the particular subject population.

This broad overview of research ethics assumes familiarity with the details of the relevant codes and laws, review of which is recommended via the publications or Web sites listed in the bibliography. Human research guidelines emanating from the American Psychological Association and federal law express general goals, such as competence of investigator and respect for subjects' welfare and autonomy. They express ethical requirements very simply (for example, they list the elements of informed consent) and leave the subtleties of interpretation to the researcher. Guidelines for animal research emphasize knowledge of the species and minimizing of discomfort, illness, and pain. Some have criticized the failure of APA and government guidelines

to require ethical decision making or harm/benefit analysis in animal research (Orlans, 1997).

Institutional Review Boards (IRBs) or human subjects ethics committees and Institutional Animal Care and Use Committees (IACUCs) are mandated by law to be established within each organization that conducts research and receives federal funding. The purpose of these committees is to review all proposals for human research to ascertain that the plan or "protocol" has adequately considered the ethical dimensions of the project and complies with relevant regulations. Many journals require proof of committee approval prior to accepting research articles. However, it is the responsibility of the scientist, not ethics committees, to apply ethical and legal principles appropriately. In some cases, this means interpreting the spirit or intent, rather than the letter, of the law or code, then presenting this interpretation (with citation of supporting scientific literature) to one's institutional ethics committee or editor. There is a growing scientific literature on research ethics, such as the journals *Ethics & Behavior*, *Science and Engineering Ethics*, and *IRB: A Review of Human Research*; the role of personal opinion and discretion now plays no greater role in judgment of what is ethical than in judgment of what is valid science.

In psychological research on humans, key concerns are respect of privacy and autonomy, maximizing benefit and minimizing risk, and giving potential subjects an adequate basis for deciding whether to participate. However, many subjective factors complicate matters: a range of cultural, developmental, socioeconomic, and individual psychological variables influence privacy needs, the perception of risk and benefit, and the way in which individuals communicate and make decisions, as well as the degree of trust, rapport, and comprehension that accompanies their relationship with the researcher. Researchers must resist the temptation to assume that subjects will necessarily respond as though they held, understood, or valued the same cultural perspectives as the researcher. Most dictionaries define culture as a system of values, morals, norms, experiences, beliefs, concepts, and language. The following is a useful heuristic for researchers seeking to understand the implications of culture for research ethics:

	Subject Knows	Subject Doesn't Know
Researcher Knows	Shared culture, or understanding of subject's culture & beliefs	What the subject doesn't know about the researcher's culture & beliefs
Researcher Doesn't Know	What the researcher doesn't know about the subject's culture & beliefs	Shared ignorance

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	Subject Knows	Subject Doesn't Know
Researcher Knows	Shared culture, or understanding of subject's culture & beliefs	What the subject doesn't know about the researcher's culture & beliefs
Researcher Doesn't Know	What the researcher doesn't know about the subject's culture & beliefs	Shared ignorance

When there is much shared culture, traditional informed consent procedures may be highly appropriate. The researcher explains the research; the subject largely understands and may ask some questions, and after appropriate discussion of these matters, agrees to participate or declines. Where shared culture does not exist, the researcher should compensate by learning about the subject's culture and relevant beliefs and adjusting procedures accordingly.

There is often the illusion of shared culture when, in fact, neither knows much about the other's beliefs or culture. For example, most psychologists regard certain kinds of self-disclosure and openness about personal matters as basic to mental health and social maturity. Hence, it would be natural (but thoughtless and unsophisticated) to conduct an experimental intervention involving self-disclosure without realizing that subjects from some traditional cultural backgrounds may consider such behavior as shameful, involving loss of face and disgrace to family. Failure to recognize where cultural differences may exist and to seek to understand the relevant culture and beliefs of subjects can result in many procedural errors, including inadequate assurances of confidentiality, inadequate informed consent, exposure of subjects to serious risk, and research methods or instructions that subjects will find offensive and puzzling. Subjects may disclose information harmful to themselves, misunderstand instructions, experience guilt, disrespect and lie to the researcher, refuse to participate or sabotage the project, or even precipitate public protest against the research.

An important part of research planning and pilot testing is to learn how various segments of the research population would respond to the intended procedure. If unacceptable to some critical segments of the research population, a more culturally sensitive version of the procedure needs to be designed. In addition, the informed consent should be carefully crafted to communicate effectively with the target population, so that potential subjects have an opportunity to come to terms with the procedure or decline to participate.

The cell of "shared ignorance" involves the unexpected risks and the benefits foregone when the researcher lacks understanding of the subjects and the subjects know too little to protect themselves. For example, unknowing researchers have stumbled upon possible child abuse because subjects did not understand the implications of their disclosures, leaving the researcher in confusion about the legal and ethical obligations that follow from such an ambiguous disclosure. The ethical researcher uses a variety of techniques to enlarge the window of shared knowledge, learning more about the culture and vulnerabilities of the subjects, and the research risks and benefits that could ensue.

Discovering Vulnerabilities and Risks

Predicting and preventing risks requires understanding possible vulnerabilities of subjects. Those who are especially vulnerable in research include persons who:

- do not share the researcher's values or culture.
- are poor, uneducated, or otherwise have little power in society.
- are weakened, physically, economically, politically, or emotionally.
- are located in an institution (workplace, school, prison) that may compromise their autonomy, coerce their participation, or make harmful use of their data.
- may be damaged by subjects' revelations (for example, relatives, co-workers).
- may be engaged in illegal activities.
- are visible public figures.
- are scapegoats or targets of prejudice.
- are too young or too old to avoid coercion or exercise autonomy.

All animals are vulnerable because of power inequality between scientist and animal.

Information about vulnerabilities and ways to do sensitive research may be gained through: consultation with relevant ethnographic literature, personal experience with the populations, use of surrogate subjects, focus groups drawn from relevant gatekeepers and stakeholders in the research, or community consultation. The aim of each of these methods is to learn how informed subjects are likely to respond to the intended research. For example:

- Would they approve of any uses of placebo conditions or concealment?
- What risks or fears (warranted or otherwise) are likely to arise?
- What issues of privacy and confidentiality are important to subjects?
- What benefits do subjects and other stakeholders expect to receive from the research?
- Are the intended uses or dissemination of the results acceptable to the stakeholders?
- What communication processes are acceptable to use to recruit, inform, and involve subjects?
- Will the intended informed consent procedure be attended to, comprehended, believed, and produce competent decisions in the target population?

Surrogate subjects are drawn from the research population, "walked through" the research procedure with detailed explanation, and asked to comment on issues such as the above.

Focus groups meet in a comfortable private place, where food and drink are provided. The focus group leader describes the project and what it seeks to achieve; participants comment and ask questions. Depending on whether the focus group participants are surrogate subjects, scientists who have studied the sub-

ject population, or gatekeepers of the subject community (ministers, teachers, politicians, union representatives, informal leaders), the perspectives they offer will differ; multiple perspectives should be sought. Focus groups can move much information into the cell of shared culture and understanding and out of the other cells of the diagram above. Bowser and Sieber (1992) describe focus group procedures used to develop effective approaches in recruiting and interviewing youthful crack cocaine users about safe sex practices and knowledge about AIDS; a carefully developed underground "grapevine" then served to inform and recruit participants, and some focus group members who shared subjects' culture became research assistants.

Community consultation involves equal status meetings between researchers and self-appointed representatives of the group to be studied. This concept was developed when members of the San Francisco gay community refused to participate in clinical trials of emerging treatments for HIV infection unless they were involved as equals in the design of the research (Melton, Levine, Koocher, Rosenthal, & Thompson, 1988).

Other *gatekeepers* and *stakeholders* include any persons who have a stake in assuring that the research is ethical, legal, or valid and who are likely to offer additional useful ethical perspectives if consulted. In addition to the groups already mentioned, these may include representatives of the research institution (including legal counsel, research administrators, and any others having relevant expertise or authority), the funder, representatives of scientific associations, and non-scientific representatives such as relevant human or animal rights advocates.

Researchers often justify risk and inconvenience to subjects on grounds that the research will benefit science and society yet make no provision for such benefits. Those who "grab data and run" with no regard for benefiting stakeholders of research are unwelcome in that setting again and spoil the reputation of science for others who follow. There are many ways to benefit the subjects of research and many of the stakeholders, even if the initial data are scientifically unexciting. The resulting goodwill with subjects and gatekeepers means that the door will be open to continued fine-tuning of the project.

Providing Benefits

Many kinds of benefits may ensue from a research project. The recipients of benefits may include all stakeholders: subjects, their community (family, workplace, and so forth), the researcher and research team, the research institution, funder, and science. The kinds of benefits each might receive include: good relationships, knowledge, material resources, opportunities to give or receive training, opportunities to do good and earn the

esteem of others, empowerment, and scientific success (Sieber, 1992).

Discovering Meanings of Privacy, Confidentiality, and Anonymity

Privacy is about persons; it refers to the ability to control the access that others have to one's self. Although researchers know when someone has invaded their privacy, this is a poor basis for deciding when subjects would want to restrict access to themselves. Age, culture, status, education, and circumstances largely determine the degree of access that individuals wish to grant and the controls they exercise over access (Laufer & Wolfe, 1977). For example, personal questions about matters such as love and friendship may be eagerly answered by those who are happy with their relationships or for whom relationships are not salient, but may cause humiliation and pain to those who have recently experienced rejection. Powerful adults may refuse to answer a question that feels invasive; a less powerful adult may lie to the researcher; while a young child may reveal much and feel very upset. Conversely, very young children have little sense of social embarrassment and may comfortably answer questions that would embarrass an older child.

Many methods have been developed to respect the privacy of subjects and to guard the integrity of research against the subterfuges of subjects seeking to protect their privacy. (See Boruch & Cecil, 1977, for a comprehensive review of methods.) For example, a researcher who discovers the names of persons with HIV infection and tries to interview them by phone might expect a hostile "Where did you get my name?" and refusal to participate. However, a researcher seeking such sensitive medical history data might employ physicians to serve as "brokers" compiling the needed data, with explicit permission of the subjects, and removing any identifiers that would enable the researcher or anyone else to deduce the names of the subjects. Simply removing names might not prevent *deductive disclosure*; for example, license, Social Security, or phone numbers, or other demographic information could enable one to trace back to the name of an individual. *Anonymous* data contain no information that might permit deductive disclosure.

An individual's right to privacy in research is legally protected by their right to refuse to participate; hence, informed consent is an important way to respect privacy. The law says little about privacy and social research, except that the Buckley Amendment prohibits access to children's school records without parental consent, the Hatch Act prohibits asking children questions about religion, sex, or family life without parental permission, and the National Research Act requires parental permission for research on children. Various state laws also pertain.

Confidentiality is about data and is an extension of the concept of privacy. It refers to whatever agreement persons enter into about how access to information will be controlled. Confidentiality agreements are part of informed consent agreements. Subjects may willingly share personal information under a believable confidentiality agreement. Unfortunately, researchers may glibly promise to prevent any access by others without ensuring that there is no possibility of data theft, subpoena, or snooping. Research that could be subject to subpoena should be protected by a certificate of confidentiality, which may be obtained from the Office for Protection from Research Risk (National Institutes of Health). Other protections of sensitive data include substituting numbers for names and storing the unique identifiers and associated numbers elsewhere, under lock.

Many ways of assuring confidentiality of data have been used (Boruch & Cecil, 1979). For example, various methods of randomized response or error inoculation provide a strategy for asking questions such as "Have you cheated on your income tax?" so that no one can know who has given an incriminating answer. The simplest variant is for subjects to roll a hidden die before answering. If the die comes up, say, two, the subject is to answer untruthfully. The researcher knows that one response in six is false and can use simple algebra to determine the proportion of subjects who have cheated on their taxes (Fox & Tracy, 1986).

Voluntary Informed Consent

Voluntary informed consent is two-way communication about the conditions of research participation between subjects and researcher, not simply a consent form. *Voluntary* means without threat or undue inducement. *Informed* means that the subject is told what a reasonable person in that situation would need to know to decide whether to participate. At a minimum, subjects should be informed about the research purpose and procedures, any foreseeable risks, benefits, alternatives to participation, confidentiality agreements, compensation for harm, and whom to contact with questions or complaints; subjects should be assured that any participation is voluntary with right to withdraw at any time and should be given a copy of the written consent statement. *Consent* means an explicit agreement to participate. The literature in cognitive, social, and educational psychology describes ways to create readability, comprehension, trust, personalization of information, and decision-making ability, and should be used to create effective informed consent. A written statement is usually presented along with a verbal statement and discussion, and when the information is complex for the subject population, the researcher may also employ a videotape, simulation, or group discussion to engage subjects in fuller exploration and understanding of the research.

Debriefing is important both to enhance the subject's understanding of the research experience and to give the researcher a chance to learn subjects' perceptions of the research. At a minimum, the researcher should describe the purpose and importance of the study, what is known about the problem studied, and what variables were employed. A written layperson's version of the literature on which the study was based can be provided immediately, and the findings sent to subjects and other stakeholders when available. Thoughtful sharing of findings and solicitation of comments from subjects and other stakeholders is beneficial to all concerned.

Deception and Concealment

Deception or concealment may be justified when they are the only feasible ways to achieve stimulus control, study responses to low-frequency events, avoid serious risk to subjects, or obtain data that would otherwise be unobtainable due to subjects' defensiveness, embarrassment, or fear of reprisal. Research on responses to aggression, for example, might be studied by having an actor (disguised as another research participant) make aggressive statements to the subject. *Role* deception means that the subject is misled as to the real identity of another. *Device* deception means that a device is presented as being something it is not. *Implicit* deception means that the subject is tacitly led to assume something that is not so. An unjustifiable rationale for using deception is to trick people into participation they would find unacceptable. Some forms of deception are harmful and wrongful especially when immoral or highly private behavior is strongly induced (Sieber 1982, 1983a) and are indefensible. In such cases, alternative approaches not requiring deception should be employed (for example, simulation and role-playing).

Other alternatives include obtaining informed consent to deceive or conceal. For example, subjects may be asked if they would participate in one of several studies in which some of the studies might involve deception and others not, or in a study in which they might be assigned to a placebo or control condition. Subjects may waive their right to be informed. Less benign are studies in which subjects may consent to participate but are misinformed about the nature of the study or are observed without consent and with implicit deception.

When using a "consent to concealment" method, it is easy to dehoax subjects about what has really happened. Not so with false informing or implicit deception, for having been deceived once, subjects would tend not to believe a researcher who finally tells the truth. It is still harder to desensitize subjects, that is, to return them to a state of mind at least as positive and constructive as when they entered the research (Sieber, 1983b).

In summary, ethical research requires more than the following of rules. It calls for sensitive application of psychological knowledge of human (or animal) nature and creative problem solving as well.

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Joan E. Sieber

Ethics in Practice

Some ethics problems in psychology are not difficult to identify; they involve gross violations of patients' rights

In summary, ethical research requires more than the following of rules. It calls for sensitive application of psychological knowledge of human (or animal) nature and creative problem solving as well.

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Ethics in Practice

Some ethics problems in psychology are not difficult to identify; they involve gross violations of patients' rights

or exploitation of vulnerable individuals. Other ethics problems are more subtle, involving issues that require psychologists to balance self-interest or convenience against the well being of their patients or the ideals of the profession. The specific temptations that they must avoid and the specific ideals to which they should aspire are given in the "Ethical Principles of Psychologists and Code of Conduct" (1992) and in the formal and informal curricula to which all psychologists are exposed over the course of their professional training. Psychology deals with problems that matter greatly to individuals and society (e.g., child abuse, violence, divorce, childrearing, suicide, and sexuality) so both the technical and ethical correctness of psychologists' choices are significant.

Professionals have special knowledge and skills, but possessing these does not in and of itself determine what is right or moral. Society grants professions access to status, power, and resources (income) and in return expects that professions will regulate themselves and act in ways that benefit society. Psychologists owe a special duty to persons in a professional relationship, known in legal terms as a fiduciary obligation. It denotes the special duty to care for the welfare of those who have become one's clients or patients.

Ethics as a Means of Regulating Conduct

In order to do what is right, the practitioner must first understand what is right. Ethics, along with law and etiquette, provide principles and standards that help to determine whether an action is right, good, or proper. Ethics focuses on the ideals of human behavior and according to many moral philosophers is distinguished by three main features: (1) it is based on principles, (2) the principles have universality (e.g., they could be applied generally to all similar persons), and (3) appropriate behavior may be deduced from the principles by moral reasoning. Professional ethics in practice is a combination of ethics, law, and etiquette.

Much of ethical philosophy is concerned with the basis on which acts are considered ethical. One method of moral justification—teleology or utilitarianism—justifies an action as ethical if it results in the creation of more good than harm. Jeremy Bentham articulates this viewpoint in *An Introduction to the Principles of Morals and Legislation* (New York, 1863/1948). An alternative justification, deontology, focuses on the essence of the act itself, particularly as it is based on respect for persons. This approach is most closely associated with Immanuel Kant's theories, as William Frankena describes in his *Ethics* (2nd ed., New Jersey, 1973). In actual practice, professional ethics involves a mixed deontological-teleological framework. The minimal ethical obligations are termed "mandatory obligations," and the ideals or maximal obligations are termed "aspirational." The psychology code divides aspirational obligations into six

ethical principles and focuses on the mandatory obligations in its 102 standards.

Considerable research in moral development has shown that over the course of their education and professional training, psychologists (like other professionals) engage in principled reasoning. However, as J. Rest and D. Narvaez describe in *Moral Development in the Professions: Psychology and Applied Ethics* (Hillsdale, NJ, 1994), this is only one of the elements necessary to act ethically. It is necessary for the professional to: (1) recognize that a moral issue is at stake, (2) give priority to acting ethically, (3) understand the ethical principles at stake, and; (4) have the skills necessary to implement the proper action. Thus ethics is both a cognitive and behavioral aspect of professional practice. Once an ethical dilemma has arisen, a process of decision making must be undertaken to determine the best action under the circumstances. There are several approaches to ethical decision making, such as those described by Leonard Haas and John Malouf in *Keeping Up the Good Work: A Practitioners' Guide to Mental Health Ethics* (1995); M. Canter, B. Bennett, S. Jones, and T. Nagy in *Ethics for Psychologists: A commentary on the APA Ethics Code* (1994); and D. Marsh and R. Magee in *Ethical and Legal Issues in Professional Practice with Families* (1997).

Psychology and Ethics. Psychology is both a learned profession and a healing art. Thus, in common with other healing arts, its central ideals concern the promotion of human welfare and the alleviation of suffering. Psychology also is based in science, so that its approaches to healing and treatment should be based on valid evidence. Psychology is an independent profession, not subject to the supervision of any other profession. Therefore, psychologists must maintain and monitor their own standards. As members of a scientific discipline, psychologists are obliged to use only valid scientific evidence and to be accurate and honest in their representations. Psychologists function not only as mental health practitioners but as teachers, researchers, and public advocates. Many of the principles of psychology ethics are applicable to all psychologists, regardless of their field of specialization. Others (for example, the need to uphold privacy and confidentiality) are particularly applicable to those psychologists who deliver professional services.

The development of ethical standards in organized psychology is unique. In 1948, a committee of psychologists convened by the American Psychological Association undertook an empirical assessment of ethical problems in the field. By survey and questionnaire, critical incidents in ethics were solicited from psychologists and codified into psychology's first ethics code (*Ethical Standards of Psychologists*, Washington, D.C., 1953). Subsequently, the association indicated that the code should periodically be revised in order to reflect changing realities in the field.

The six principles of the ethics codes are themselves not “enforceable,” since they are aspirational. However, the 102 standards, covering eight areas of practice, are clear-cut rules for appropriate conduct that can be enforced (that is, penalties may be imposed for violations). All in one way or another have implications for the practicing psychologist. The code’s six principles are as follows:

1. *Competence.* This principle focuses on the need for psychologists to provide services and use techniques in which they are qualified by education, training, or, experience. It underscores psychologists’ obligations to exercise good judgement in areas of emerging practice and to undertake continuing education for professional competence.
2. *Integrity.* This principle underscores the need for honesty and accuracy in describing services, fees, products, and so forth. It also focuses on psychologists’ obligation to be aware of their own values, belief systems, needs, and limitations. It implies a variety of standards in the area of informed consent and reminds psychologists to avoid potentially harmful dual relationships.
3. *Professional and scientific responsibility.* This principle underscores the need to remain accountable for ones’ decisions as a psychologist, regardless of whether one is an employee or a supervisor. It also focuses on the interrelationship of all members of the profession, in that psychologists have a responsibility to uphold the reputation of the discipline and the public’s trust in psychology and psychologists. It is the basis for standards regarding confronting colleagues’ improper behavior.
4. *Respect for people’s rights and dignity.* This principle gives rise to standards in the area of privacy and confidentiality. It reminds psychologists of their inherently powerful position and their need to understand cultural and other differences between themselves and consumers of their service.
5. *Concern for others’ welfare.* This principle underscores the obligation to avoid exploitation and to contribute to the welfare of those with whom psychologists interact, not limited to patients but including students, supervisors, and research participants.
6. *Social responsibility.* This principle focuses on psychologists’ obligations to improve the community and society in which they work and live. It also implies contributing professional time pro bono (from *pro bono publico*, for the benefit of the public).

Inculcating Ethical Principles

No matter how good the ethics enforcement mechanism, prevention of ethics infractions and the maintaining of high ethical standards in the profession at large is a more effective means of protecting the public than is apprehending offenders.

Prevention begins with the profession attracting

those who aspire to its highest ideals and with training experiences that reinforce their commitment to high standards of practice. In 1981, mandatory ethics education was instituted for all programs that received accreditation from the American Psychological Association as professional psychology training programs (clinical, counseling, school, and industrial/organization psychology). Psychology was the first mental health profession to make formal ethics instruction mandatory. Ethics instruction is also provided at all psychology internship training sites, in addition to the informal professional socialization that occurs continuously during the years of training.

Many of the ordinary ethics problems that practitioners encounter involve misunderstandings and failures to appreciate conflicts of interest, as P. Keith-Spiegel notes in the article, “Violation of ethical principles: Ignorance or poor professional judgment versus willful disregard” (*Professional Psychology*, 1977, 8, 288–296). Publication of professional journal articles such as the regular ethics feature in the journal *Professional Psychology* and continuing education in ethics (now required in several states) serve to educate practicing psychologists about current dilemmas.

Enforcement of Ethics Standards

The American Psychological Association maintains an Office of Ethics, staffed by a full-time psychologist and ethics associates. Complaints are heard by a volunteer ethics committee composed of nine psychologists and one layperson. The ethics office receives an average of 110 formal complaints against members each year, and of these 66 to 75% are opened as formal cases; in 1996, “complaints were filed against approximately 0.11% of the membership,” the committee reported (Report of the Ethics Committee, 1996. *American Psychologist*, 1997, 52, 897–905). The ethics committee both responds to complaints against psychologists and answers educational questions from the membership and the public at large. Psychology is a licensed mental health profession in all 50 states. Therefore, psychologists’ practice is subject to the oversight and enforcement of state boards of psychology. All of these state boards incorporate the Ethical Principles of Psychologists and Code of Conduct into the statutes that govern the practice of psychology. Therefore, ethics violations may be the basis for complaints to state licensing boards. There are also state psychological associations in every state, and each has a volunteer ethics committee, which responds to complaints against members. Licensing boards regulate licensed psychologists and pursue those complaints against individuals practicing psychology without a license, while state associations focus on the behavior of their members. Finally, other psychological entities such as local psychological associations, the

American Boards of Professional Psychology, or specific psychological societies, maintain ethics committees.

It is also noteworthy that ethics violations can form the basis of legal complaints. Thus, courts can shape the ethics code of a profession by legal decisions. For example, the famous Tarasoff decision (*Tarasoff v. Board of Regents of the University of California*) made an impact on the ethical standards of all mental health professions when the court found a "duty to protect" incumbent on mental health practitioners.

Problems in Professional Psychology Ethics

There are certain common problems that are enduring issues in professional ethics, but the field is not static. New techniques, theories, research evidence, technology, and service delivery systems pose new problems and require new ways of interpreting the fundamental ethical principles. Some examples of both enduring and emerging areas of ethical concern follow:

Sex and boundaries. A persistent problem in psychology, as in other mental health professions, is the sexual exploitation of patients. This is considered a boundary violation, in that it blurs or transgresses the boundary between the therapist/patient relationship and the relationship of romantic or sexual partners. It is also considered a dual relationship in that the romantic and therapeutic relationships occur at the same time. The code of ethics prohibits sexual intimacy with patients as well as potentially injurious dual relationships (for example, treatment of friends or business associates). The problem has persisted, however, perhaps showing the difficulty of effectively controlling personal needs in a close relationship such as psychotherapy, as K. Pope, J. Sonne, and J. Holroyd suggest in *Sexual Feelings in Psychotherapy* (Washington, D.C., 1993).

Competence. Another area of persisting ethical concern is the maintenance of competence. All professions have a "half life" in which the knowledge accumulated during the training years becomes obsolete or irrelevant. Psychology is no exception to this trend and it is incumbent on a psychologist to maintain knowledge of current practices.

Finances. Clarity about fees and propriety in the collection of fees is an important area of psychological practice. Psychologists sometimes turn their past-due accounts over to collection agencies, and this can be the cause of considerable distress for possibly vulnerable patients if handled poorly.

Testing and assessment. Competence in psychological testing is one of the hallmarks of the professional psychologist. Increasing sophistication of psychological tests and increasing reliance by employers, courts, and others on psychological screening makes the use and misuse of psychological testing an area of considerable ethical conflict. Psychologists must

use valid tests, interpret them competently, be clear with those whom they test about the purposes of the assessment and clear with those who use the results about the limits of such findings.

Confronting colleagues. Psychologists are obliged to limit their practices and get help when faced with alcohol and drug problems, depression, or other stresses that interfere with effective functioning. Although the current ethics code calls for self-awareness of one's limitations as a practitioner, this is not always easy to achieve, and confrontation by colleagues may be necessary. Psychologists, like other mental health professionals, have difficulty calling possible problems to the attention of their colleagues; the problem of impairment in the profession is one of continued concern, as R. Kilburg, P. Nathan, and R. Thoreson note in *Professionals in Distress* (Washington, D.C., 1986).

Duty to protect. A relatively new legal obligation that has in turn required clarification of psychologists' ethical obligations is the duty to protect. Courts have decided, based on the Tarasoff decision, that psychologists are obligated to attempt to protect those who may be harmed by the actions of their patients. This duty has long included mandatory reporting of possible child abuse, and now extends to reporting of domestic violence and reporting of threats of harm to specific others. The ethical obligation to uphold the law and the potentially conflicting ethical obligation to protect patient privacy can make this a complex area for psychologists.

Managed care. Managed care depends heavily on "utilization review" (to prevent overtreatment), "provider profiling" (to identify those who provide treatment consistent with the organization's rules) and "treatment guidelines" (which mandate specific interventions for specific problems). All of these cost-containment strategies can affect the traditional boundaries of the psychologist-patient relationship. For example, session limits raise an ethical conflict in that psychologists are obliged to maintain an established psychologist-patient relationship until the treatment is completed, a referral is made or it is clear that the patient will no longer benefit from the service. Otherwise, there is risk of abandonment. On the other hand, psychologists who continue to treat without reimbursement may jeopardize their practices. This may occur either because they no longer receive enough income to keep their offices open or because the managed care entity removes them from its panel of providers for "excessive" treatment.

Privacy and confidentiality. There are increasing threats to the privacy of psychotherapy patients, in that utilization reviewers, insurance companies, and other third-party payers insist on knowing details of the treatment. The rapid spread of electronic means of record keeping and billing also poses threats to privacy. Psychologists must on the one hand be accurate informing patients about the limits of privacy and confidentiality and on the other hand strive to

protect the interests of their patients to the extent possible, obtain reimbursement, and provide a safe therapeutic environment in which private matters can be discussed.

Electronic service delivery. The rise of technologies such as the Internet poses the question of whether psychologists can deliver psychological services via video or computer with integrity. This is an emerging area of ethical concern in that it is unknown whether the techniques useable in face-to-face treatment are generalizable to electronic vehicles of treatment delivery.

Expert testimony. Increasingly, courts are relying on psychologists to provide expert testimony on the mental state of criminal defendants, the parental fitness of child custody disputants, mental disability of claimants, and other issues. This has increased psychologists' obligation to be clear about their roles and the limits of their expertise. This is particularly an ethical problem for psychologists who make a transition from providing treatment services to a parent to becoming expert witnesses for that parent in a custody evaluation (the current ethics code strongly advises against such a dual role).

The "professional estate" of the psychologist. The issue of how records are to be disposed of and practices dealt with following the psychologist's retirement, death, or disability has not been addressed extensively in the professional literature. This is another issue that combines legal problems and ethical obligations.

Group, marital, and family therapies. Most of the principles of professional psychology ethics were developed with the assumption that treatment involved one patient or client working with one therapist. The unique needs of group, couples, and family therapy particularly in regard to confidentiality, privileged communication, and possibly conflicting needs of different participants may require elaborations of the ethics code to clarify the ethical issues in multiperson therapies. Family therapists in particular have been actively writing about the unique ethical conflicts raised by treating several members of the same family at the same time. Group therapists have often dealt with the problem of confidentiality (i.e., group members are not bound by the ethical or legal restrictions on the therapist) by having group members sign agreements at the beginning of treatment to maintain each others' confidentiality.

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Ethics in Publication

[This entry is extracted from the *Publication Manual of the American Psychological Association*, 4th ed., 1994, pp. 292–298.]

The “Ethical Principles of Psychologists and Code of Conduct” of the American Psychological Association (*American Psychologist*, 1992) includes six ethical standards related to scholarly publishing. These standards are reprinted in Table 1 and are described in this entry in greater detail. They reflect basic ethical principles that underlie all scholarly writing and publication. These longstanding ethical principles are designed to achieve two goals:

1. To ensure the accuracy of scientific and scholarly knowledge, and
2. To protect intellectual property rights.

Two of these standards (reporting of results and sharing data) deal with accuracy, three relate to property rights (plagiarism, publication credit, and professional reviewers), and one concerns both quality of knowledge and its ownership (duplicate publication of data).

Reporting of Results

The essence of the scientific method involves observations that can be repeated and verified by others. Hence, psychologists do not make up data or modify their results to support a hypothesis. Errors of omission also are prohibited. Psychologists do not omit trouble-

some observations from their reports so as to present a more convincing story.

Careful preparation of manuscripts for publication is essential, but errors can still occur. It is the author's responsibility to make such errors public if they are discovered after publication. The first step is to inform the publisher. Journals publish correction notices that bring errors to the attention of future users of the information. Book publishers correct subsequent printings of the book.

Plagiarism

Quotation marks should be used to indicate the exact words of another. Summarizing a passage or rearranging the order of a sentence and changing some of the words is paraphrasing. Each time a source is paraphrased, a credit for the source needs to be included in the text. The following paragraph is an example of how one might appropriately paraphrase some of the foregoing material in this section:

As stated in the *Publication Manual of the American Psychological Association* (1994), the ethical principles of scientific publication are designed to ensure the integrity of scientific knowledge and to protect the intellectual property rights of others. As the *Publication Manual* explains, authors are expected to correct the record if they discover errors in their publications; they are also expected to give credit to others for their prior work when it is quoted or paraphrased.

The key element of this principle is that an author does not present the work of another as if it were his or her own work. This can extend to ideas as well as written words. If an author models a study after one done by someone else, the originating author should be given credit. If the rationale for a study was suggested in the Discussion section of someone else's article, that person should be given credit. Given the free exchange of ideas, which is very important to the health of psychology, an author may not know where an idea for a study originated. If the author does know, however, the author should acknowledge the source; this includes personal communications.

Publication Credit

Authorship is reserved for persons who receive primary credit and hold primary responsibility for a published work. Authorship encompasses, therefore, not only those who do the actual writing but also those who have made substantial scientific contributions to a study. Substantial professional contributions to a journal article may include formulating the problem or hypothesis, structuring the experimental design, organizing and conducting the statistical analysis, interpreting the results, or writing a major portion of the paper.

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Two of these standards (reporting of results and sharing data) deal with accuracy, three relate to property rights (plagiarism, publication credit, and professional reviewers), and one concerns both quality of knowledge and its ownership (duplicate publication of data).

Reporting of Results

The essence of the scientific method involves observations that can be repeated and verified by others. Hence, psychologists do not make up data or modify their results to support a hypothesis. Errors of omission also are prohibited. Psychologists do not omit trouble-

some observations from their reports so as to present a more convincing story.

Careful preparation of manuscripts for publication is essential, but errors can still occur. It is the author's responsibility to make such errors public if they are discovered after publication. The first step is to inform the publisher. Journals publish correction notices that bring errors to the attention of future users of the information. Book publishers correct subsequent printings of the book.

Plagiarism

Quotation marks should be used to indicate the exact words of another. Summarizing a passage or rearranging the order of a sentence and changing some of the words is paraphrasing. Each time a source is paraphrased, a credit for the source needs to be included in the text. The following paragraph is an example of how one might appropriately paraphrase some of the foregoing material in this section:

As stated in the *Publication Manual of the American Psychological Association* (1994), the ethical principles of scientific publication are designed to ensure the integrity of scientific knowledge and to protect the intellectual property rights of others. As the *Publication Manual* explains, authors are expected to correct the record if they discover errors in their publications; they are also expected to give credit to others for their prior work when it is quoted or paraphrased.

The key element of this principle is that an author does not present the work of another as if it were his or her own work. This can extend to ideas as well as written words. If an author models a study after one done by someone else, the originating author should be given credit. If the rationale for a study was suggested in the Discussion section of someone else's article, that person should be given credit. Given the free exchange of ideas, which is very important to the health of psychology, an author may not know where an idea for a study originated. If the author does know, however, the author should acknowledge the source; this includes personal communications.

Publication Credit

Authorship is reserved for persons who receive primary credit and hold primary responsibility for a published work. Authorship encompasses, therefore, not only those who do the actual writing but also those who have made substantial scientific contributions to a study. Substantial professional contributions to a journal article may include formulating the problem or hypothesis, structuring the experimental design, organizing and conducting the statistical analysis, interpreting the results, or writing a major portion of the paper.

ETHICS: Ethics in Publication. Table 1. Ethical standards for the reporting and publishing of scientific information

The following ethical standards are extracted from the "Ethical Principles of Psychologists and Code of Conduct," which appeared in the December 1992 issue of the *American Psychologist* (Vol. 47, pp. 1597-1611). Standards 6.21-6.26 deal with the reporting and publishing of scientific information.

6.21 Reporting of Results

(a) Psychologists do not fabricate data or falsify results in their publications.

(b) If psychologists discover significant errors in their published data, they take reasonable steps to correct such errors in a correction, retraction, erratum, or other appropriate publication means.

6.22 Plagiarism

Psychologists do not present substantial portions or elements of another's work or data as their own, even if the other work or data source is cited occasionally.

6.23 Publication Credit

(a) Psychologists take responsibility and credit, including authorship credit, only for work they have actually performed or to which they have contributed.

(b) Principal authorship and other publication credits accurately reflect the relative scientific or professional contributions of the individuals involved, regardless of their relative status. Mere possession of an institutional position, such as Department Chair [or Laboratory Director], does not justify authorship credit. Minor contributions to the research or to the writing for publications are appropriately acknowledged, such as in footnotes or in an introductory statement.

(c) A student is usually listed as principal author on any multiple-authored article that is substantially based on the student's dissertation or thesis.

6.24 Duplicate Publication of Data

Psychologists do not publish, as original data, data that have been previously published. This does not preclude republishing data when they are accompanied by proper acknowledgment.

6.25 Sharing Data

After research results are published, psychologists do not withhold the data on which their conclusions are based from other competent professionals who seek to verify the substantive claims through reanalysis and who intend to use such data only for that purpose, provided that the confidentiality of the participants can be protected and unless legal rights concerning proprietary data preclude their release.

6.26 Professional Reviewers

Psychologists who review material submitted for publication, grant, or other research proposal review respect the confidentiality of and the proprietary rights in such information of those who submitted it.

Those who so contribute are listed in the byline. Lesser contributions, which do not constitute authorship, may be acknowledged in a note. These contributions may include such supportive functions as designing or building the apparatus, suggesting or advising about the statistical analysis, collecting or entering the data, modifying or structuring a computer program, and recruiting participants or obtaining animals. Conducting routine observations or diagnoses for use in studies does not constitute authorship. Combinations of these (and other) tasks, however, may justify authorship. As early as practicable in a research project, the collaborators should decide on which tasks are necessary for

the project's completion, how the work will be divided, which tasks or combination of tasks merits authorship credit, and on what level credit should be given (for example, first author, second author).

Authors are responsible for determining authorship and for specifying the order in which two or more authors' names appear in the byline. The general rule is that the name of the principal contributor should appear first, with subsequent names in order of decreasing contribution. If authors played equal roles in the research and publication of their study, they may wish to note so in a footnote. Collaborators may need to reassess authorship credit and order if major changes are

necessary in the course of the project (and its publication). This is especially true in faculty-student collaborations, when students may need intensive supervision or additional analyses may need to be conducted beyond the scope of a student's thesis or dissertation.

Authors are also responsible for the factual accuracy of their contributions. Authors not only receive credit for the published work, they take responsibility for the opinions and statements included in the work. The corresponding author (the author who serves as the main contact with the journal editor or book publisher) should always obtain a person's consent before including that person's name in a byline or in a note. Each author listed in the byline of a journal article should review the entire manuscript before it is submitted.

Duplicate Publication of Data

Data that have already been published once are not published again as if they were new and original. Duplicate publication distorts the knowledge base by making it appear there is more information available than really exists. It also wastes scarce resources (for example, journal pages and the time and efforts of editors and reviewers). Duplicate publication can also lead to copyright violations. An author cannot assign the copyright to more than one publisher.

This standard means that an author must not submit to a scientific journal a manuscript describing work that has been published in whole or in substantial part elsewhere. Journals serve as the archival record for a discipline. A major aspect of their worth is that they publish new, original knowledge. Duplicate publication would pollute their worth.

This policy does not necessarily exclude from consideration by journals manuscripts that have been previously published in abstracted form (for example, in the proceedings of an annual meeting) or in a periodical with limited circulation or availability (for example, in a report by a university department or by a government agency). This policy does exclude the same or overlapping material that has appeared in a publication that has been offered for public sale, such as conference proceedings or a book chapter; such a publication does not meet the criterion of "limited circulation." Publication of a Brief Report in most journals is with the understanding that an extended report will not be published elsewhere; the Brief Report is the archival record for the work. Problems of duplicate publication may also arise if material is first published through the mass media.

The prohibition of duplicate publication also means that the same manuscript must not be submitted to more than one publisher at the same time. If a manuscript is rejected by one journal, an author may then submit it to another.

Whether the publication of two or more reports

based on the same or on closely related research constitutes duplicate publication is often a matter of editorial judgment. Any prior publication should be noted and referenced in the manuscript, and the author should inform the journal editor of the existence of any similar manuscripts that have already been published or accepted for publication or that may be submitted for concurrent consideration to the same journal or elsewhere. The editor can then make an informed judgment as to whether the submitted manuscript includes sufficient new information to warrant consideration.

The author is obligated to present work parsimoniously and as completely as possible within the space constraints of journal publications. Data that can be meaningfully combined within a single publication should be presented together to enhance effective communication. Piecemeal, or fragmented, publication of several reports of the results from a single study is undesirable unless there is a clear benefit to scientific communication. An author who wishes to divide the report of a study into more than one article should inform the editor and provide such information as the editor requests. Whether the publication of two or more reports based on the same or on closely related research constitutes fragmented publication is a matter of editorial judgment.

The prohibition of piecemeal publication does not preclude subsequent reanalysis of published data in light of new theories or methodologies if the reanalysis is clearly labeled as such. There may be times, especially in the instances of large-scale or multidisciplinary projects, when it is both necessary and appropriate to publish multiple reports. Multidisciplinary projects often address diverse topics, and publishing in a single journal may be inappropriate. Repeated publication from a longitudinal study is often appropriate because the data from different times make unique scientific contributions; useful knowledge should be made available to others as soon as possible.

As multiple reports from large-scale or longitudinal studies are made, the author is obligated to cite prior reports on the project to help the reader evaluate the work accurately. For example, in the early years of a longitudinal study one might cite all previous publications from it. For a well-known or very-long-term longitudinal study, one might cite the original publication, a more recent summary, and earlier articles that focused on the same or related scientific questions addressed in the current report. Often it is not necessary to repeat the description of the design and methods of a longitudinal or large-scale project in its entirety. The author may refer the reader to an earlier publication for this detailed information. It is important, however, to provide sufficient information so that the reader can evaluate the current report. It is also important to make clear the degree of sample overlap

in multiple reports from large studies. Again, authors should inform and consult with the editor.

As indicated earlier, journals serve as an archival record for a discipline. The majority of books, however, often serve different purposes, one of which is the compilation, synthesis, and dissemination of the new information that has been published in journals. Therefore, journal articles are revised sometimes for publication as book chapters. The author has a responsibility to reveal to the reader that all or portions of the new work were previously published and to cite and reference the source. If copyright is owned by a publisher or by another person, copyright must be acknowledged, and permission to adapt or reprint must be obtained. For example, this entry is reprinted with minor modifications from the fourth edition of the *Publication Manual of the American Psychological Association* (Washington, D.C., 1994) by permission of the copyright holder, the American Psychological Association.

Data Verification

To permit competent professionals to confirm the results and analyses, authors are expected to retain raw data for a minimum of 5 years after publication of the research. Other information related to the research (for example, instructions, treatment manuals, software, and details of procedures) should be kept for the same period. This information is necessary if others are to attempt replication. Authors are expected to comply promptly and in a spirit of cooperation with such requests. Sometimes there may be special concerns that must be addressed, such as confidentiality of the participants and proprietary or other concerns of the sponsor of the research. Generally, the costs of complying with the request should be borne by the requestor.

Prior to publication, researchers must make their data available to the editor at any time during the review and production process if questions arise with respect to the accuracy of the report. Otherwise, the submitted manuscript can be rejected.

Professional Reviewers

Editorial review of a journal or book manuscript requires that the editors and reviewers circulate and discuss the manuscript. When submitting a manuscript to an APA journal, an author implicitly consents to the handling necessary for review of the manuscript. Editors and reviewers, however, may not, without the author's explicit permission, quote from a manuscript or circulate copies for any purposes other than that of editorial review. If a reviewer consults with a colleague about some aspects of the manuscript, the reviewer should inform the editor. Editors and reviewers may not use the material from an unpublished manuscript to advance their own or others' work without the author's consent. Editors and reviewers should also avoid con-

flict of interest, or its appearance, by declining to evaluate the manuscripts of colleagues.

Electronic Publishing

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ETHNIC AND RACIAL IDENTITY. [This entry comprises two articles: *Ethnic Identity* and *Racial Identity*. For a general discussion of identity, see *Identity*.]

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Ethnic identity is a dynamic, multidimensional construct that refers to one's identity, or sense of self, in ethnic terms, that is, in terms of a subgroup within a larger context that claims a common ancestry and shares one or more of the following elements: culture, race, religion, language, kinship, or place of origin. Ethnic identity is not a fixed categorization, but rather a

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Ethnic Identity

Ethnic identity is a dynamic, multidimensional construct that refers to one's identity, or sense of self, in ethnic terms, that is, in terms of a subgroup within a larger context that claims a common ancestry and shares one or more of the following elements: culture, race, religion, language, kinship, or place of origin. Ethnic identity is not a fixed categorization, but rather a

fluid and dynamic understanding of self and group that changes with age, time, and context. An ethnic identity is constructed and modified as people become aware of other groups and of the ethnic differences between themselves and others and attempt to understand the meaning of their ethnicity within the larger setting. It is a central defining characteristic of many individuals, particularly those who are members of minority or lower-status groups.

Although at one time ethnic identity was expected to become less important due to mass communication and globalization, it became in fact more salient throughout the twentieth century as a consequence of complex social and historical forces, among them the persistence of intergroup prejudice and the increased movement of immigrants and refugees. There has been a related surge of interest in the topic from various social science disciplines, including sociology, anthropology, and psychology. Within psychology, the topic has been explored by social, cross-cultural, and developmental psychologists. Generally, sociologists and anthropologists have focused on group level processes, while psychologists have emphasized individual and interpersonal processes. However, the boundaries between disciplines have become increasingly blurred as insights from one are incorporated into others.

Components of Ethnic Identity

There is general agreement that ethnic identity is a multidimensional construct, but there is little consensus on exactly what it includes. Most approaches recognize one or more of the following elements, described with their usual means of assessment.

1. Ethnic self-identification refers to one's self-label as an ethnic group member. Self-identification has been assessed by asking respondents to answer open-ended questions about their ethnic identification, to select one or more labels from a given list, or to generate their own list of self-labels from which researchers can determine whether and how prominently ethnicity is mentioned. Studies with children have used dolls or pictures to determine their ability to identify or label themselves and their ethnic group.

2. Affective components include feelings of belonging to the ethnic group and the attitudes and evaluations associated with ethnicity. Questionnaires have assessed affective components such as pride, affirmation, and positive feelings toward one's group, or preferences for ethnically related items, such as food or language usage. The sense of belonging to a group has been studied through direct questions, such as the desire to belong to or to leave the group, as well as through ratings of similarity to a variety of descriptors associated with the group. Measures for children have tapped preference for own-group or other-group with pictures or dolls.

3. Cognitive components include knowledge about the group, such as its history and traditions, together with one's understanding of ethnicity and its implications for oneself. Knowledge about the group has been assessed with questions about its customs, history, or famous people. Understandings about ethnicity have typically been studied through interviews, including questions assessing the extent to which one has thought about one's ethnicity.

4. Value orientations associated with ethnicity provide a worldview and define relationships between the self and others. Individualism, collectivism, and familism are the most frequently studied cultural values, but other values, such as gender roles and attitudes toward authority, have also been examined. Questionnaires have usually been used to assess values.

5. Processes of change in components of ethnic identity over time and with increasing age have also been studied, most often through interviews.

Comprehensive questionnaires that tap several components have been developed for specific groups (e.g., for Latinos, by Felix-Ortiz, 1994; for Asians, by Suinn, Ahuna, & Khoo, 1992) or for use with any ethnic group (Phinney, 1992).

These aspects of ethnic identity have been emphasized to a different extent and in varying combinations across the fields of sociology, anthropology, social psychology, cross-cultural psychology, and developmental psychology.

Sociological and Anthropological Approaches to Ethnic Identity

In the United States, initial interest in ethnic identity came from sociologists who studied the self-identification patterns of immigrants to the United States. Stonequist (1935) emphasized the problems of the immigrant caught between two cultures and never fitting in. It was assumed that in order to become part of their new society, immigrants would have to give up their old identities, based on their culture of origin, and become American. Research primarily with European immigrants examined the ways in which they became assimilated into the American mainstream and the extent to which they retained or did not retain an identification with their culture of origin. More recent research has extended this topic to immigrants from non-European backgrounds. The sociologist Mary Waters (1990) pointed out that the process is quite different in the United States for European and non-European groups. For descendants of immigrants from Europe, an ethnic identification can be chosen voluntarily; identification entails no social costs and provides enjoyment for those who choose to associate with an ethnic culture. Because of intermarriage and assimilation, many Americans from European backgrounds cease to identify themselves as members of an ethnic group after

one or more generations in the United States and think of themselves only as Americans.

For those who are racially identifiable there may be relatively little choice, in that an ethnic label is likely to be imposed by others. However, within any one group a variety of labels is available. People of African descent can call themselves Black or African American; those of Latin American origin use labels such as Hispanic, Latino, or, for those of Mexican descent, Mexican American or Chicano. These labels are associated with different meanings for the individual. The actual labels used vary historically as well, as is seen in the change from colored to Negro to Black to African American. For biethnic or biracial individuals, the choice of a label has changed from a time when a single non-White ancestor could determine one's group membership as non-White, to the current situation, in which self-identification is a complex interaction of appearance, choice, the particular setting, and the available social categories.

Sociologists and anthropologists have also looked at ethnic identity in a larger context. Sociologists and anthropologists such as Lola Romanucci-Ross and George DeVos (1995) and E. Roosens (1989) have shown that ethnic identity is embedded in social and historical processes worldwide. They provide case studies and analyses of the ways in which the identities of a wide range of ethnic groups throughout the world have evolved and changed in response to the social, political, and economic constraints and opportunities afforded by particular contexts.

Social Psychological Approaches

Most social psychological research on ethnic identity is based on social identity theory (SIT), as proposed by the British social psychologist Henri Tajfel (Tajfel & Turner, 1986). Social identity theory emphasizes that the social groups to which people belong, such as religious, occupational, or political groups, form an important basis for their identity. According to the theory, the basic need to maintain a positive sense of self underlies the tendency to evaluate positively the groups one belongs to. Much early research tested the theory using artificially created groups, the minimal group paradigm.

Tajfel also speculated about the specific identity problems that some ethnic groups face as a result of negative stereotypes of their group within society. He suggested that an affirmation of one's ethnicity is a way of dealing with the denigration of one's group by others and thus preserving self-esteem. Therefore, the affirmation of one's ethnicity is likely to be stronger and more salient among groups which have faced greater discrimination. In fact, ethnic identity varies across ethnic groups in the United States. African Americans

generally show the strongest sense of affirmation and belonging to their group, followed by other ethnic minorities. European Americans consistently show lower salience and affirmation of their ethnicity. For racially distinct groups within the United States, ethnic identity is likely to remain salient as long as intergroup discrimination exists and European Americans predominate in positions of power.

Affirmation of one's ethnic identity is also generally assumed to be associated with positive self-evaluation with psychological well-being. Most measures of ethnic identity show consistent but low correlations with self-esteem, although some components, such as the positive evaluation of one's group, show a stronger correlation than others. Furthermore, the relationship between ethnic identity and attitudes toward self varies across ethnic groups and individuals. The relationship is likely to be stronger among individuals for whom ethnicity is highly salient, including members of most minority groups than among members of the majority group.

Social psychological research has examined the ways in which ethnic identity is negotiated at the individual level within the changing social contexts of both the ethnic group and the larger society. The various influences that individuals have been exposed to, together with the group's history and current social context, interact in complex ways to determine the expression of ethnicity, with individuals building on prior attitudes, understandings, and experiences to construct a way of being ethnic in each situation.

Ethnic identity varies in the short term over differing contexts, with strong ethnic feelings emerging in settings where ethnicity is highly salient, such as family gatherings or traditional celebrations, and receding in settings that deemphasize ethnicity. An unresolved question is whether ethnic identity is likely to be stronger or more salient for a very small subgroup within a setting, for example, a few minority students in a predominantly White school, or for a large group within a setting, such as a school that is predominantly Hispanic. In the former case, salience may result from minority status; in the latter, it may be an outcome of cultural dominance at the local level together with minority status as the societal level.

Acculturation and Cross-Cultural Approaches to Ethnic Identity

Acculturation has been described as the changes that occur when one cultural group comes into extended firsthand contact with another. Cross-cultural psychologists have explored the acculturation process of subgroups such as immigrants, refugees, indigenous peoples, and other minorities within a larger society. Early assimilationist views were based on the assumption

that as members of such groups became acculturated and identified increasingly as members of the new society, their identity as ethnic group members would decline. Acculturation was viewed as a linear process in which closer ties with the new culture inevitably meant the loss of ties to the culture of origin. However, conceptualizations by cross-cultural psychologist John Berry and others emphasize that acculturation includes two independent dimensions, involvement with both the ethnic culture and the larger society. By dichotomizing and crossing these two dimensions, one can define four possible types of acculturation: biculturalism (involvement both with cultures), assimilation (involvement only with the larger society), separation (involvement only with the ethnic culture), or marginalization (involvement with neither). [See also Acculturation; Cultural Disintegration; and Marginalization.]

These types of acculturation may differ with regard to behaviors, attitudes, and identification. Research with immigrants has generally shown that over subsequent generations, behaviors such as food, language, and customs change to resemble those of the host society. On the other hand, ethnic identification and the affective components of ethnic identity, including feelings of belonging and pride in one's ethnic group, can be extremely persistent, remaining strong over many generations even though traditional ethnic practices and knowledge about the group decline. This aspect of ethnic identity has been termed ethnic loyalty or symbolic ethnicity. Such loyalty can be the basis for a bicultural identity, in which one identifies both as ethnic and as part of the larger society. A variety of forms of bicultural identity have been defined by LaFromboise and others (1994).

Language is one of the most complicated behaviors associated with ethnicity. It is frequently used as the primary indicator of acculturation. Some writers, such as Howard Giles and his colleagues (1977), suggest that language proficiency and use are core components of one's ethnic identity, intimately tied to one's sense of self as a group member. Among immigrants, research suggests a strong link between ethnic identity and language retention. However, many ethnic group members maintain a strong self-identification with their group even though the use of an ethnic language has declined or disappeared.

Cross-cultural psychologists have also explored the cultural values held by different ethnic and cultural groups and the relationship of such values to ethnic identity. The most widely studied values are individualism and collectivism. Researchers have shown that collectivism, the subordination of the self to one's group, is correlated with ethnic identity, whereas individualism, the emphasis of individual over group goals, is not. Both collectivism and ethnic identity are higher

among ethnic minority groups than among European Americans.

Developmental Approaches

The study of ethnic identity by developmental psychologists has drawn from cognitive developmental theory, social identity theory, and the psychosocial theory of Erik Erikson (1968).

Cognitive developmental theory emphasizes the increasing cognitive competence of the child as a basis for understanding changes in ethnic identity with age. Frances Aboud (1987) has shown that young children typically learn their ethnic self-label between the ages of four and seven years, although the age varies with the particular group and contact with other groups. Around age eight to ten, following the learning of their ethnic group label, children develop an understanding of ethnic constancy (the fact that their ethnicity stays the same over time and in spite of superficial changes, such as clothing). They acquire knowledge about their ethnic culture through the process of enculturation as described by Martha Bernal and George Knight (1993).

Cognitive development influences the way in which children understand ethnicity. Young children understand it in literal and concrete terms, defined by food, customs, and often language. With increasing cognitive competence, children begin to develop a group consciousness and to understand ethnicity in terms of norms of behavior. Adolescents and adults are able to understand ethnicity in more abstract terms, as changing over time, and shaped by social and historical forces.

Children's feelings about their ethnicity are influenced from an early age by the family, community, and larger society. When families provide strong positive images of their ethnicity, children's early feelings about their ethnic group are likely to be positive. Warm, authoritative parenting contributes to children's affirmation of ethnicity. A vital ethnic community also provides a context in which individuals form a positive sense of their group. However, as social identity theory suggests, children are influenced as well by messages from the larger society. When negative messages become internalized, children may hold conflicting feelings about their ethnicity, including wanting to belong to another group. Confronting and dealing with such negative attitudes is part of the process of ethnic identity formation.

The psychosocial approach of Erik Erikson (1968) focuses on ego identity formation as a pivotal process of development that occurs primarily during adolescence. A stable sense of self is achieved through exploring and questioning attitudes and identifications in domains such as occupation, religion, and gender roles, and making commitments to roles and values that will

serve as a guide to the future. Marcia defined four identity statuses on the basis of the presence or absence of exploration and commitment, foreclosure, diffusion, moratorium, and identity achievement (see Marcia et al., 1993).

Using Erikson and Marcia as a basis, Phinney (1989) developed a stage model of ethnic identity formation that has parallels to models of racial identity and minority identity development. Prior to adolescence, the child is assumed to have a foreclosed ethnic identity, that is, an identity derived from others rather than personally examined. Depending on prior socialization, it may include positive or negative attitudes toward one's group. With the onset of adolescence, as part of the task of identity formation, most minority youth enter a moratorium or exploration phase. The experience of discrimination may also motivate ethnic exploration. Adolescents begin questioning previously accepted views of ethnicity and trying to understand the meaning of being a member of an ethnic group within a larger society, often by learning about the history and traditions of their group. Such attempts ideally lead to an achieved ethnic identity, characterized by clarity about oneself as ethnic. This sense of self is assumed to be a source of personal strength and positive self-evaluation. Reexamination of the meaning of ethnicity can continue throughout life, depending on one's experiences. A related process model has been developed for white identity by Helms (1990). Phinney's Multigroup Ethnic Identity Measure (1992) is a questionnaire that measures both cognitive components of ethnic identity (exploration) and affective components (affirmation and sense of belonging); it can be used with any ethnic group.

The process of ethnic exploration and commitment has implications for attitudes toward oneself and other ethnic groups, but the process varies depending on group membership. For minorities, a foreclosed ethnic identity may include a preference for the dominant majority group. For the dominant group, foreclosure may involve feelings of racial superiority and negative stereotypes of other groups. During the moratorium phase, minority adolescents are often intensely involved in their own group, and strong in-group attitudes may be associated with negative feelings toward other groups. For the dominant group, the moratorium leads to growing awareness of racism and of the privilege resulting from their position of dominance. With the commitment that defines an achieved ethnic identity comes a secure, confident, and stable sense of self as an ethnic group member and a realistic assessment of one's group in the larger context. A broader understanding of one's own and other groups is expected to lead to more positive and accepting views of all groups. However, historical evidence suggests that this process is thwarted when political, economic, and social forces

limit opportunities for individuals to express their identity as group members or to interact in positive ways with members of other groups.

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Jean S. Phinney

Racial Identity

Janet Helms, a prominent researcher of racial identity, describes racial identity as a sense of collective or group identity tied to one's perception that he or she is a member of a group that shares a cultural heritage (Helms, 1990). Two of the earliest research programs on racial identity were initiated in the 1930s. Ruth and Eugene Horowitz and, separately, Kenneth and Mamie Clark reported evidence that many African American children expressed a preference for White stimulus figures (e.g., dolls and photographs) over Black ones. Although Dr. Curtis Banks later demonstrated that true empirical evidence for White preference among African Americans was indeed lacking, these two research programs influenced the thinking even into the 1960s, possibly because the conclusions were so consistent with the pervasive theme of Black self-hatred prominent in the writings of social scientists during the same period.

The years between 1968 and 1975 have been described as the Black consciousness phase of the African American social movement. During this period, the study of racial identity progressed in a different direction. Social scientists (especially African American social scientists) became interested in strategies for differentiating intragroup differences among African Americans. At one end of the continuum, a growing cadre of African Americans were emerging who were, perhaps unfortunately, labeled as Black militants be-

cause they rejected the negative images of African Americans set forth by the larger society in favor of more positive self-definitions. These individuals also expressed a pride in their racial group membership. They stood in stark contrast to other African Americans who were viewed as more traditional because they believed they could improve their social position through integration and acceptance from the dominant society. Eventually the term *racial identity* was used to describe the extent or manner of identification with one's racial heritage and the sense of group identity with others who share a common racial heritage.

Years earlier, W. E. B. Du Bois had used the term *double consciousness* to describe the dynamics of being both American and of African descent. DuBois explained that African Americans had dual selves—both American and African—that, at times, could be antagonistic or inconsistent with each other. DuBois further proposed that each African American must determine how to combine these two selves in the identity process. Despite this common developmental task, it would be inaccurate to assume that every African American resolves this duality in the same manner. Rather, it is clear that considerable within-group variability still exists about what it means to be African American. Racial identity remains one way of understanding this variability.

The study of racial identity differs from the study of ethnic identity in at least one important respect. Many of the existing theories of ethnic identity are intentionally broad in order to explain the impact of culture and history on ethnic identity among various groups. However, despite common themes in identity development, the experiences of various racial and cultural groups are not identical. Rather, important ethnic group differences in the identity process are evident. Racial identity is used here primarily to describe the idiosyncratic experiences unique to African Americans as a result of the rich African heritage as well as the unique legacy of slavery, oppression, and colonialism.

Models of Racial Identity

Numerous models of racial identity have emerged. In *Black and White Racial Identity* (1990), Helms described eleven different models. Four alternative models are described below that illustrate the diversity in how racial identity is conceptualized. These four are the nigrescence models, African self-consciousness theory, optimal theory, and the multidimensional model of racial identity.

The French term, *nigrescence*, is used to describe the first set of models. Nigrescence type models developed by Thomas Parham, Janet Helms, William Cross, Jake Milliones, and others describe a developmental process that many African Americans undergo to rid themselves of negative images of "blackness" internalized

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via social interactions, the media, and other socialization experiences. Generally, the models suggest a progression from a way of thinking labeled by the theorists as "Negro" (a state in which the person has internalized the negative perceptions of the dominant society about blackness) to "black" (a state characterized by greater appreciation of one's racial group).

Janet Helms also points out that many of the various nigrescence models incorporate three separate identities when describing racial identity. These include personal identity (generic personality characteristics evident in all humans, such as self esteem, anxiety, and concern for others), reference group orientation (the degree to which one's own thoughts and behaviors are consistent with the values of a particular social group), and ascribed identity (affiliation with a particular racial group). Helms describes that, as an individual progresses toward a psychologically healthy racial identity, personal identity moves from negative to positive, and reference group orientation moves from a reliance on a White/Euro-American orientation to a Black, bicultural, and ultimately pluralistic reference group orientation. Ascribed identity moves from identifying with whites to identifying with Blacks or pan-Africans.

The stage model proposed by William Cross, Thomas Parham, and Janet Helms is a good example of the nigrescence models. In the first stage, preencounter, the individual, viewing the world from a white frame of reference, endorses a white normative standard and devalues his or her own blackness. Initially, these scholars proposed that an external negative event, such as a racist incident, triggers movement into the second stage, encounter. That event is assumed to be so powerful that it shatters the person's worldview and signals a need to change one's thinking about self and others of the same racial heritage. More recently, Thomas Parham has argued that a variety of encounter experiences could serve as a catalyst for recognizing the inadequacy of one's former frame of reference, including even a positive experience within the African American community. The third stage, immersion/emersion, is a period of transition or metamorphosis in which the person is consumed with replacing vestiges of the former Euro-American perspective with a new frame of reference more consistent with the emerging allegiance to one's own racial heritage. It is not uncommon for individuals in this stage to be quite involved in activities or organizations to improve the quality of life for African Americans. Individuals who progress to the fourth stage, Internalization, emerge from the state of withdrawal characteristic of the immersion/emersion stage to become less reactionary and psychologically more open. The enhanced self-confidence about blackness in the internalization stage enables the person to adopt a more pluralistic, nonracist worldview.

Thomas Parham and Janet Helms developed the Ra-

cial Identity Attitude Scale, which has preencounter, encounter, immersion/emersion, and internalization subscales. The design of the scale provides some additional information about their conceptualization of the racial identity process. Specifically, rather than assigning people to a single stage based on their responses, respondents receive scores on each of the subscales. This suggests that individuals may simultaneously possess attitudes associated with various stages. For example, even though an individual's worldview may be becoming more consistent with the internalization stage than some of the earlier stages, she or he may still display some attitudes in certain areas that are more consistent with encounter or immersion/emersion thinking.

Recently, Thomas Parham has proposed some revision of the theory. Specifically, he has proposed that (1) it is not inevitable that every African American starts at the *preencounter* stage, (2) that racial identity is a lifelong process and recycling through the stages is not uncommon, and (3) *internalization* may not be the only healthy resolution of racial identity.

Strengthening one's capacity for confronting the negative attitudes and experiences that African Americans encounter in the dominant culture is a major component of the nigrescence or stage models of racial identity. However, other perspectives of racial identity place less emphasis on interactions with the dominant society and focus more on the internalization of positive African philosophical beliefs and values. Kobi Kambon's social theory is an example of an African-centered approach to racial identity. The theory includes a biogenetic or predispositional component, African self-extension orientation, and a conscious expression of African spirit, African self-consciousness. African self-consciousness is particularly relevant for understanding racial identity because the level of African self-consciousness is assumed to be influenced by social-environmental forces. Four important values/behaviors are associated with the healthy expression of African self-consciousness. These include: (a) a recognition of oneself as African and an adoption of a worldview consistent with that membership, (b) a worldview that the survival of people of African descent is a high priority, (c) respect for and involvement in activities that perpetuate the survival of African life and cultural institutions, and (d) recognition of the need to resist any anti-African forces (e.g., oppression) that threaten the development and survival of African people. Other principles from African heritage are also components of the theory. These include communality, interdependence, corporate responsibility, and collective survival.

Optimal theory is a third theoretical approach to racial identity. Linda James Myers is the author of this theory. It is rooted in a conceptual system that dates back to the wisdom and traditions of ancient Africa

(Myers & Higgins, 1998). Individuals are assumed to differ in the extent to which they endorse two opposing worldviews with important value differences—optimal and suboptimal. An optimal worldview (more consistent with an African-centered philosophy) bases self-worth on internal factors, such as honesty, integrity, trustworthiness, and compassion. Great value is placed on the acquisition of peace, happiness, and positive interpersonal relationships.

A suboptimal worldview causes people to base their self-worth on external factors, such as material possessions and social standing. The more a person's inner beliefs are consistent with a suboptimal worldview, the greater the role that factors such as gender and race play in his or her self-perception because of the link between such factors and social standing.

The optimal and suboptimal worldviews also differ in how they perceive the spiritual to be connected to the material. An optimal worldview does not separate the spiritual from the material. However, a suboptimal worldview segments the material, sensory, and spiritual components of reality. Moreover, in a suboptimal system the material world is the basis for evaluating self-worth. Consequently, an optimal worldview is associated with a more favorable racial identity because the individual is less concerned with measuring up to the ideals of the dominant society that emphasize materialism and external characteristics.

Based on scientific evidence that human life began in Africa, Myers argues that all races can trace their ancestry to Africa. Therefore, this worldview is seen as applicable to all races. Moreover, even white males can be oppressed if they endorse a suboptimal worldview because they, too, are subject to the insecurity associated with the need to bolster self-worth through domination, control, and exploitation.

Optimal theory describes a sequence of seven phases that are somewhat similar to the identity development stages described above. The individual has no awareness of being in the first phase (Phase 0, infancy). During phases 1 (individuation), 2 (dissonance), and 3 (immersion), individuals move from a view of self that is passed down to them by their family through a period in which they explore aspects of the self that may be devalued by others and immerse themselves in the culture of the devalued group while rejecting the dominant group. During phases 4 (internalization), 5 (integration), and 6 (transformation), the individual gains acceptance of that part of the self that was previously devalued, begins to endorse a worldview that is based on positive values, connection to one's ancestors, and an enhanced spiritual awareness.

Robert Sellers and his colleagues proposed the most recent of the four models of racial identity—the Multidimensional Model of Racial Identity (MMRI). One unique feature of this model is the assertion that racial

identity has both situational and stable features. For example, this team demonstrated that race is more salient in certain social settings (e.g., when the individual is the only African American in a situation in which racial themes are present) than in more race-neutral situations (e.g., when everyone present is the same race or racial themes are relatively absent from the situation). The four dimensions of the MMRI model are salience (relevance of race during a particular situation), centrality (the extent to which race is an integral component of how one defines oneself), regard (affective judgment and evaluation of one's racial group), and ideology. According to the model, four alternative ideological philosophies are common among African Americans. These philosophies are nationalist, oppressed minority, assimilationist, and humanist.

Measures of Racial Identity

A number of paper-and-pencil measures of adult racial identity have emerged. The diversity among them is another indicator of the various ways that racial identity is conceptualized. Kathy Burlew, Shana Bellow, and Marilyn Lovett recently identified four types or categories of racial identity measures. These include: (1) identity formation, especially process measures, (2) cultural connectedness (e.g., a perception that one belongs to the same group as other African Americans and an endorsement of African American traditions and values), (3) multicultural experiences (attitudes, experiences, and perceptions regarding other groups, primarily Whites), and (4) multidimensional measures that include more than one of the other three types in the same scale.

The most appropriate manner of measuring racial identity in children is still an unresolved issue. Dolls or other figures were used in some of the earliest studies. This methodology was used in perhaps the most well-known, albeit dated, work on racial identity among children—the doll studies by Kenneth and Marie Clark. In these studies, a child was presented with both a Black and a White doll. The experimenter asked the child to respond to a series of questions by selecting the doll they preferred. For example, the child was told: "Give me the doll that is a nice doll," or "Give me the doll that is a nice color." Later, the Clarks designed a coloring test. Children supposedly indicated their racial preference by how they responded to instructions to color a boy or girl as "you would like little boys (or girls) to be."

The Horowitzes used photographs of African American and White children in something they called the Show Me Test. Children were asked to select the child that they preferred as a companion for a variety of situations. Some of the situations were: "Show me all those you want to come to your party," or "Show me all those you like." These types of measures have re-

ceived considerable criticism by those who question whether children's responses to these items are a true indication of their attitudes about their race. Consequently, the measures are seldom used today. However, findings by Darlene and Derek Hopson and Sharon-ann Gopaul-McNicol based on the doll test received national attention when the studies were presented at the Convention of the American Psychological Association as recently as 1987.

The Preschool Racial Attitude Measure was first developed by John E. Williams and Roberson in 1968 and revised in 1975. Here, African American children are presented with stories and asked to decide whether the picture of either the light (supposedly White) or the dark (supposedly African American) child best fits the story. Some of the stories portray the character in a positive manner and others portray the character in a negative manner. African American children are presumed to demonstrate more positive racial identity by either selecting the African American picture for positive stories or failing to select the African American child for negative stories.

Recently, several scholars have developed paper-and-pencil measures for children. Faye Belgrave has developed both the Afrocentric Values and the Racial Identity scales. Also, Maxine Clark developed the Children's Racial Attitude and Preference Test.

The Impact of Racial Identity

Many view a strong racial identity as an undesirable characteristic. This may be due in part to the fact that they may have been introduced to the term *racial identity* by social scientists trying to explain what some thought was a separatist or militant ideology. However, empirical research has revealed that racial identity has numerous positive consequences for African Americans, including less vulnerability to maladjustment, less psychological distress, greater levels of self-actualization, less alcohol consumption, more antidrug attitudes, and greater levels of marital satisfaction. Moreover, the evidence is mounting that racial identity has implications for counseling and therapy. For example, Thomas Parham and Janet Helms have demonstrated that individuals high in preencounter attitudes prefer a White therapist; those high in either encounter or immersion/emersion attitudes prefer an African American therapist; and the race of the therapist is not as important to those with high internalization attitudes.

The strong evidence that racial identity has positive benefits for development has prompted many parents to be concerned with the development of a positive racial identity in their children. There are signs of racial awareness in African American children as early as age three. Moreover, other evidence suggests that some children become aware of the positive and negative images ascribed to their race at a young age as well. Dar-

lene Powell-Hopson and Derek Hopson demonstrated the efficacy of interventions designed to counteract the negative stereotypes sometimes associated with African Americans. These results reinforce the importance of racial socialization in the home and the community.

Racial socialization refers to the activities of parents and the community to influence the attitudes of their children about race. Some common socialization activities include exposure to African American achievers, Black history, and Black cultural values (e.g., religious practices, customs, and strong extended family ties). A growing number of African American families are aware of or participate in a Kwanzaa celebration developed by Dr. Maulana Karenga to reinforce ties to strong African-based cultural values. Also, rites-of-passage programs that prepare adolescents for adulthood are available in many communities.

Many assume that racial identity would have little salience for Whites. Indeed, the emphasis of racial identity theories has been on explaining the African American experience. Nevertheless, in *Black and White Racial Identity*, Janet Helms argues that Whites undergo a process of racial identity as well. A major task in the process of White racial identity is to develop a healthy identity about what it means to be White that is not grounded in social notions of racial superiority.

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Ann Kathleen Burlew

ETHNOCENTRISM suggests a belief that one's group is dominant and represents the standard against which all others are judged. It signifies the supremacy of one's own people and their ways of doing things. The phrase suggests an overestimated preference for one's own group and concomitant undervalued assessment or aversion of other groups (Cornell & Hartmann, 1998; LeVine & Campbell, 1972). The term describes a particular phenomenon, promotes a theory of attitude development, and introduces links with several important social psychological constructs. Ethnocentrism suggests that negative attitudes toward others originates from a need to preserve positive self-judgments by projecting one's own negative traits on to others. It is unclear whether or not fervent liking for one's own group is consistently associated with a firm disdain of other groups. Ethnocentrism represents a common aspect of ethnic identity but is seen as less virulent than is the view of inherent, biologically based inferiority and superiority that is generally attached to racism. It has been suggested that the difference between usage of ethnicity and race in the social sciences has to do with the observation that ethnicity denotes less the implication of some essential and unchangeable difference (Cornell & Hartmann, 1998).

The role of ethnocentrism in the life of ethnic groups incorporates both social and psychological functions and is inseparably related to the distinctive strategies of adaptive processes when in contact with other groups. Ethnocentrism is a phenomenon present among every ethnic group and has long attracted the attention of social scientists interested in the interaction and mutual influence among ethnic groups. As an aspect of the person's self concept, social identity is derived from membership in a group together with the value and emotional importance attached to it. The term *ethnocentrism* describes a particular phenomenon that is inherently linked to the formation of attitudes. It is closely associated with an individual's thinking concerning one's group of origin and reference group membership. The conceptualization of ethnocentrism suggests that negative attitudes toward other groups arise from a need to maintain and protect self-esteem by projecting one's own unflattering characteristics on to others. Accordingly, ethnocentrism spawns a particular ethnic identity or orientation to one's reference group and assumed quality of self-esteem. Basic theory

about normal development and available empirical data, however, suggest significant variations in one's orientation to reference group membership as a function of developmental status (that is, being a young child, adolescent, or adult).

Developmental Perspectives and Ethnocentrism

The expression and experience of ethnocentrism varies in significant ways as a function of developmental status. Young children learn about their social environment, and develop a sense of self and reference group orientation. Ethnocentrism has been linked to several constructs of importance for one's reference group orientation (for example, race consciousness, race awareness, racial and ethnic attitudes, and racial preference). Racial awareness has been documented in the literature for over half a century and has been observed for children as young as 3 years (Clark & Clark, 1939; Horowitz, 1939). Although the published studies did not consider the unique developmental status in the thinking of young children, much of the work, nevertheless, was ecologically sensitive in its demonstration of the link between children's racial identity and the character of the social context particularly for children of color.

The acquisition of attitudes has been described as an identificatory process discernible in children as early as 2 years of age since young children have a tendency to imitate their parents (for example, adoption of parental roles). In the later preschool years, the roles become incorporated into children's own value systems and perceptual ideals. Empirical findings demonstrate that normative cognitive development and broadening social experiences are involved in the more general development of ethnocentrism expressed as one's reference group orientation. More recent developmental research findings suggest that the patterns of reference group orientation and ethnic identity are expressions of ethnocentrism when considered for young preschool children, middle childhood youth (that is, 6- to 12-year-olds), and adolescents. They are different from the mature and differentiated attitudes, preferences, values and beliefs expressed by adults. The implications of developmental stage for the interpretation of constructs associated with ethnocentrism have been extensively reviewed (Spencer 1985; Spencer & Markstrom-Adams, 1990; Swanson, 1994). In sum, a developmentally sensitive interpretation of children's reference group orientation findings (for example, race awareness, racial attitudes, race consciousness, racial preference) suggest that young children generally may demonstrate White (European) oriented or Eurocentric valuing beliefs. A lack of Afrocentered values for African American youth, however, does not necessarily mean own-group rejection or self-hatred. A developmental interpretation suggests that social cognitive abilities and developmental status

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about normal development and available empirical data, however, suggest significant variations in one's orientation to reference group membership as a function of developmental status (that is, being a young child, adolescent, or adult).

Developmental Perspectives and Ethnocentrism

The expression and experience of ethnocentrism varies in significant ways as a function of developmental status. Young children learn about their social environment, and develop a sense of self and reference group orientation. Ethnocentrism has been linked to several constructs of importance for one's reference group orientation (for example, race consciousness, race awareness, racial and ethnic attitudes, and racial preference). Racial awareness has been documented in the literature for over half a century and has been observed for children as young as 3 years (Clark & Clark, 1939; Horowitz, 1939). Although the published studies did not consider the unique developmental status in the thinking of young children, much of the work, nevertheless, was ecologically sensitive in its demonstration of the link between children's racial identity and the character of the social context particularly for children of color.

The acquisition of attitudes has been described as an identificatory process discernible in children as early as 2 years of age since young children have a tendency to imitate their parents (for example, adoption of parental roles). In the later preschool years, the roles become incorporated into children's own value systems and perceptual ideals. Empirical findings demonstrate that normative cognitive development and broadening social experiences are involved in the more general development of ethnocentrism expressed as one's reference group orientation. More recent developmental research findings suggest that the patterns of reference group orientation and ethnic identity are expressions of ethnocentrism when considered for young preschool children, middle childhood youth (that is, 6- to 12-year-olds), and adolescents. They are different from the mature and differentiated attitudes, preferences, values and beliefs expressed by adults. The implications of developmental stage for the interpretation of constructs associated with ethnocentrism have been extensively reviewed (Spencer 1985; Spencer & Markstrom-Adams, 1990; Swanson, 1994). In sum, a developmentally sensitive interpretation of children's reference group orientation findings (for example, race awareness, racial attitudes, race consciousness, racial preference) suggest that young children generally may demonstrate White (European) oriented or Eurocentric valuing beliefs. A lack of Afrocentered values for African American youth, however, does not necessarily mean own-group rejection or self-hatred. A developmental interpretation suggests that social cognitive abilities and developmental status

may impact reference group orientation and children's awareness of society's evaluative judgments concerning in-groups and out-groups. It does not mean necessarily that the out-group has internalized the negative perceptions of the group's status into one's own self-evaluative judgments. Instead, information gleaned from the social context may represent a young child's increasing knowledge of social stereotypes. For young "out-group" children, the level of normal cognitive egocentrism may protect the psyche from internalizing negative values concerning the self which are associated with societal ethnocentrism. In sum, young children's own level of cognitive egocentrism prevents the exposure to ethnocentrism and opposing value systems from resulting in cognitive dissonance and psychological discomfort (Spencer, 1985; Spencer & Markstrom-Adams, 1990; Swanson, 1994). However, there are important changes with the transition into middle childhood or the latency years. Data indicate a shift from extreme Eurocentric responses to neutral or Afrocentric response patterns for African American youngsters (Spencer, 1982; Spencer & Markstrom-Adams, 1990). Developmental theorizing suggests an important role of social cognition (Alejandro-Wright, 1985; Semaj, 1985; Spencer & Markstrom-Adams, 1990) and parenting. The broadening role of social context for more general ethnocentrism is evident in adolescence: racial socialization matters (Stevenson, 1995).

The most fundamental psychological developmental task of adolescence is achieving a sense of identity. The development of a clear sense of self stems from several sources given the broadening contexts of adolescent socialization and development. These sources include social identities based on gender, class, and ethnic group membership. Ethnic group membership and ethnic identity themes are important in societies that are heterogeneous in composition and have a history of significant intergroup tensions (for example, the experiences of Native Americans and African Americans in nineteenth- and twentieth-century America). Parental involvement in the racial socialization of its children varies significantly and has important implications for ethnocentrism (Swanson, 1994). Adolescents are vulnerable since all aspects of social identity processes undergo abrupt revisions during the unavoidable and rapid physical, physiological processes and psychological changes. What is known is that ethnic identity becomes increasingly ethnocentric during the adolescent and young adult years.

Empirical Approaches to Ethnocentrism

A major focus of ethnocentrism has been with adult subjects considered within limiting contexts (for example, college-age students). However, the outcomes and underlying theoretical assumptions have often been applied to the experiences of children. Accordingly, nor-

mative developmental processes were seldom considered and integrated into the conduct of research; young children's ethnic and racial attitudes were assessed and findings interpreted from an adult perspective.

Identity is frequently confused with ethnicity. Most early studies singularly assessed children's racial attitudes and preferences without a concomitant assessment of self concept (Spencer 1985, 1988; Spencer & Markstrom-Adams, 1990). In addition, efforts to understand normative developmental processes in contexts imbued with negative imagery were often based upon faulty assumptions about deficit family contexts in which minority youths were reared. Thus, early ethnocentric literature utilized a deficit and deficiency orientation for explaining minority youth behavioral patterns. There continues to be an inattention to cultural biases and social stereotyping about minority status that results in a lack of critical attention to societal context as a risk factor and source of chronic life course stress for visible minorities. Ecological context analyses and the more recent phenomenological variant of ecological systems theory (Spencer, 1995) provide alternative conceptual interpretations of ethnocentrism studies.

Contemporary "whiteness studies," have begun to theorize about the impact of ethnocentrism on the psychological well-being and identity processes of Whites. Traditionally, the literature has always assumed minority psychopathology and problem outcomes, on the one hand; Whites' or majority group members' psychological status and assumed health were considered the standard. The recent burgeoning of "White identity" theorizing and research efforts, however, suggest new speculations about White privilege, psychopathology, and vulnerability (Fine, Weiss, Powell, & Wong, 1997; Helms, 1990).

Conclusions

The internal factors that support ethnocentrism are linked to contextual factors, developmental status, economic and social variables, gender- and sex-role expectations and stereotypes. These internalized attributes are often regarded as social-perceptual coping strategies that may help group members maintain positive group identity in the process of functioning with other, particularly dominant, group members. These strategies, while perhaps protective for minority group members functioning in a larger and dominant culture, do not account for the role of ethnocentrism among majority group members that often exacerbate perceptions of privilege and power in intergroup interactions.

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Margaret Beale Spencer and Dena Phillips Swanson

ETHNOCULTURAL PSYCHOTHERAPY refers to psychotherapy that is intended to enhance therapeutic effectiveness by responding to and incorporating pertinent elements of the client's ethnic and cultural back-

ground. This responsiveness may include awareness of the cultural values and experiential background of clients and the development of intervention strategies that are effective, given their background. The assumptions of ethnocultural psychotherapy are that culture has a profound effect on attitudes, emotions, and behaviors and that failure to consider culture can be an impediment to effective treatment. Related concepts include multicultural therapy and culturally competent psychotherapy.

History

Because the United States has many distinct ethnic and cultural groups, ethnocultural psychotherapy was largely developed in the United States. For a number of decades, the practice of Western psychotherapies in the United States has been criticized for being culturally biased and ineffective with clients with non-Western backgrounds or cultures. While few rigorous studies have examined the outcome of psychotherapy with members of different ethnic groups, the available evidence suggests that ethnic minority clients tend to prematurely terminate treatment or fail to show the positive treatment outcomes often found among mainstream clients. Therapists who encounter clients from different cultures may not understand the meaning of the client's behaviors and symptoms and may have a more difficult time establishing rapport, credibility, and a therapeutic alliance. Western treatment practices may also be at variance with the cultural patterns of clients. Thus, psychotherapeutic treatments developed for clients in one culture may be less effective with clients from different cultures. For example, Western psychotherapies often focus on the person and attempt to promote the growth, independence, and individuation of the person. Clients from non-Western cultures, such as the Chinese, may find the treatment emphasis on independence and individuation as being inappropriate because they come from more collectivistic societies that encourage interdependence rather than independence. It should be noted that members of a particular ethnic group may not share all of the same cultural values. Individual differences are important to consider in ethnocultural psychotherapy because the intent of the therapy is to respond to the cultural values of the particular client.

Another ethnocultural consideration is the experiences of the different groups in a multicultural society. Most societies have many different cultural groups, such as the African Americans, Asian Americans, Latinos, Native Americans, as well as mainstream European Americans in the United States. All of the groups vary not only in cultural backgrounds and histories, but also in patterns of intergroup relations. Some groups have been subjected to racism, prejudice, and discrimination. Given this history, therapists and clients

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from different cultures may have stereotypes, prejudices, and misinformation about each other. In psychodynamic terms, transference on the part of clients and countertransference on the part of therapists may occur because of the history of intergroup relations. Ethnocultural therapy must therefore take into account possible transference and countertransference phenomena due to intergroup relations as well as cultural differences between therapists and clients.

Ethnocultural therapy does not assume that all clients need to have totally different kinds of treatment depending on their cultures. Some tactics in treatment may work well with clients regardless of culture, and more research needs to be devoted to the therapeutic conditions that promote favorable treatment outcomes regardless of culture and those that have culture-specific effects. However, the more frequent problem in therapy is the application of treatment without due consideration of the cultural or experiential backgrounds of clients.

In one sense, all therapies are ethnocultural in that they are developed in a particular cultural setting and are likely to be culturally compatible with clients from that setting. Problems occur when the client's cultural background differs markedly from the cultural orientation of the treatment.

Ethnocultural Therapy

There is no single method in ethnocultural therapy because the precise treatment method may depend on the particular culture of the client and the theoretical orientation of the therapist. Moreover, clients within an ethnic group may exhibit considerable individual differences. Many advocates of ethnocultural psychotherapy focus on the processes rather than the methods involved in the treatment. Three processes have been popularly discussed, namely, therapist attitudes and beliefs, knowledge, and skills (D. Sue, Ivey, & Pedersen, 1996).

Therapists should be aware of their own culture and cultural biases toward their clients that may occur. They should also be knowledgeable about the culture of their clients and the sociopolitical influences that impinge on the lives of their clients. For example, knowledge of how clients conceptualize their mental health problems, goals for treatment, and preferred means for solving problems is important to ascertain. The knowledge can be acquired in many ways: immersion in the culture of the client, learning through readings, exposure to and consultation with experts in the culture. Finally, therapists should realize that helping styles may be culturally limited and use those techniques that are culturally consistent with their clients. In this way rapport, communication, and therapeutic alliance between therapists and clients can be facilitated.

Because ethnocultural therapy is process oriented,

therapists may use a variety of psychotherapeutic orientations and modify them to be more culturally responsive or use new, non-Western tactics with their clients. This does not imply that therapists need to simply employ cultural interventions that are used in the clients' cultures. For example, a client who comes from a culture that uses spiritual healing does not necessarily mean that the therapist should use such techniques. Therapists should decide on how to treat clients based on, among other considerations, a working knowledge of their own and their clients' cultures. The important point is the use of treatment strategies that are effective, which necessarily involves consideration of the cultural background of clients.

Little rigorous outcome research has been conducted on the effects of ethnocultural psychotherapy. As previously mentioned, there is no single method used in therapy. Available research suggests that interventions that consider cultural factors promote better treatment outcomes than those that do not (S. Sue, Zane, & Young, 1994).

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Stanley Sue

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Historically, ethnography grew out of an already established genre, the accounts of exotic peoples written by travelers, missionaries, and colonial officials. Continuing in this vein, early-twentieth-century field-workers in anthropology often romanticized the cultural setting and—to use a current term—emphasized its “otherness.” Many of the early efforts were somewhat unstructured, but as the discipline of anthropology became professionalized in the second quarter of the century, the ways of describing cultures came to be relatively standardized. During this classical phase, descriptions were frequently organized around a set of macro-categories classifiable as the techno-economic sphere (relation of humans to nature), the social-organizational (relation of humans to each other), and the magico-religious or ideational (relation of humans to the expressive world). (Most textbooks in anthropology continue to organize their substantive materials along these lines.) Beginning in the 1950s and 1960s, however, ethnographers began focusing on a “problem orientation,” in which their investigations were confined primarily to specific elements of the sociocultural system, and they often accorded to those elements a much more detailed scrutiny and analysis than had the writers of the classical phase. In recent years, as the more specific studies have continued, ethnographers have also turned to the urban-industrial world and the investigation of special-interest groups such as tourists, occupational specialists such as psychiatrists, and social deviants such as narcotic addicts. In all approaches, the common thread has been the reliance on fieldwork, that is, on close and direct contact with the people under study.

For each of the delineated phases, there are definable strengths and weaknesses. In the early period, prior

to the advent of worldwide culture contact and the inevitable losses of tradition it entailed, researchers could still capture and portray many of the customs most different from Western norms. But in gathering information almost solely by means of the informal technique of participant observation, these early ethnographers were susceptible to a “romantic bias,” a tendency to exaggerate positive characteristics and downplay negative traits (Rohner, DeWalt, & Ness, 1973). A corrective to the bias, through the use of cross-validating methods, was seldom employed or even envisioned in the years when ethnography was a new field of inquiry. Subsequently, in the classical era, the trend toward standardization in ethnographic description was facilitated by more self-conscious efforts to provide documentation in the form of censuses and genealogies, property schedules, and maps and house plans. With standardization came greater ease of cross-cultural comparison, for it assumed the existence of transcultural categories (technological, social-structural, magico-religious, and so on) that were to some degree commensurable. But as to any conception that the great ethnographies were complete and fully accurate, both critical reflection and the results of follow-up research pointed to the problematic character of the fieldwork process, and prompted general acknowledgment of the partial and fallible nature of all ethnographic undertakings.

Some of the specialized investigations that followed the classical phase did produce exhaustive and systematic descriptive materials on narrow sociocultural topics, while others made use of new techniques and instruments to generate types of data previously unavailable cross-culturally. In more recent years a number of investigators, attempting to apprehend epistemological issues surrounding the ethnographic enterprise, have turned to a “hermeneutic” or interpretive approach. Pioneered by Clifford Geertz (1973), this approach, termed “thick description,” emphasizes the necessity of contextualizing events in the process of building understanding. Relying on both local social discourse and his or her own intimate knowledge of the setting, the ethnographer eventually arrives at a description of the totality of “meanings” of people's lives, their behavior, and institutions.

A related development has focused on the writing of ethnography and on the recognition that the authorial presentation of “facts” is shaped by the generic conventions of ethnographic writing. This movement has led to a critique of the ethnographic monograph as a semiliterary rather than scientific product, and to various forms of experimental writing that attempt to incorporate more nearly authentic representations of the ethnographic scene. The contract between these latter approaches and the positivist program in behavioral science is marked. Nevertheless, all of the genres in the

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modern era can and do produce penetrating and informative monographs on a multitude of topics.

The Human Relations Area Files and Ethnographic Codes

A valuable sampling from the ethnographic record can be found in the Human Relations Area Files (HRAF), an archive consisting of reproductions of the texts on almost 400 societies (of more than 2,000 in the world), with the information on each distributed into more than 700 topical categories constructed to cover the range of sociocultural phenomena (e.g., blood feuding, child training, cremation, elopement, kinsnip, malnutrition, monotheism, political movements, recreation, spinsters, subsistence, and transvestism). Altogether, almost one million pages of ethnography have been processed for the HRAF through its standardized classification system. This indexed system, available on paper slips, microfilm, and/or electronic files in over 300 educational and research institutions, makes possible cross-cultural surveys of the information on a given topic, or rapid inspection of the information on specific societies, geographical areas, and social types (for example, hunter-gatherers, agriculturalists, and peasants). Additionally, the HRAF's archive facilitates the testing of hypotheses about the relationships among sociocultural variables, some with psychological implications (for example, whether unpredictability of resources is associated with frequency of warfare).

Although many of the most extreme customs described in the literature can no longer be studied in vivo because they are now culturally extinct, their established existence at particular times and places is indicative of the various "strong treatments" to which people are capable of subjecting themselves, treatments that for ethical reasons cannot be experimentally imposed on individuals. But such cultural loss reminds us that the rapid and unrelenting cultural change in much of the world over the past century means that any cultural description would necessarily hold only for the specific spatiotemporal nexus it was reported to occupy, and that contemporary conditions may be far different. For example, a group like the !Kung Bushmen of the Kalahari Desert, who as a result of anthropological study in the 1960s became emblematic of the foraging way of life, had by the 1990s been drawn increasingly into the cash economy and become smallholders who made a living by herding, farming, craft production, and some hunting and gathering. The continuance of some foraging by the !Kung typifies the way in which sociocultural change tends to be partial and demonstrates how earlier descriptive materials, while requiring updating and checking, can remain applicable.

In addition to the systematized textual reproduction with which the HRAF is involved, another major effort has been the attempt to codify cultural characteristics

of a large world sample of societies. The most ambitious undertaking is the *Ethnographic Atlas* of George P. Murdock (1967), which presents coded data on more than 1,000 societies. Among the variables included in the atlas are family organization (extended and nuclear), kin-group types (patrilineal and matrilineal), settlement patterns (bands, villages), norms of premarital sexual behavior, and games. Codes on other cultural attributes have also been developed (especially for a carefully chosen world sample of 186 societies), for example, for adolescence, child-training practices, the status of women, and theories of illness. (The periodical *Ethnology* published numerous codes between 1962 and 1984, and *Cross-Cultural Research* [before 1993, *Behavior Science Research*] continues to do so.) Research based on these codes has produced many outcomes with implications for psychological inquiry, for example, Alice Schlegel and Herbert Barry III's finding (1991) that adolescence is not a special life stage confined to preadults in the Western world, but rather that it is a constant in the human life cycle.

Methodology and Measurement

Methodology is among the concerns of a relatively small minority of sociocultural anthropologists, but these researchers have worked to raise the standards of ethnographic data-gathering. One periodical, the journal *Field Methods* (formerly *Cultural Anthropology Methods*), contains useful methodological contributions, including discussions of text-management programs for handling field notes, integration of textual and statistical methods, computer simulation of ethnographic analyses, and computer-readable orthographies and fonts for the alphabets of a variety of languages. For some types of structured data collection, a few ethnographers have begun to use pocket-sized microcomputers in directly recording information and even the training of informants for direct data entry.

Attention has been devoted to the development of techniques for systematic behavioral observations in naturalistic settings. Most are variants of those used in psychological research, but with modifications appropriate to fieldwork conditions. Adequate interobserver reliability has been achieved for some formats among all types of techniques. The subject matter has ranged from daily activities (child care, housekeeping, recreation, subsistence) to social behavior (aggression, nurturance) to direction of gazing (at males, females, adults, children). To cite a single finding, in *Intimate Fathers* (1991), Barry S. Hewlett showed that Aka Pygmy fathers spend 47% of their day holding or within arm's reach of their infants. The level of paternal care by the Aka far exceeds that reported for any other society.

A continuing comparative project, focused on estimates of time use, has thus far published information

systematically gathered and coded on 13 societies (Johnson & Johnson, 1987). Each individual study presents data (on disk) both in their original format, as coded by the field investigator, and in a standardized format that readily allows cross-cultural comparisons. Accompanying each data set is a standard set of supporting information, including background cultural data (on economic organization, social structure, etc.).

A model of "culture as consensus," introduced by A. Kimball Romney, Susan C. Weller, and William H. Batchelder (1986), is based on the theoretical idea of culture as shared knowledge and meaning systems. The procedure, which enables the assessment of cultural statements with small numbers of individuals, measures patterns of agreement and is a form of reliability theory wherein the universe is one of subjects (rather than of items), and data are coded as given (rather than as correct or incorrect). Subjects provide responses to a series of questions, and from these data one is able not only to estimate how much each individual knows but also to arrive at a composite picture of what, collectively, the subjects "know." In this way one arrives at a set of precisely measured cultural statements and also an assessment of the degree of correspondence between any given individual's knowledge and the collective cultural knowledge.

These recent contributions promise to improve the quality of the ethnographic record in its continuing cumulation. Ethnography takes on added importance for psychology at the opening of the twenty-first century as the flow of peoples across geographic and political boundaries increases and new ethnic enclaves and cultural forms appear almost everywhere.

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cultural and ethnic groups—their origins, values, patterns of thinking, styles of communication, customs and behaviors, and related topics. Among its goals are the development of cross-cultural awareness, cultural sensitivity, and a methodology for the effective teaching of these interrelated issues. It draws heavily on concepts and research associated with cross-cultural psychology, cultural and social anthropology, and sociology.

Development of the Concept

Ethnopedagogy is a new term, not previously defined in the literature. However, it encompasses a variety of activities formerly and currently addressed in various ways by the disciplines mentioned above. Its origins can be found in a number of complementary terms, including the two from which it is formed: ethnology (the description and study of similarities and differences within and between cultural or ethnic groups) and pedagogy (the art or science of teaching). In general, it refers to the application of knowledge to the teaching of culture and ethnicity.

Areas of Interest and Application

In practice, ethnopedagogy and the techniques associated with it can be applied to a broad range of subject areas. These include the teaching of courses such as cross-cultural psychology, cultural anthropology, society and culture, cross-cultural human development, and others in which culture, ethnicity, and diversity are a major focus.

Other rapidly growing areas of interest include cross-cultural and diversity training for individuals planning to study or work in other cultures, students involved in international exchange programs, counseling and clinical programs preparing professionals to interact with clients of diverse cultural backgrounds, and employees working for multinational corporations or in culturally diverse workplaces.

Teaching Strategies and Methodologies

The way in which culture, ethnicity, and diversity are taught will vary depending, in part, on one's familiarity with and understanding of cultural similarities and differences, the availability of materials and teaching resources, the context in which the teaching and learning occurs, and the background and needs of those being taught. Therefore, what follows is not meant to be an all-inclusive inventory of teaching strategies and methodologies. Instead, it consists largely of techniques found by the author to have been particularly effective in his own teaching of culture, ethnicity, and diversity in a variety of circumstances over a period of nearly three decades.

Simulation Games. Experience has shown that ac-

tive participation by learners in real-life situations results in the greater understanding of cultural and ethnic concepts. Simulation games like *Barnga*, in which participants experience the effects of cross-cultural interaction, culture shock, and lack of common communication patterns is particularly effective (available from Intercultural Press, Yarmouth, ME). Other simulations include *BaFá BaFá*, with its focus on misperceptions of the intercultural experience (available from Simulation Training Systems, Del Mar, CA), *Ecotonos*, which analyzes and compares decision-making in monocultural and multicultural groups (available from Intercultural Press, Yarmouth, ME).

Films and Videos. Carefully selected educational films and popular videos can be an effective method for providing interesting and often insightful adventures into all aspects of culture, including the portrayal of stereotypes (followed by discussions of how they are learned and how they can be unlearned), cultural differences in verbal and nonverbal patterns of communication, and issues related to discrimination, ethnocentrism, acculturation, and other relevant topics. A valuable resource providing advice on finding, selecting, and effectively using video and film materials in teaching about culture, diversity, and ethnicity is Ellen Summerfield's *Crossing Cultures Through Film* (1993). Some examples of films include *Becoming American*, *A Class Divided*, *City of Joy*, *Dim Sum*, *Iron and Silk*, *The Joy Luck Club*, *Valuing Diversity*, and *Zorba the Greek*.

Student Panels. In academic settings, cultural issues and topics presented by students, faculty visitors to the classroom professionals in business, medicine, and other areas generally provoke great interest and discussion. For example, a panel might consist of international students from campus comparing and contrasting their views on child rearing, family life, dating and marriage customs, and educational experiences in their home cultures and their host culture, as well as difficulties in adapting to a new culture. Another panel might be made up of local students who have completed a study abroad program and offer their insights into living and studying in another culture.

Exercises and Activities. Cultural awareness and the understanding of similarities and differences in ethnicity and diversity can be enhanced by the use of a wide range of creative exercises and activities (see the bibliography for several suggested resources). Other pedagogical approaches include having individuals spend some time tutoring minorities (Native Americans, Southeast Asians, recent European immigrants), discussing cultural topics with e-mail "pals" in other countries (see Gardiner's article in *Cross-Cultural Psychology Bulletin*), completing take-home exams that involve Internet assignments such as "cyber field trips" and "cultural scavenger hunts" (see chapter by Gardi-

ner in *Teaching About Culture, Ethnicity, and Diversity*, by Singelis), preparation of research papers and presentations (adolescent rites of passages, cultural differences in birth practices, bicultural families, culture, and elder care), and a "Cross-Cultural Food Day," to which participants bring a food associated with a particular ethnic group (often their own), discuss its preparation and role in the culture, and share with others in the group.

One final suggestion for integrating a variety of ethnopedagogical models into the classroom is to team-teach courses with those individuals in related disciplines who also deal with cultural topics, such as teachers of foreign languages, English as a Second Language, and intercultural communication.

Concluding Comments

Although use of the term *ethnopedagogy* is new to the literature, attempts to teach about culture, ethnicity, and diversity are not. As the world becomes increasingly multicultural, issues related to these topics will become even more important, as will the need for integrated approaches to learning and understanding about the role culture plays in the everyday lives of individuals throughout the world.

[See also Multicultural Education.]

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considering the critique and its aftermath, however, we must outline the essential elements of the theoretical approach presented by Lorenz and Tinbergen.

The Four Questions

Ethologists have emphasized the breadth of their approach by discussing four types of questions that have to be answered before a particular bit of behavior is truly understood. We might illustrate this by referring to Lorenz's studies of imprinting, the process through which a young animal (in his studies, a bird) learns to recognize its mother and to demonstrate appropriate attachment.

The first question has to do with immediate causation—that is, how do the state of the organism and the features of its environment result in the emergence of a particular pattern of behavior? For example, in the case of imprinting, ethologists have devoted many experimental hours to defining the “optimal” sensory characteristics of the imprinting stimulus. The second question concerns development. Other studies have been devoted to determining the precise age in the young bird's life at which imprinting is likely to occur and to recognizing the point at which a limiting age is reached—that is, an age at which imprinting on a parental figure is unlikely to occur even in the presence of an optimal stimulus. The third question involves function—in our illustrative case, what are the functional consequences of the young bird imprinting on a maternal figure? This might be answered by demonstrating the protection provided to the young bird as the result of maintaining close proximity to its parent. The bird at this early age might also be learning the characteristics of its species in a manner that will ensure selection of an appropriate mating partner during adult life. Fourth, there is the question of behavioral evolution: What was the evolutionary route that resulted in the appearance of imprinting in this particular species? Is it found in all other species in this genus or family, suggesting the presence of the characteristic in a common ancestor? These evolutionary questions are frequently the most difficult to answer, because the process occurred during remote periods of time and cannot be studied directly.

Core Concepts and a Research Strategy

As for all animal behaviorists, the starting point for classical ethologists involves the accurate description of behavior. Here, Lorenz drew on a distinction that had been introduced by the American zoologist C. O. Whitman and divided behavior into two categories. The term *appetitive behavior* was employed to describe the components of behavior that varied within an animal from day to day and between animals of the same species in identical situations, for example, when animals searching for food took different routes in the same environ-

ment. However, stereotypic aspects of behavior, particularly the terminal elements in a sequence of motivated behavior, were termed *consummatory behaviors*. These constant components of behavior, demonstrated by all members of a species when conditions were appropriate, were designated as *fixed action patterns* (FAPs).

Darwin's studies of facial expression in his classic work *The Expression of the Emotions in Man and Animals* (London, 1872) are a prime example of this critical step in behavioral analysis. Following Darwin's lead, Lorenz argued that behavioral FAPs as indicators of evolutionary heritage were as reliable as the structure of the hand or forepaw. Given Lorenz's interest in using behavior for phyletic reconstruction, mapping the FAPs of a species (or of a domain of behavior such as courtship in a particular species) became the first step in the study of behavior.

Next in the ethological analytic strategy was the experimental determination of the critical stimuli responsible for eliciting or releasing FAPs. For example, using captive graylag geese and artificial eggs of different sizes and shapes, Lorenz determined the optimal stimulus characteristics for an egg incubated by a goose in its nest. Lorenz found that he could literally build a better egg than that provided by nature, as judged by the vigor of retrieval behavior. The use of models for defining the critical dimensions of eliciting, or releasing, stimuli became a staple feature of ethological research.

Ethologists noted early on that behavior showed spontaneous variability even when it was emitted in a constant stimulus situation. The spontaneity of behavior was explained by Lorenz and Tinbergen in what was to become the most controversial aspect of the classical ethological framework. In particular, they suggested that spontaneous appetitive behavior patterns and subsequent consummatory FAPs were energized by the metabolic accumulation of action specific energy in motivational centers in the nervous system. Foraging for food and eating, seeking sexual partners and mating, patrolling one's territory and fighting were thought to be stimulated by the accumulation of action specific energy. The termination of these behavior patterns resulted, in turn, from the motor performance of the consummatory patterns in question. The motivational system presented by Lorenz and Tinbergen had much in common with drive systems proposed by Sigmund Freud and William McDougall, including a hydraulic metaphor that involved “pressure” building up in the system when consummatory behaviors remained unexpressed. For the ethologists, their motivational system explained many common phenomena. Vacuum activities—the appearance of consummatory sequences in the absence of any environmental stimulus, as when a kitten pounces on an imaginary prey—were “explained” by the accumulation of such high levels of

action specific energy that performance of the relevant FAPs was inevitable. Similarly, the waxing of feeding behavior as a function of time since eating was attributed to the accumulation of energy, whereas a lack of interest in food immediately following a meal was linked with the dissipation of energy through performance of feeding-related FAPs. There was, however, a price to be paid for this facile explanation.

Comparative Psychology and the Classical Ethologists

For most of the twentieth century, comparative psychology constituted a relatively small component of animal psychology in the United States. Comparative psychology was concerned with naturalistic perspectives, species-characteristic behavior patterns, and species variation in behavior (Dewsbury, 1984). More broadly, however, animals were typically employed in American laboratories as convenient substitutes for human participants in providing data on the critical general laws of learning, and the white rat (or the Skinnerian pigeon) became the subject of choice (Beach, 1950). Given this background, it is not surprising that, when connections were made with the ethologists, it was a relatively small subset of American animal psychologists, the truly comparative psychologists, who led the way.

For some (e.g., Beach, 1960), the essential task was awakening psychologists to the crucial importance of studying animals in naturalistic perspective. Although terms were modified to suit the taste of American psychologists (for example, Frank A. Beach used "species-characteristic behavior" as a substitute for "instinctive behavior"), the emphasis was on the fascinating experimental phenomena revealed by ethological research in Europe. However, for others, the theoretical framework could not be bypassed.

In 1953 Daniel Lehrman published his classic paper "A Critique of Konrad Lorenz's Theory of Instinctive Behavior." The heart of Lehrman's critique was an attack on the too-casual use of "instinct" in the Lorenzian formulation and the failure (in Lehrman's view) of Lorenz to deal adequately with the complexities of developmental analysis. It was, in a sense, an old argument. After all, psychologist Zing-Yang Kuo (1922) had debated the instinct psychologists of his day along similar lines. But, focusing on Lorenz's own writings, Lehrman's arguments revealed how the use of terms such as *instinct* served to terminate prematurely the search for developmental understanding and pointed to the absence of a physiology that could be offered in support of Lorenz's energetic schemes.

There was also a political element to Lehrman's critique. Lorenz's use of instinct could be interpreted to mean "fixed" or "inevitable" when applied to humans. And the natural accumulation of an action specific ag-

gressive energy in animals that must have overt expression in the natural order of life might appear to have sinister implications in a world dealing with the aftermath of World War II. The existence in Lorenz's prewar bibliography of articles that provided biological justification for maintenance of racial purity (Kalikow, 1979) did not pass Lehrman's notice. Other comparative psychologists offered additional critiques of the instinct concept while recognizing the basic significance of the ethological approach (Beach, 1955; Hebb, 1953), and the English ethologist Robert Hinde (1960) published a powerful critique of energetic drive theories.

From these interactions between ethologists and comparative psychologists during the 1950s and 1960s a new synthesis emerged. It was, perhaps, best reflected in Robert Hinde's text of 1966, *Animal Behaviour: A Synthesis of Ethology and Comparative Psychology*. The newly emerging field of animal behavior drew on the developmental and learning perspectives, on technology, and on the methodological sophistication of American psychology while incorporating the breadth of species, naturalistic reference points, and evolutionary concerns of the ethologists. The appearance in the 1970s of books devoted to the analysis of species-characteristic learning processes, studied in both European ethological laboratories and American psychological laboratories, was visible testimony to the symbiotic benefits of these interactions (Hinde & Stevenson-Hinde, 1973; Seligman & Hager, 1972).

Sociobiology: Challenging the "Synthesis"

In the 1970s, however, a new approach to animal behavior emerged that was to change the research of both classical ethologists and comparative psychologists. The most enduring and powerful component of this new approach drew on the theoretical writings of William D. Hamilton (1964a,b). Hamilton provided a genetic analysis of social behavior based on the proportion of shared genes between social actors. In a short period of scientific time, these writings completely changed the study of animal societies from sociological descriptions of behavior in terms of age and sex roles to a new focus on the behavior of individuals competing and/or cooperating to maximize "inclusive fitness," as measured by success in promoting the appearance of one's genes in subsequent generations. This emphasis on individual genetic competition became the key concept incorporated in Edward O. Wilson's 1975 synthesis of animal behavior as "sociobiology." Wilson drew fire from both the ethologists and the comparative psychologists, in part because of his neglect of behavioral ontogenies and mechanisms and his focus on genetic outcomes. However, the situation was compounded by a diagram in the first chapter of Wilson's book. According to this schematic analysis, both com-

parative psychology and ethology were vigorous players in 1950. But by 1975 comparative psychology was portrayed as "absent," and ethology was much reduced in size. Indeed, according to Wilson's prediction, by the year 2000 even ethology would be reduced to a "sliver," joined with physiological psychology in linking the "important" disciplines of sociobiology and integrative neurophysiology.

Despite Wilson's dire predictions, there is an ever-changing field of animal behavior that receives information from and is enriched by the parent disciplines of zoology and psychology. Just as evolutionary biology provided the background for Hamilton's genetic analysis, so the cognitive revolution in psychology, emerging at about the same time as Hamilton's analysis, has reawakened interest in the animal mind. This conceptual transfer is routed from the parent discipline (psychology) through the subdiscipline (comparative psychology) to a common contemporary field of animal behavior.

[Many of the people mentioned in this article are the subjects of independent biographical entries.]

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ETIC-EMIC THEORY. See Cross-Cultural Psychology, article on Theories and Methods of Study.

EUROPEAN FEDERATION OF PROFESSIONAL PSYCHOLOGISTS' ASSOCIATIONS.

The EFPPA is a relatively young organization, founded in 1981. Its origins began in the late 1970s when there was movement among psychology associations in European nations including the European Community (now the European Union), to cooperate and to share information in a formal manner. At the time, representatives of twelve national psychology associations convened to draft a constitution and statutes. There were good reasons for European psychology associations to work together, both generally, and specifically in relation to developments in the European Community (e.g., the EC Directive 49/84) linked to harmonization of training and mobility of psychologists. The EFPPA was founded in Germany as a federation of national psychology associations, and the first general assembly was held in Heidelberg in 1981. Since 1982, general assemblies have been held every 2 years, and since 1991, in conjunction with biennial European Congresses of Psychology, which are arranged under the auspices of EFPPA. EFPPA is a federation of national psychology organizations that seeks to develop European policy and to promote psychology at the European level.

According to EFPPA statutes, only one association of psychologists may represent a country, and EFPPA tries to ensure that this is the most representative association in the country. EFPPA now has 30 member associations, including all the European Union member states, the other countries of western Europe, and a growing number of members from central and eastern Europe. Thus, EFPPA could be said to represent more than 100,000 psychologists. In general, member associations are concerned with promoting and improving psychology as a profession and as a discipline, particularly, though not exclusively, in clinical settings. EFPPA has a particular focus on professional issues, such as training and research associated with psychological practice, and other professional issues, such as ethics, codes of conduct, and professional regulation.

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Psychologists in member associations include clinical practitioners as well as academic and research psychologists. One of EFPPA's goals is the integration of practice with research and the promotion of an integrated discipline of psychology in Europe.

The aims of EFPPA are broad and include: (a) promoting communication and cooperation among member associations in Europe; (b) promoting the application of psychology to improve the well-being of those whom psychologists serve; (c) promoting the discipline of psychology and its application, with particular reference to the professional training and professional status of psychologists; (d) supporting member associations in promoting the interests of psychology within their own countries; (e) facilitating contacts with international bodies of psychology; and (f) encouraging the development of professional psychology in all its different areas and subject matters. EFPPA was originally formed to facilitate collaboration, particularly in relation to developments in the education and training of psychologists and the increasing trends in different countries toward legal definitions and regulations for psychologists. Since its formation, EFPPA has engaged in a number of different activities in relation to the discipline and profession of psychology: (a) collection and dissemination of information; (b) development of policy and standards; (c) communication; (d) lobbying and political activity; and (e) congresses and conferences.

EFPPA has a unique potential for collecting and disseminating information on a wide range of areas in psychology, particularly through its task forces. EFPPA produces booklets and reports on professional issues in Europe, publishes a quarterly newsmagazine, is associated with the quarterly journal, the *European Psychologist*, publishes news and information on its Web site's home page, and arranges the biennial European Congress of Psychology. The congress aims to provide a forum for integration and interchange, and for psychologists from different areas to develop collaboration and shared understanding. It is also an occasion when many European organizations focusing on special topics may arrange satellite congresses or participate in symposia or keynote addresses in the congress itself.

An original objective of EFPPA has been to develop a more common framework for standards of training and professional practice of psychologists. "Optimal Standards for Training" was adopted by member associations in 1990; current booklets on regulation, education, and training provide a framework to build on. EFPPA now participates in a European Union-funded project to develop a European Framework for Psychologists Training, which will eventually lead to a European Diploma for Psychologists. Further objectives are to encourage and support individual member associa-

tions in their efforts to gain regulation of the profession in their own countries, and to investigate the possibility of a European law to regulate the profession as a whole. These objectives have been the focus of two task forces. In general, EFPPA attempts to monitor developments and lobbies for directives and legislation, both within and outside the European Community.

The EFPPA has several means of communication with its member associations and with others. These include regular circulars mailed to member associations from the secretariat, a home page on the World Wide Web, a quarterly magazine (*News from EFPPA*), and the biennial general assembly and European Congress of Psychology. In 1996, the first issue of *European Psychologist*, published in collaboration with the EFPPA, made its appearance. An annual meeting of the Presidents Council, which consists of presidents of its member associations provides an opportunity for wide-ranging and more informal exchange. EFPPA also has links to many other bodies of psychologists, in particular, the International Association of Applied Psychology and the International Union of Psychological Science.

During 1995–1999, EFPPA had task forces in the following areas: (a) clinical psychology, (b) European legal matters, (c) evaluation of psychology curricula, (d) forensic psychology, (e) health psychology, (f) organizational psychology, (g) psychology in education, (h) psychotherapy, (i) traffic psychology, (j) refugees and enforced migration, (k) disaster and crisis psychology, and (l) tests and testing. EFPPA has a standing committee on ethics. Task forces provide a valuable means of collecting information in particular areas from member associations, and their reports are useful resources both for members and others (EFPPA usually publishes reports in booklet form and as abbreviated reports in the *European Psychologist*).

The EFPPA is expanding in membership and activity. Several psychology associations from nonmember countries are preparing applications for membership in EFPPA. The implications of this growth reflect the expansion of Europe: more languages, more national interests and traditions, more possibilities for richness in diversity, and more emphasis on academic study. Many countries are actively seeking to learn new applications of the discipline, with new opportunities for psychologists to develop and use their skills.

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Ingrid Lunt

EUROPEAN SCIENCE FOUNDATION. The ESF is a multidisciplinary association more than 60 national research funding agencies and academies from more than 20 countries committed to the promotion of all branches of basic science. It was established in 1974 at the instigation of a group of senior scientists and the heads of Europe's principal research funding agencies who, for a number of years, had been discussing the need to form a network of European laboratories and scientific institutions. Their solution was to create a flexible, nongovernmental organization whose main task would be to facilitate cooperation in, and harmonization of, its members' scientific activities. Included among this founding group were Hubert Curien, then Director of Physics at France's Centre National de la Recherche Scientifique (CNRS) and later French Minister for Science, Friedrich Schneider, Secretary General of the German Max Planck Gesellschaft (MPG), and Sir Brian Flowers of the United Kingdom's Science Research Council (SRC).

The ESF came into being in Strasbourg, France, on 18 November 1974 when representatives of forty-two academies and research councils from fifteen European countries agreed to its establishment. The principal aims of ESF, set out in its first statute, are to advance cooperation in basic research, promote mobility of research workers, assist the free flow of information and ideas, and coordinate, where appropriate, the basic research activities supported by its member organizations. It was further envisaged that the Foundation

would facilitate cooperation in the use of existing research facilities and in assessing and executing projects of major importance.

Sir Brian Flowers was elected as the first ESF president, Professor Olivier Reverdin of Switzerland and Professor Povl Riis of Denmark were elected vice presidents, and Dr. Friedrich Schneider of Germany was elected secretary general.

ESF's scientific activities were to be directed by a number of standing committees covering broad scientific disciplines. In ESF's first year of operation it was agreed that the already existing European Medical Research Councils and the European Science Research Councils (ESRC) should become ESF standing committees along with the newly created standing committee for the social sciences. These three committees were joined by a fourth in 1977 with the establishment of an ESF standing committee for the humanities. In 1994, two new committees for the life and environmental sciences and for the physical and engineering sciences were created from the old natural sciences committee (ESRC). In addition, ESF refocused its mission to include providing advice on research and science policy issues of strategic importance.

Since its establishment, ESF has launched and coordinated a large range of scientific activities in all the main disciplinary fields, from physics to the humanities. These activities have included workshops, conferences, networks, and programs, as well as summer schools, and in certain specific fields such as neuroscience, training grants to enable young European researchers to work in other countries and be introduced to new techniques. For the social sciences and the humanities, ESF has provided the only place where it has been possible to develop a European science policy.

The promotion of psychology within ESF's portfolio of scientific activities has been taken up principally by the standing committee for the social sciences, but it has also figured in scientific programs, networks, and conferences in the fields of the humanities and medical sciences. One of ESF's very first actions was to adopt as an additional activity the European Training Programme in Brain and Behaviour Research. ESF's interest in the development of this interdisciplinary field, which brought together scientists from disciplines as diverse as experimental psychology, neuroscience, and pharmacology, was to prove long lasting, culminating in the European Neuroscience Programme, which ran until 1996.

Another research area identified early on by the ESF as appropriate for development at a European level was second-language acquisition by adult immigrants. This program, which ran from 1981 to 1987, examined the ways in which adults acquire a language other than their mother tongue in everyday interactions with na-

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In a similar fashion, a European network on longitudinal studies on individual development, led by Professor David Magnusson of the University of Stockholm, proved important in promoting more effective research. Running for 6 years from 1985, the network resulted in a series of influential textbooks on a variety of issues including transition mechanisms in child development, successful aging, and data quality and methodological problems in longitudinal research.

Other ESF initiatives involving psychologists have included three scientific networks on neural mechanisms of learning and memory, on code switching and language contact, and on written language and literacy. The first of these ran from 1988 to 1991 and fostered collaboration among psychologists, neuroscientists, and neurologists working in Europe on the experimental analysis of the neural mechanisms of memory processes viewed within the context of neural plasticity. The second network, from 1989 to 1992, focused on describing and explaining code-switching phenomena through comparison of a large number of varied contact situations. A third network on written language and literacy ran from 1991 to 1994 and tackled the complex cultural and psychological processes involved in writing and written language acquisition.

More recently, ESF has been examining human-computer interactions and the impact of environmental factors and degradation on cognitive functions. A five-year research program on learning in humans and machines has drawn on psychology, computer science, educational research, and sociology in an attempt to create a new discipline aimed at increasing understanding of learning processes and designing more effective tools for distance learning. As part of a wide-ranging initiative to draw up a future European research agenda in the field of environment and health, leading scientists have been looking at how cognitive functions can act both as mediators for health consequences and as potential end points of environmental influence in order to identify future research priorities and key questions.

In addition, a series of ESF research conferences on the development of sensory, motor, and cognitive capabilities in early infancy, with funding from the European Commission, has enabled young researchers to participate in high-level discussions at the frontiers of research development.

The European Science Foundation is based in Strasbourg, France; extensive information about the ESF is available through its World Wide Web site (<http://www.esf.org>).

Andrew Smith

EVALUATION RESEARCH. See Research Methods.

EVOLUTIONARY PSYCHOLOGY represents a synthesis of modern evolutionary theory with current formulations of psychological phenomena. The synthesis is based on a series of premises:

1. Manifest behavior depends on underlying psychological mechanisms, defined as information-processing devices instantiated in brain wet-ware.
2. Evolution by selection is the only known causal process capable of creating such complex organic mechanisms.
3. Evolved psychological mechanisms are functionally specialized to solve adaptive problems that recurred for human ancestors over the vast expanse of evolutionary history.
4. Human psychology consists of a large number of these functionally specialized and integrated evolved mechanisms, each sensitive to particular forms of contextual input. Each of these premises is described below.

Manifest Behavior Requires Underlying Psychological Mechanisms

No behavior can be produced without psychological mechanisms, and all theories within psychology imply the existence of such mechanisms. If a man responds to a public insult with violence but a woman does not; if a child cries to get its way but an adult does not; if a human gossips and a chimpanzee does not, it is because these different beings possess somewhat different psychological mechanisms. All psychological theories, even the most ardently environmental ones, imply the existence of psychological mechanisms. Even Skinner's theory of operant conditioning, for example, implies the existence of domain-general mechanisms that cause organisms to alter their behavioral output in accordance with the history of reinforcement that they have experienced. The next question is: What causal process is responsible for the origins of these psychological mechanisms?

Evolution by Selection Is the Central Causal Creator

Only three theories retain currency for the origins of complex organic mechanisms: Evolution by selection, creationism, and seeding theory. Creationism, the idea that a supreme deity fashioned current organic mechanisms in all their glorious diversity, is regarded as a matter of religious belief. It leads to no specific scientific predictions and cannot explain in a principled manner the specific organic forms that science has observed. Seeding theory—the idea that extraterrestrial organisms came down and planted the seeds of life on

tive speakers, and made a significant contribution to the European development of this research field.

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Other ESF initiatives involving psychologists have included three scientific networks on neural mechanisms of learning and memory, on code switching and language contact, and on written language and literacy. The first of these ran from 1988 to 1991 and fostered collaboration among psychologists, neuroscientists, and neurologists working in Europe on the experimental analysis of the neural mechanisms of memory processes viewed within the context of neural plasticity. The second network, from 1989 to 1992, focused on describing and explaining code-switching phenomena through comparison of a large number of varied contact situations. A third network on written language and literacy ran from 1991 to 1994 and tackled the complex cultural and psychological processes involved in writing and written language acquisition.

More recently, ESF has been examining human-computer interactions and the impact of environmental factors and degradation on cognitive functions. A five-year research program on learning in humans and machines has drawn on psychology, computer science, educational research, and sociology in an attempt to create a new discipline aimed at increasing understanding of learning processes and designing more effective tools for distance learning. As part of a wide-ranging initiative to draw up a future European research agenda in the field of environment and health, leading scientists have been looking at how cognitive functions can act both as mediators for health consequences and as potential end points of environmental influence in order to identify future research priorities and key questions.

In addition, a series of ESF research conferences on the development of sensory, motor, and cognitive capabilities in early infancy, with funding from the European Commission, has enabled young researchers to participate in high-level discussions at the frontiers of research development.

The European Science Foundation is based in Strasbourg, France; extensive information about the ESF is available through its World Wide Web site (<http://www.esf.org>).

Andrew Smith

EVALUATION RESEARCH. See Research Methods.

EVOLUTIONARY PSYCHOLOGY represents a synthesis of modern evolutionary theory with current formulations of psychological phenomena. The synthesis is based on a series of premises:

1. Manifest behavior depends on underlying psychological mechanisms, defined as information-processing devices instantiated in brain wet-ware.
2. Evolution by selection is the only known causal process capable of creating such complex organic mechanisms.
3. Evolved psychological mechanisms are functionally specialized to solve adaptive problems that recurred for human ancestors over the vast expanse of evolutionary history.
4. Human psychology consists of a large number of these functionally specialized and integrated evolved mechanisms, each sensitive to particular forms of contextual input. Each of these premises is described below.

Manifest Behavior Requires Underlying Psychological Mechanisms

No behavior can be produced without psychological mechanisms, and all theories within psychology imply the existence of such mechanisms. If a man responds to a public insult with violence but a woman does not; if a child cries to get its way but an adult does not; if a human gossips and a chimpanzee does not, it is because these different beings possess somewhat different psychological mechanisms. All psychological theories, even the most ardently environmental ones, imply the existence of psychological mechanisms. Even Skinner's theory of operant conditioning, for example, implies the existence of domain-general mechanisms that cause organisms to alter their behavioral output in accordance with the history of reinforcement that they have experienced. The next question is: What causal process is responsible for the origins of these psychological mechanisms?

Evolution by Selection Is the Central Causal Creator

Only three theories retain currency for the origins of complex organic mechanisms: Evolution by selection, creationism, and seeding theory. Creationism, the idea that a supreme deity fashioned current organic mechanisms in all their glorious diversity, is regarded as a matter of religious belief. It leads to no specific scientific predictions and cannot explain in a principled manner the specific organic forms that science has observed. Seeding theory—the idea that extraterrestrial organisms came down and planted the seeds of life on

earth—begs the questions of the origins of the intelligent extraterrestrial beings and of the subsequent evolutionary process that produced humans from the initial seeds. Evolution by selection, in contrast, is a powerful and well-articulated theory that has successfully organized and explained thousands of diverse facts in a principled way. In one bold stroke, this theory united all living forms into one grand tree of descent, accounted for the origins of new species and the modification in organic structures over time, and explained the apparent purposive quality of the component parts of those structures, that is, that they seem “designed” to serve particular functions linked with survival and reproduction. Other causal processes in evolution, such as mutation, genetic drift, recombination, hitchhiking, and antagonistic pleiotropy are unlikely to produce complex functional organic mechanisms in the absence of selection.

Evolved Psychological Mechanisms Are Functionally Specialized

A central premise of evolutionary psychology is that the main nonarbitrary way to identify, describe, and understand psychological mechanisms is to articulate their functions—the specific adaptive problems they were designed to solve. Anatomists identify the liver, heart, and lungs as separate, although connected and integrated, mechanisms because they perform different functions (e.g., filter toxins, pump blood, and uptake oxygen). Understanding the nature of these mechanisms requires understanding their functions, that is, what they were designed to do or the manner in which they contributed to reproduction. Analogously, evolutionary psychologists suggest that the human mind consists of functionally specialized psychological mechanisms, each designed to solve a specific information-processing problem. For example, cheater-detection mechanisms function to solve the problem of free-riders in social exchange (Cosmides, 1989); mate-preference mechanisms function to solve the problem of selecting reproductively valuable mates (Buss, 1994); and kin-identification mechanisms function in part to solve the adaptive problem of allocating acts of altruism (Burnstein, Crandell, & Kitayama, 1994).

The adaptive problems that psychological mechanisms are designed to solve have several key features. First, they must have recurred over the long course of human evolutionary history. Since evolution is a slow process, there is no expectation that humans have evolved mechanisms to solve modern adaptive problems, such as avoiding electrical outlets that could cause death or fast food that could clog arteries. Second, adaptive problems are those whose solution contributed to successful reproduction, either directly or indirectly. Since differential reproduction is the engine

of evolution by selection, only solutions that lead to an increment in reproduction, relative to alternative variants that happen to exist in the population at that time, could have evolved. Third, the manner in which an adaptive problem is solved defines the function of the mechanism.

The functional specialization of evolved psychological mechanisms means that they are highly sensitive to narrow slices of context. Even a complex mechanism like the eye is not designed to “see everything.” In fact, the eye is functionally specialized to see only electromagnetic waves within a narrow range (the visual spectrum), and not waves outside that range, such as radio waves or X rays. Moreover, within the visual spectrum, the eye is further designed to register motion, edges, particular colors, depth, and so on. Contrary to most people’s intuitions, the exquisite flexibility and context-sensitivity of human behavior comes from having a large number of these functionally specialized mechanisms, not from having a few general “plastic” psychological mechanisms.

Methods for Generating and Testing Evolutionary Psychological Hypotheses

Evolutionary psychologists use two methods for generating and testing hypotheses about evolved psychological mechanisms. The first is to start with an adaptive problem and generate hypotheses about an evolved psychological solution. As an example of this “top-down” method, consider the adaptive problem of paternity uncertainty. Because fertilization occurs internally within women, they are 100% certain that they are the mothers of their children. Putative fathers can never be sure, because another man might have inseminated his mate and hence fathered “his” child. Evolutionary psychologists have hypothesized that male sexual jealousy is a psychological mechanism that has evolved as one possible solution to the adaptive problem of paternity uncertainty (Daly, Wilson, & Weghorst, 1982). The prediction is that men’s jealousy should focus heavily on cues to sexual infidelity. Women are also predicted to get jealous, but no woman has ever faced the adaptive problem of maternity uncertainty. From an ancestral woman’s perspective, however, if her mate committed an infidelity she stood to lose her mate’s investment, commitment, and resources—all of which could get channeled to rival women. Therefore, the prediction is that women’s jealousy will focus more on cues to the long-term diversion of her partner’s commitments, such as him becoming emotionally involved with another woman. It is important to recognize that, although jealousy has been studied extensively, no previous social science theories prior to the evolutionary one had ever predicted that the sexes would differ in the weighting given to the triggers of jealousy.

A variety of empirical studies were subsequently conducted to test the evolutionary psychological hypothesis. Consider the following scenario: *Imagine that your romantic partner became interested in someone else. What would upset or distress you more? (A) Your partner having sexual intercourse with that other person, or (B) your partner becoming emotionally involved with that other person.* In contrast to the dozens of previous studies that had yielded no sex differences in jealousy, this dilemma produced large sex differences. While both events are upsetting to both sexes, the majority of men (roughly 60%) indicated that they would be more distressed by sexual infidelity. In contrast, only 15% of the women indicated that they would be more distressed by sexual infidelity, with the overwhelming majority declaring greater distress about emotional infidelity (Buss, Larsen, Westen, & Semmelroth, 1992).

These gender differences have been replicated using physiological measures of distress as well. When imagining a partner's sexual infidelity, men show greater distress, as measured by increased electrodermal activity, electromyographic activity, and heart rate (Buss, Larsen, Westen, & Semmelroth, 1992). These sex differences have been replicated across cultures as diverse as Germany, the Netherlands, Korea, and Japan (Buunk, Angleitner, Oubaid, & Buss, 1996), and they have been pitted against alternative hypothesis designed post hoc to account for the gender difference (Buss, 2000). In sum, gender differences in the triggers of jealousy were discovered using the first method of evolutionary hypothesis generation—starting with an adaptive problem and making predictions about a possible evolved solution. Men who were sexually jealous presumably acted to prevent a partner's sexual infidelity, thus solving the adaptive problem of paternity uncertainty. Modern humans are the descendants of men who acted to prevent such infidelities, not the descendants of men who were indifferent to the sexual contact their partners had with other men.

The second method consists of starting with observed psychological phenomena and generating hypotheses about what adaptive problem they might have evolved to solve. As an example, evolutionary psychologists started with the observation that women and men seemed to be very selective in their choice of marriage partners (Symons, 1979). Mainstream nonevolutionary psychologists, of course, had also observed this phenomenon, but none had developed hypotheses about what functions it might have evolved to solve. Evolutionary psychologists predicted that women's mate preferences might have evolved to solve the problem of securing resourceful mates to invest in their children, whereas men's mate preferences might have evolved to solve the problem of selecting fertile mates. These predictions were then tested in a study involving

37 different cultures, ranging from the Zulu tribe in South Africa to coastal dwelling Australians (Buss, 1989). The results confirmed predictions generated from these hypotheses: In all 37 cultures, women expressed a greater preferences for mates who were high in status, ambition, industriousness, and financial prospects, whereas men expressed a greater preference for mates who were young and physically attractive, two known cues to a woman's fertility. In sum, the studies of mate preferences illustrate the second method of generating and testing evolutionary psychological hypothesis—starting with a known phenomenon and generating hypotheses about design features, based on hypothesized solutions to adaptive problems.

These two methods have been used to discover a host of interesting psychological phenomena, including: patterns of fears and phobia, particular mechanisms of color vision, universal adaptations to terrestrial living, beliefs and desires about the minds of other people, patterns of step-child abuse, causes of marital dissolution, shifts in mate preferences depending on temporal context, gender differences in sexual fantasy, patterns of mate guarding and mate retention, gender differences in risk-taking, superior spatial location memory in women, mechanisms of cheater detection in social exchange, patterns of sexual harassment, patterns of altruism and cooperation, and cross-cultural variations in patterns of food sharing (see Barkow et al., 1992, and Buss, 1999, for extensive summaries).

The Field of Psychology from an Evolutionary Perspective

Scientific success in uncovering the mysteries of life have been based on three critical foundations—mechanism, natural selection, and historicity (Williams, 1992). Since the cognitive revolution, psychologists have moved away from behaviorism's unworkable antimentalism, making it respectable to study information-processing mechanisms inside the head. Evolutionary psychology adds the importance of natural selection and historicity in the creation of those information-processing mechanisms. The previous neglect of natural selection has led psychologists to ignore the adaptive functions of mechanisms and therefore has hindered the quest to unravel the mystery of why these mechanisms exist at all, and more specifically why they exist in the particular forms that they do.

A critical task for this new psychological science will be the identification of the key adaptive problems that humans confronted repeatedly over evolutionary history. By identifying some of the problems most obviously and plausibly linked with survival and reproduction, we have barely scratched the surface. Most adaptive problems remain unexplored, most psychological solutions undiscovered. Evolutionary psychology

provides the conceptual tools for emerging from the fragmented state of current psychological science. It provides the keys to unlocking the mysteries of where we came from, how we arrived at our current state, and the mechanisms of mind that define who we are.

Charles Darwin ended his classic book, *On the Origin of Species* (1859), with this prophesy: "In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation." Evolutionary psychology, emerging more than 130 years after *Origin*, represents the fulfillment of Darwin's prophesy (Buss, 1999).

Societies and Research Institutions Focusing on Evolutionary Psychology

Several universities host centers and areas within departments devoted to the study of evolutionary psychology, including: the University of California at Santa Barbara (Center for Evolutionary Psychology), the University of Texas (the Individual Differences and Evolutionary Psychology Area within the Psychology Department), and the University of New Mexico at Albuquerque. The international society devoted to evolutionary psychology is the Human Behavior and Evolution Society (HBES), founded in 1989, and which hosts annual meetings that draw international scholars from psychology, anthropology, economics, sociology, biology, and psychiatry. The journal for HBES is the *Journal of Evolution and Human Behavior*.

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David M. Buss

EXCEPTIONAL STUDENTS. *Exceptional* is an umbrella term covering a wide range of conditions and problems that refer to deviations or differences from normative developmental and social expectancies. These differences may be physical, sensory, cognitive, emotional, or behavioral, and may range from mild to severe. What is considered exceptional is defined, in part, by the social and political climate of the times, thus, definitions have varied historically. Classification systems developed by the American Psychiatric Association and the U.S. Office of Education are currently used to order the array of exceptional conditions (Keogh & MacMillan, 1996).

The public education system has been the major agency providing services to exceptional children and youth, although those with severe disabilities may be served in residential or hospital placements. Historically, services were limited to individuals with severe disabilities in physical/sensory functions. Compulsory school attendance laws forced recognition of the needs of a broader range of students with disabilities and led to increased numbers of special education programs, usually delivered in segregated classes or schools. Following the 1960s civil rights movement, legal challenges were mounted by parents and advocates, and major new legislation at the federal level emerged: the 1975 Education for All Handicapped Children Act, the 1991 Individuals with Disabilities Education Act (IDEA), and the 1994 Improving America's Schools Act (IASA). All have had major impact on services for children and youth with disabilities, and on the facilities that provide services for them.

IDEA requires that all children and youth with disabilities have access to a fair and appropriate public education in the least restrictive environment as determined on an individual basis. IDEA also contains procedural safeguards that protect the rights of children and families, including parent and student input into the Individual Education Plan (IEP). The guarantees in

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IDEA have been maintained, broadened, and strengthened in subsequent legislation. Part H of IDEA (P. L. 94-142, the Education of the Handicapped Act Amendments of 1986, and the later amendments under P. L. 102-119) provides services for at-risk children or those with disabilities from birth through 2 years of age.

Child counts documenting the use of special services are taken by states on 1 December of each year, with data reported to, and integrated by, the U.S. Office of Special Education Programs (OSEP). In the 1994-1995 school year, a total of 5,545,198 children and youth, ages 3 to 21, received services under IDEA. Approximately 10% were 5 years old or younger. About 12% of elementary and secondary school students received special education services. Federal support for education and related services for children and youth with disabilities has increased steadily since 1975. In 1995, \$2,322,915,000 was appropriated; allocation per child for 1995 was \$418 (U.S. Dept. of Education, 1996).

Services by Categories

Current legislation identifies 12 categories of disabilities for children 6 to 21 years old. The percentage of students receiving services in each category is based on 1994-1995 figures provided by OSEP: specific learning disabilities (51.1%); speech or language impairments (20.8%); mental retardation (11.6%); serious emotional disturbance (8.7%); multiple disabilities (1.8%); hearing impairments (1.3%); orthopedic impairments (1.2%); other health impairments (2.2%); visual impairments (0.5%); autism (0.5%); deaf-blind (2.6%); and traumatic brain injury (0.1%) (U.S. Dept. of Education, 1996). Services are delivered in programs ranging from the regular class to home or hospital settings. In 1994-1995, 95% of exceptional children received services in regular school buildings; however, placement patterns differed according to exceptional conditions, and regular class placements were more common for elementary than for secondary students. Resource room programs are widely used for students with problems in speech and language and learning disabilities. Separate classrooms are more often used for children with mental retardation, autism, and multiple disabilities.

Preschool children who receive services under Part H of IDEA are not categorized by disability, but rather may be considered for special services as needed in settings ranging from regular classes to home or hospital. Intervention needs are framed within the Individual Family Service Plan (IFSP) rather than the IEP. In 1994, 47% of services for infants and toddlers were delivered in homes, 31% in early intervention classrooms, and 17% in outpatient facilities. The most frequent services included speech and language, physical and occupational therapy, and family counseling and special instruction.

Professional and Advocacy Groups

Major professional organizations and advocacy groups related to exceptionality include the American Association on Mental Retardation, the Association for Retarded Citizens, the Council for Exceptional Children, Division 33 of the American Psychological Association, the Learning Disabilities Association of America, and those targeting specific low-incidence conditions, such as the Autism Society of America, the Association for Children with Down Syndrome, and the Foundation for the Junior Blind. Most major organizations publish journals, newsletters, and monographs. The National Association for Gifted Students provides advocacy and information for exceptionally able and talented individuals. Gifted or talented students are not covered by IDEA, but a number of states and school districts provide special services for those students. Gifted or talented students with physical, sensory, or specific learning disabilities are termed *twice exceptional* and may be covered by IDEA.

Assessment and Identification

Identification and referral for services for children with exceptional needs may come from health professionals or parents; however, except for young children or those with severe physical or sensory disabilities, identification usually occurs after school entrance. Determining the need for special education services is typically a process of referral by regular classroom teachers and subsequent assessment by school psychologists and language specialists. Systemwide screening in the primary grades is relatively rare. Eligibility for services in categories of mental retardation, learning disabilities, and speech or language impairment involves estimation of ability level, a potential problem as some states have banned or restricted use of IQ tests. A discrepancy between expected achievement (ability) and actual performance remains a pivotal but controversial consideration for diagnosis of learning and language disorders (Gresham, MacMillan, & Bocian, 1996).

Alternative approaches to standardized testing such as curriculum-based assessment, pre-referral interventions, and dynamic assessment are increasingly used. Assessment of emotional or behavioral disorders typically involves case histories, parent or teacher symptom checklists, and measures of social adaptation. Potential problems arise from low concordance between school criteria for serious emotional disturbance (SED) and symptoms of clinical disorders derived from emotional or behavioral checklists. Children with attention deficit hyperactivity disorder (ADHD), for example, often do not qualify for special education services, but may be provided regular classroom adaptations under Section 504 of the 1973 Rehabilitation Act. This law prohibits discrimination against persons with disabilities, and de-

finer disability more broadly than IDEA. Test bias and disproportionate representation of children from minority ethnic, cultural, or language backgrounds in special education programs remain controversial.

Intervention and Treatment

Comprehensive systems of care involving joint case management and treatment with medical and social services agencies outside the school are emerging (Short & Talley, 1997). A number of children and youth with emotional and/or behavioral disorders receive pharmacological treatment under medical supervision, but their use remains controversial. Many children with attention deficit disorder (ADD) and ADHD respond well to methylphenidate hydrochloride (Ritalin), improving on attentional and behavioral measures. Dosage and monitoring of effects are critical, as doses that improve attention and classroom behavior may impair classroom learning (Forness, Sweeney, & Toy, 1996). Psychotropic drugs are best used in therapeutic programs that combine psychosocial interventions with children and families. A number of treatment approaches from different disciplinary and professional perspectives have strong advocates, but lack solid evidence of efficacy and are considered controversial (Silver, 1987). These include diet regimens, patterning exercises, and perceptual-motor training.

Individual educational planning remains a hallmark of special education and related services. Objectives for each pupil's cognitive, academic, social, and emotional development are specified in the IEP and the progress toward goals is monitored periodically. The 1997 amendments to IDEA require formal reevaluation every three years. Instructional responses to special learning needs include: collaborative teaching, in which regular and special education teachers jointly plan and teach lessons; pre-referral interventions in which instruction is modified and tested before referral for formal assessment; and peer-mediated instruction using classmates with no disabilities as tutors. Basic skill instruction in reading has focused on early phonological awareness and training in executive functions such as self-monitoring of attention. These approaches have stronger empirical support than previously favored aptitude-treatment strategies that focused on isolated deficits in perceptual or linguistic skills (Forness, Kavale, Blum, & Lloyd, 1997). Computer-assisted instruction and other technologies designed to minimize disabilities have met with some success, but effective classroom software continues to lag behind technological advances. There is an increasing, but controversial, trend toward mainstreaming and full inclusion, meaning full-time placement of all children with disabilities in regular classrooms, and the elimination of special schools and classrooms or part-time placements in resource classrooms (Fuchs & Fuchs, 1994). Educators

are supportive in principle, but uncertain about the implementation and effectiveness of inclusive models of service delivery.

Research

Research on children with disabilities has received major support from the National Institute of Child Health and Human Development (NICHD) and from OSEP. Research topics include basic research on neuropsychological, neurophysiological, and linguistic processes, and educationally oriented research addressing phonological awareness, curriculum-based assessment, peer-mediated instruction, social skills development, and cognitive strategy training including mnemonics, working-memory, and self-monitoring or evaluative strategies (Berninger, 1997). Behavioral approaches and single-subject research designs remain popular. Prevention strategies, such as classroom-wide interventions followed by targeted instructional strategies for nonresponders, have become the focus of research on pre-referral intervention. Meta-analyses of major interventions in special education and related services have been used to address efficacy questions (Forness et al., 1997). Contemporary scientific approaches and qualitative, ethnographic methods are increasingly used to address contextual effects; however, quantitative research continues to be the prevailing methodology.

Few large-scale efficacy studies of children with disabilities are in process at the end of the 1990s, and follow-up studies of special education graduates provide a somewhat dismal outcome picture (Blackorby & Wagner, 1996). The findings may reflect real inadequacies in special education programs, or they may be related to changing demographics of children who receive services. Sampling issues and practices present challenges and possible confounds. As more children are taught in inclusive settings, programs for students with mental retardation or serious emotional disturbance contain fewer, but more seriously impaired children. The use of the term *developmental delay* for children up to age 9 is useful in practice, but means a lack of sample specificity. There has also been an increase in the number of children with newly recognized morbidities, such as prenatal substance abuse, cancer survival, and fetal alcohol effects. Failure to recognize or detect comorbid conditions is a problem. Suspension or expulsion of children with histories of school violence complicate intervention efforts and threaten reliable tests of program efficacy. Recent amendments to IDEA provide for immediate placement of violent or aggressive children with disabilities in interim alternative placements for up to 45 days, but what constitutes appropriate alternative placements is often uncertain. Questions of who should be identified as exceptional and where and how they should be educated remain.

[See also Teachers.]

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Barbara K. Keogh and Steven R. Forness

EXCHANGE RELATIONSHIP. See Interdependence, article on Interdependence Theory.

EXCITEMENT refers to the bodily condition of being roused, or figuratively, the experience of "shaking one's feathers." In nonmetaphoric terms, being roused or aroused manifests itself in heightened overt and covert activity. This manifestation is thought to characterize all vital emotions, and its experience is considered part of all strong feelings. Excitement, then, is deemed an essential component of acute pleasure and displeasure, sadness and happiness, love and hate, despair and elation, gaiety and dejection, rage and exultation, exhilaration and grief, frustration and triumph, merriment and fear, anger and joy, along with all other intensely experienced behaviors. Although sexual activities are usually not included in listings of emotions, they cer-

tainly have their place among excitement-linked behaviors.

As an accompaniment of emotions, the indicated state of bodily arousal or excitedness is independent of pleasantness or unpleasantness. Acute anger, for instance, is an unpleasant experience associated with great agitation. Similar levels of agitation are also found, however, in the pleasant experiences of triumph and exultation or in sexual engagements. The apparent hedonic neutrality of excitement is not necessarily invoked by the excitement concept. Increasingly, this concept is used to focus on the pleasurable experience of states of great excitedness. Excitement has come to denote the essentials of high-intensity, quality experiences worthy of pursuit. Excitement is to be sought and appreciated, which implies that the concept is partial to pleasure.

Excitement seeking has been directly linked, in fact, to the pleasure principle. Mood-management theories are based on the hedonistic premise that humans behave so as to attain good moods of the greatest possible intensity for the longest possible time. This premise entails the assumption that the experience of pleasurable excitement is the more intense, the greater the associated bodily excitation.

Alternative theories place less emphasis on pleasure maximization. Zuckerman (1979) suggested that humans, like other primates, are constitutionally prepared to cope with aversive conditions on a regular basis, but that modern life deprives them of opportunities. He focused on a need for stimulation, essentially an inclination to seek out challenges, as an individual difference variable in order to explain why some are more driven than others to jump from airplanes, climb cliffs, do drugs, or watch horror movies. In this frame, stimulation is attained for its excitatory quality and at times might be deemed noxious throughout. As a matter of course, however, challenging circumstances will terminate and their overcoming or elusion can be expected to foster some degree of pleasure.

The transition from challenge to pleasurable reactions has led to proposals that make the intensity of pleasure partly, if not entirely, dependent on the intensity of preceding displeasure. Apter (1992) invoked such a dependency. He distinguished zones of safety, danger, and trauma and proposed that (a) nonrisky behavior in the safety zone is unexciting; (b) risky behavior in the danger zone is exciting and enjoyable to the extent that trauma is avoided; and (c) risky behavior in the trauma zone, although exciting, causes harm and hence, if not fatal, displeasure. In this model, risky behaviors in the danger zone are more enjoyable the closer they are to the border of the trauma zone. Prior risk maximization amounts to ultimate pleasure maximization, provided that traumatic conditions are successfully eluded. Play-

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Barbara K. Keogh and Steven R. Forness

EXCHANGE RELATIONSHIP. See Interdependence, article on Interdependence Theory.

EXCITEMENT refers to the bodily condition of being roused, or figuratively, the experience of "shaking one's feathers." In nonmetaphoric terms, being roused or aroused manifests itself in heightened overt and covert activity. This manifestation is thought to characterize all vital emotions, and its experience is considered part of all strong feelings. Excitement, then, is deemed an essential component of acute pleasure and displeasure, sadness and happiness, love and hate, despair and elation, gaiety and dejection, rage and exultation, exhilaration and grief, frustration and triumph, merriment and fear, anger and joy, along with all other intensely experienced behaviors. Although sexual activities are usually not included in listings of emotions, they cer-

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ing it safe, on the other hand, is the formula for boredom because of the lack of excitedness.

Apter (1992) has aggregated an impressive array of illustrations that seem to agree with his model. Car racing, roller coaster riding, rock climbing, hang gliding, bungee jumping, fugu eating, juvenile wilding, and erotic scarfing are all considered demonstrations of the practice of pushing danger to the trauma edge in order to attain the most intense experiences of excitement. Apter included coercive actions in this paradigm, suggesting that rape is often committed to intensify sexual excitement, that violent crime is, on occasion, perpetrated for the thrill of it, and that slaughter in combat can foster joyful excitement of the utmost intensity.

Implicit in the consideration of such extreme behaviors is that unproblematic achievements may satisfy needs and prove gratifying in a quiet way that is readily experienced as boredom. Reminiscent of Freud's observation that initially unrequited love has depth, whereas easy seduction does not, excitement and emotional intensity appear to depend on obstacles, competition, rivalry, even spite, as well as the possibility of failure. Experiences of triumph and exultation presuppose effort, striving, and struggling in the face of defeat and humiliation. A degree of aversion, anticipated or manifest, is thus considered prerequisite to gratifying excitement.

A more universal paradigm of emotional interdependencies that are exploitable for pleasure was proposed by Zillmann (1996). This paradigm applies to all emotions associated with increased excitation and specifies the bodily processes that mediate the intensification of particular emotions by the emotions that precede them. A theory of excitation transfer focuses on sympathetic activity in the autonomic nervous system. Such activity is common to all acute emotions and to all forms of sexual excitedness. Owing much to the functional interpretation that Walter B. Cannon provided in his well-known analysis of fight-and-flight reactions, transfer theory projects that sympathetic activation serves immediate energy mobilization by supplying brain and muscles with glucose. The mobilization is mediated by catecholamine release, mostly adrenaline and noradrenaline, into the systemic blood circulation. This being a sluggish humoral process, the instigated activity dissipates only slowly. It is its lingering presence that is considered to influence subsequent emotions. Specifically, the theory posits that humans are equipped with (a) a comparatively fast-acting cognitive apparatus that allows rapid adjustments to environmental changes, and (b) an excitatory system that is archaic in acting slowly and in rather undifferentiated fashion. The cognition-excitation time discrepancy in this adjustment creates what could be considered inappropriate reactions and emotional confusions.

Consider a woman who steps on a snake in the

grass. The event is likely to instigate a strong excitatory reaction, along with evasive action. Consider further that it was a prank by her son who planted a rubber snake. Cognition reveals instantly that her fear is groundless. Excitation, however, is just manifesting itself, and she is likely to tremble for minutes after the shock. During this period of residual excitation from fear, she is bound to overexperience any emotion dictated by cognition. For instance, she might feel abused, get angry, and overreact aggressively. On the other hand, she might feel foolish at being angry and burst into hysterical laughter, exhibiting mirth to a degree that is entirely incommensurate with the safe sighting of a rubber snake.

Excitation transfer thus explains the extreme demonstrations of excitement seeking described by Apter (1992): Apprehension of trauma fosters sympathetic excitation, and residues thereof facilitate the experience of pleasurable excitement upon the apprehension's termination. Apprehension of trauma is but one excitatory precondition, however. Numerous nonthreatening conditions are also capable of evoking excitatory reactions of considerable intensity. Unexpected pleasant events and innocuous surprises can excite. So can stark sensory stimulation. Moreover, excitement may result from empathy with observed liked others or from witnessing the abusive treatment of parties deemed deserving of punishment. For instance, action-inviting music can excite, and so can merely witnessing others' sexual activities or exposure to the fictional portrayal of the slaughter of a serial killer. Residual excitation from all these sources can intensify subsequently experienced pleasurable excitement. It has been demonstrated, for instance, that sexual pleasure can be intensified by excitation from preceding anxiety or anger reactions, that intense enjoyment of drama hinges on the intensity of empathic distress that precedes satisfying resolutions, or that parachuting is most thrilling and gratifying for novices who experience more initial anxiety than hardened veterans of the sport. The excitement-augmenting stimulation may also accompany, rather than follow, the primary instigation of emotion. Embedding exciting sexual images in music videos, for instance, has been shown to elevate the appreciation of the accompanied music.

The experience of pleasurable excitement, then, presupposes two conditions: (a) cognition must foster an appraisal that the prevailing circumstances are safe and rewarding; and (b) sympathetic excitation must be pronounced in order to provide individuals with extero- and interoceptive feedback of being physically excited (e.g., heavy breathing, racing heart, or muscular tenseness). The experience-intensifying excitation may come from different sources, however, and give a global impression.

The mediation of excitation that fuels excitement in-

volves gonadal hormones as well as adrenal catecholamines. The androgen testosterone proves particularly important. According to an analysis by Henry (1986), elevated testosterone levels are uniquely linked with elation that derives from successful social competition and the achievement of dominance. It has been shown that victory in both physical and mental competition leads to increased testosterone release, along with reduced release of the stress hormone cortisol. Defeat has the opposite consequence and results in a depression-like response pattern. The control and mastery of social and environmental circumstances, especially after an expenditure of effort, thus appears to be a potent contributor to pleasurable excitement. Confronting danger in a difficult climb and making it safely to the mountaintop may be exciting, but it would be more exciting if it were linked to victory over competitors: Getting there first promises an elating testosterone rush; getting there last might be depressing despite overcoming danger.

Henry's (1986) analysis includes endocrine processes in the brain. Of particular interest to excitement is the release of endorphins and related opioids. Elation, once achieved, is associated with low endorphin levels. Depressive displeasure is linked with increased endorphin release. These observations help explain why experiences of acute displeasure cannot be sustained for long periods and why, on occasion, they seem to yield euphoric sensations in their wake. In accordance with suggestions by Solomon (1980), it appears that endocrine regulation applies to hedonism in that prolonged experiences of displeasure initiate an opponent process, the release of endorphins, that eventually removes the displeasure and possibly fosters pleasure. The runner's high, which depends on the self-infliction of prolonged bodily torment, could be explained in this way. So might be the oddly pleasurable experience of having watched a tragic play. On the other hand, the symmetry of opponent-process theory projects that no state of intense pleasurable excitement can be sustained and must come to an end, if only because endorphin levels diminish. Findings concerning the release of neuropeptides during pleasurable excitement suggest, however, that a reversal into displeasure does not inevitably follow pleasure. Such regulation merely prevents intense pleasure from becoming painful, and restores the organism's capacity for new bouts of excitement.

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Dolf Zillmann

EXEMPLAR. See Schema.

EXERCISE AND PHYSICAL ACTIVITY. Regular physical activity, defined as any movement created by skeletal muscles that leads to energy expenditure, is an important contributor to health, functioning, and quality of life among people of all ages. The almost exclusive scientific and public health focus prior to the 1980s on vigorous forms of planned, structured exercise aimed at improving physical fitness has been broadened to include a growing appreciation of the benefits of more moderate intensity forms of physical activity on health. Among the established physical health benefits of regular physical activity are lower premature mortality rates for both younger and older adults; decreased risk of cardiovascular disease mortality, high blood pressure, colon cancer, non-insulin-dependent diabetes mellitus, and obesity; and development and maintenance of normal muscle strength, joint structure, joint function, and bone mass, which may play a role in the prevention or treatment of diseases such as osteoarthritis and osteoporosis.

There are a number of physiological mechanisms

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There are a number of physiological mechanisms

through which regular physical activity may exert its protective effects against cardiovascular disease. They include effects on plasma lipoprotein profile, blood pressure, oxygenation of the heart muscle, blood clotting factors, body fat distribution, heart rhythm disturbances, and other factors directly influencing atherosclerotic plaque development.

Regular physical activity also has a positive impact on a variety of psychological outcomes in both clinical and nonclinical populations—mood, symptoms of depression and anxiety, perceived stress, and psychological well-being—factors that have been linked to improvement in health-related quality of life. In addition, the preservation of strength, endurance, and flexibility that accompanies an active lifestyle can promote continued independence, which has been identified as an important contributor to quality of life as people age. Moderate intensity forms of physical activity such as brisk walking appear to be equally effective compared to more vigorous activities in promoting psychological benefits.

The pathways through which regular physical activity promotes psychological benefits remain to be fully explored. Possible mechanisms include increases in core body temperature, which may decrease muscle tension and promote relaxation; physical activity-induced changes in brain neuroreceptor concentrations of monoamines or endogenous opiates; cognitive factors such as enhanced feelings of self-efficacy or mastery; social factors related to positive social interactions or support; and time away from daily stressors.

In addition to its many benefits, physical activity, particularly when it is excessive, can also produce adverse effects, including musculoskeletal injury, metabolic abnormalities, increased contact with environmental hazards (e.g., motor vehicles, uneven surfaces), and, under certain circumstances, serious cardiac events (i.e., heart attack, sudden death). In many cases, such adverse events can be avoided or minimized through gradual increases in physical activity frequency, intensity, and duration commensurate with an individual's capacity and health profile. Although during vigorous physical exertion an individual may be at somewhat higher risk for a cardiac event than at other periods throughout the day, the net impact of regular physical activity is to lower the overall risk of cardiac death.

Epidemiology and Determinants of Physical Activity Patterns

Despite current national recommendations encouraging regular physical activity, only 22% of U.S. adults engage in sustained leisure-time physical activity of any intensity on most days of the week. Another 24% or more of adults are, by self-report, completely sedentary during leisure time. Among the population subgroups

that are at increased risk for being underactive are women, older adults, and groups that are less educated or have lower socioeconomic status. Only about half of U.S. youth between the ages of 12 and 21 participate regularly in vigorous physical activity. Youth participation in all types of physical activity shows a marked decline with age and school grade.

Among the most frequently reported correlates of physical inactivity are a perceived lack of time, issues related to lack of enjoyment, inconvenience, or other perceived barriers to being physically active, lack of confidence in one's ability to engage in regular physical activity (i.e., self-efficacy), lack of support from others, and perceptions concerning the costs relative to the benefits of engaging in regular physical activity. Such factors are potentially mutable with appropriate intervention. In addition, a growing number of studies indicate that physical activity determinants across several different domains (e.g., demographic, physiological, psychosocial, program-based) may interact to facilitate or impede sustained physical activity participation. For instance, evidence from a recent physical activity intervention study suggested that overweight persons assigned to a group-based physical activity program were at highest risk for nonadherence two years later (i.e., only 7.7% were adequately physically active by the second year). In contrast, persons with less than a completed high school education who were less stressed and less fit at baseline relative to other participants, and who were assigned to supervised home-based exercise programs of either high or lower intensity, had the greatest likelihood of successful adherence two years later (i.e., 69.2% were adequately physically active). Such results underscore the importance of continued efforts to understand the combined effects of different physical activity determinants.

Interventions to Promote Regular Physical Activity

In light of the substantial proportion of the population that is currently underactive, the development of interventions to promote regular physical activity across the population at large is essential. Applications of social learning theory and its derivatives that stress the reciprocal interaction of personal, behavioral, and environmental factors on physical activity patterns have met with some success. Such approaches have emphasized the use of goal setting, self-monitoring, regular feedback, ongoing levels of social support, external and self-reinforcement, stimulus-control techniques, and relapse prevention training and other cognitive decision-making strategies to promote early adoption as well as long-term maintenance of physical activity. When such strategies have been combined with a home-based format that allows an individual to choose when and where to exercise, sustained levels of physical activity

participation among both women and men have been demonstrated for up to two years. Ongoing staff supervision and support was provided primarily through mediated channels (i.e., telephone and mail). Recent efforts to utilize behavioral approaches to reduce sedentary behavior among children have also shown promise.

Cognitive-behavioral approaches have been recently combined with models emphasizing processes and stages relevant to motivational readiness for change (e.g., the transtheoretical model) with promising, albeit preliminary, results. Instructional materials and messages are matched to the individual's stage of readiness to engage in physical activity (e.g., precontemplation, contemplation, preparation, action, maintenance).

These and similar conceptual approaches have been applied to physical activity interventions conducted in a variety of community settings, including worksites, health care settings, and schools, with mixed results. Given the newness of the physical activity intervention field relative to other risk factor areas (e.g., smoking cessation, weight control), it is likely that future research in this area will continue to build on successful strategies supplemented with increased audience segmentation and intervention tailoring, with more powerful interventions a likely result.

Given the importance of environmental and policy-related factors on physical activity participation levels, a focus on interventions aimed at environmental and policy change, in combination with individual-level approaches, is essential. The development of such approaches in the United States is in its infancy. However, the push toward reduced physical energy expenditure accompanying this century's modern technological age has imposed increasing limits on natural forms of physical activity, which will likely require policy- or societal-level interventions to counteract. Examples of potentially useful interventions at this level of impact include increased proximity of safe and attractive physical activity resources to homes and worksites; incentives for the development of alternative transportation systems that encourage walking and bicycling; health insurance-based incentives to promote regular physical activity; zoning and land use policies that protect and enhance recreational outdoor space; and building construction and facilities development policies that encourage activity throughout the day (e.g., accessible and attractive stairways). Such environmental and policy interventions can occur within specific community settings (e.g., worksites, schools, public buildings), across the community at large, or at county, state, regional, or national levels.

[See also Anxiety; Depression; Diabetes; Health Belief Model; Health Promotion; Health Psychology, *article on* Assessments and Interventions; Injury; Obesity; Quality of Life; Self-Concept and Self-Representation; Self-Effi-

cacy; Social Learning Theory; Sport Psychology; Stress; and Wellness and Illness.]

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Abby C. King

EXHIBITIONISM is one form of paraphiliac behavior. Paraphilias are described in the *Diagnostic and Statistical Manual* (4th ed.) of the American Psychiatric Association (1994) as characterized by "recurrent, intense, sexually arousing fantasies, sexual urges, or behavior generally involving (1) nonhuman objects, (2) the suffering or humiliation of one's self or one's partner, or (3) children or other nonconsenting persons that occur over a period of six months" (p. 523). The behavior urges or fantasies must cause significant distress or impair the individual in an area of functioning.

Exhibitionism involves the person exposing his genitals to an unsuspecting person. While specific etiology of exhibitionism is unknown, several theories have been proposed to explain the behavior. Psychodynamically oriented theorists see the behavior as a means by which to allay castration anxiety. Behavioral therapists view the behavior as a result of learning experiences, whereby certain behaviors are reinforced by sexual arousal that end in orgasm or by the impact the behavior has on the environment. The role of fantasy is considered crucial in the development of sexual behaviors. Fantasies to which a person masturbates are reinforced and may serve as a rehearsal for the sexual activities that the person ultimately engages in. A biological basis to the behavior has also been proposed

implicating differences in hormonal levels in exhibitionists as compared to nonexhibitionists. As with most behaviors the theory, explaining the etiology of the behaviors should be comprehensive and include biological, social, and psychological factors.

Exhibitionism is a disorder diagnosed almost exclusively in males; however, it can occur in females. A large-scale study including more than 200 exhibitionists found the average age of the men was 28.9 years. These men reported that they first had urges to expose between the ages of 13 and 16. Two thirds of the men acknowledged that they had masturbated while exposing their genitals. When questioned as to what the nature of the desired sexual behavior was with the person they were exposing to, 62.4% reported a desire to touch the target person (victim) intimately, and 51.9% desired to have intercourse. When these men were questioned as to how they wanted the target person (victim) to respond, 35.1% reported that they wanted the target person to have intercourse with them, 0.5% wanted the victim to respond with fear, 14.1% with admiration, 4% with anger, 15.1% wanted the victim to show his or her private parts, 11.9% wanted any type of reaction, and 19.5% said no reaction was necessary at all. (Freund, Watson, & Rinze, 1988).

Exhibitionists may experience other forms of paraphilias. Abel, Becker, Cunningham-Rathner, Mittleman, and Rouleau (1988) interviewed several hundred sex offenders under a certificate of confidentiality. Of those exhibitionists interviewed, only 7% had one category of paraphiliac behavior. Twenty percent had two categories of paraphiliac behavior and 23% had at least three types of paraphilias. Consequently, it is imperative that when an exhibitionist is evaluated that he be assessed for other types of paraphilias as well as the exhibitionism.

Prior to developing a treatment program for the exhibitionist, it is important that a comprehensive assessment be conducted. The assessment should include information regarding the nature of the specific offense (available from police reports), victim characteristics, and any statements made by the victim. Since exhibitionists as well as other sexual offenders are apt to minimize or deny the extent of the sexual offense, it is critical that external sources of information be surveyed. It is also important to obtain a developmental history, legal history, and social and medical history. An extensive and detailed sexual history should be taken. This would include the age of onset of sexual fantasies, urges, and actual sexual behaviors, both paraphiliac and nonparaphiliac. Information pertaining to previous offenses and how particular victims were selected should be obtained. An assessment should be conducted of the individual's cognitive distortions, degree of empathy, specific skills, such as social skills and an-

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ger management. It also would be helpful to conduct psychophysiological assessment of both deviant and nondeviant arousal patterns.

While the exact prevalence of exhibitionism is unknown, a survey of college females indicated that 32% reported that they had been victims of exhibitionism. Exhibitionism is not a victimless crime in that almost all victims report that they are negatively impacted by the experience.

The exhibitionist rarely is self-motivated to receive treatment. In most cases, he enters treatment after he has been arrested and at the recommendation of the legal system. A variety of therapeutic modalities have been used to treat exhibitionists, including individual therapy, group therapy, behavior therapy, cognitive behavior therapy, hormonal treatment and psychotropic medications.

Behavioral approaches have included aversive conditioning, including covert sensitization, assisted covert sensitization, and aversive behavioral rehearsal (ABR). There are two forms of ABR; in vivo ABR (I-V-ABR) involves the therapist having the exhibitionist expose himself to people who know of him in a clinical setting under controlled conditions. The goal is to elicit and confront any fantasies and cognitive distortions that mediate the exhibitionistic behavior. Vicarious aversive behavior rehearsal (V-ABR) involves arranging for the exhibitionist to observe via videotape another exhibitionist being treated with I-V-ABR.

Biological treatments, including hormonal and psychotropic medications, have been used with some individuals who have paraphilias. Anti-androgenic medications have been widely used throughout the world since the late 1960s to treat sex offenders. Medroxyprogesterone acetate (MPA) and cyproterone acetate (CPA), both progesterone derivatives, have been the most extensively used. These medications appear to work best in those paraphiliac individuals with a high sexual drive and less well with those with a low sexual drive. More recently, other forms of pharmacological treatment have been utilized. Fluoxetine has been utilized successfully in the treatment of patients with voyeurism, exhibitionism, pedophilia, and frottage, and in persons who have committed rape (Perilstein, Lipper, & Friedman, 1991).

Serotonergic medications have been used in the treatment of individuals who presented with sexual obsessions, addictions, and paraphilias. As opposed to the above-cited studies, Stein and his colleagues found the medications were ineffective in treating the paraphilias. Those authors hypothesize that compulsivity and impulsivity may be on a neurobiological spectrum in which obsessions and compulsions are at the compulsive end and paraphilias at the impulsive end. It is clear that further controlled research using larger sample

sizes is warranted to evaluate further the efficacy of serotonergic medication in treating individuals with paraphilias.

Relapse prevention utilizes a psychoeducational model that combines behavioral skills training with cognitive intervention techniques. More recently, a relapse prevention model has been described in treating sex offenders. This model involves assisting the individual in identifying high risk situations (those situations in which the individual might be more likely to expose himself), the development of coping skills, specific skills training for dealing with high risk situations, cognitive restructuring, teaching the individual how to cope with urges, enhancing empathy, and specific lifestyle interventions.

Marshall and colleagues (1991) compared two forms of treatment for exhibitionists. The first involved modifying deviant sexual preferences; the second involved enhancing relationship and interpersonal skills and improving awareness of relapse prevention issues. These authors report that exhibitionists can be treated effectively and conclude that those treatments that take a broad conceptualization of the problem (focus on social, cognitive, and interpersonal problems) as opposed to narrowly focusing on deviant sexual preferences have the best chance of success.

For the past two decades, the studies of paraphilias have come under more rigorous investigation. Given the "hidden" nature of these behaviors and the fact that individuals with paraphilias rarely present for treatment on their own, and the majority of those individuals are referred by the legal system, we still do not have extensive information on the extent of exhibitionism in our society. Further research needs to focus on attempting to identify early those individuals at risk for developing exhibitionistic behavior and intervening as soon as possible given that a percentage of exhibitionists will go on to engage in other forms of paraphiliac behavior. Further controlled research is also called for to investigate the success of the relapse prevention model in treating exhibitionists as well as for the research looking at psychopharmacological treatments in conjunction with cognitive behavioral treatments.

[See also Sexual Disorders.]

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Judith V. Becker

EXISTENTIALISM. “Existentialism,” writes Maurice Friedman in *The Worlds of Existentialism*,

is not a philosophy but a mood embracing a number of disparate philosophies; the differences among them are more basic than the temper which unites them. This temper can best be described as a reaction against the static, the abstract, the purely rational, the merely irrational, in favor of the dynamic and the concrete, personal involvement and “engagement,” action, choice, and commitment, the distinction between “authentic” and “inauthentic” existence, and the actual situation of the existential subject as the starting point of thought. Beyond this the existentialists divide according to their views on such matters as phenomenological analysis, the existential subject, the intersubjective relation between selves, religion, and the implications of existentialism for psychotherapy.

Existentialism is a direction of movement toward particulars, but it is not and can never be an espousal of the particulars at the expense of all generality and abstraction. If that is recognized, a distinction must still be made between philosophers who are existentialist in the sense of analyzing existence according to general existential categories and others who are existentialist in the very different sense of pointing to the unique and concrete in existence that lies beyond all analysis.

Forerunners

While the forerunners of existentialism reach all the way back to Heraclitus and the Hebrew Bible, it is the

nineteenth-century Danish theologian Søren Kierkegaard (1813–1855) who is the founder of the philosophy of existence proper, through his emphasis on the existential subject—the “Single One,” whom Kierkegaard opposed to “the crowd” (= “untruth”). Kierkegaard saw the Single One as set in a direct relation with a transcendent God, but before this relationship can come into being a person must have discovered her true inwardness, and it is with all the passion of this inwardness that Kierkegaard clings to the “absurd” and attacks the “system.”

The Russian novelist Fyodor Dostoevsky may also be considered a forerunner of twentieth-century existentialism through his awareness of *Angst*—the anguish and dread of human existence, his concern with the recovery of the human being’s alienated freedom, his emphasis on the particular fact and the absurd, and his portrayal of the “man-god’s” proclamation of self will in remarkable anticipation of Nietzsche and Sartre. Friedrich Nietzsche’s teaching of “will to power,” of “the death of God”—the loss of any absolute base for values, of the importance of the self, of man as a valuing animal, of the uniqueness of each person’s way—all make him one of the foremost proto-existentialists.

Phenomenology

Although the leading phenomenologists—Wilhelm Dilthey and Edmund Husserl—were not themselves existentialists, and many existentialists are not, or are only very secondarily, phenomenologists, we cannot understand existentialism adequately without touching on phenomenology. Dilthey based his thought on the radical difference between the way of knowing practiced in the *Geisteswissenschaften*—the human studies such as philosophy, the social sciences, and psychology—and that practiced in the *Naturwissenschaften*—the natural sciences. In the former, one cannot be merely a detached scientific observer but must also participate oneself, for it is through one’s participation that one discovers both the typical and the unique in the aspects of human life that one is studying. At the same time, one must suspend foregone conclusions and the search for causality that marks the natural scientist in favor of an open attempt to discover what offers itself.

The man who raised phenomenology from an approach to philosophy to a systematic philosophy was Edmund Husserl (1859–1938). By the method of “parenthesizing,” or phenomenological reduction, he replaced the detached subject and independent object of older philosophy with a field of knowing in which phenomena are accepted as pure phenomena without their independent existence being questioned. The existential status of the world arises “from me as the transcendental Ego,” Husserl wrote, and the exploration of the field of transcendental experience becomes equivalent to the phenomenological knowledge of the world.

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It was inevitable that Husserl's existentialist successors would either: emphasize the direct experiential quality of his thought, as opposed to the idealist, like the French philosopher Maurice Merleau-Ponty; break with the transcendental ego altogether while retaining the method of phenomenology and the reality of intersubjectivity, like the French philosopher, novelist, and playwright Jean-Paul Sartre; or transform phenomenology from a method of knowledge into a "fundamental ontology," like the German philosopher Martin Heidegger.

Both Sartre and Heidegger accepted Husserl's motto "To the things themselves" as an obstacle to any attempt to find Being behind phenomena; only an existential analysis of the existent, the "ontic," would yield any knowledge of being. For Heidegger, this analysis was posited on his special use of *Dasein*—the person's "being there" in the world, thrown into a situation apart from which neither subject nor consciousness have any meaning. But while Sartre rejected Husserl's transcendental ego in favor of an impersonal consciousness which is nothing other than an emptiness or absence in the presence of the solid being of existents, Heidegger moved toward a concept of Being—the "ontological"—that was linked more with person than with consciousness—the person who becomes aware of herself as "there," "thrown," "in the world."

Karl Jaspers, under the influence of Kant, Kierkegaard, and Dilthey, but independent of Husserl, developed his own phenomenology of "limit situations," which had an important influence on Heidegger. Later, Jaspers explicitly rejected "ontology"—the study of Being—in favor of "the Encompassing," or "the Comprehensive"—a way of knowing that transcends the subject-object relationship even more radically than phenomenology by recognizing that we can never grasp the whole reality since we are a part of it. Martin Buber took the phenomenology of Dilthey over into the kind of knowing that is central to the "I-Thou" relation—one which emphasizes the incomparable uniqueness of what is known in mutual relationship.

The Existential Subject

Each existential thinker stresses becoming a real person, a Single One, an authentic human being, and each is opposed to those trends of the age that level, objectify, depersonalize, alienate, or divide the human person. Martin Heidegger's treatment of the existential subject, though lacking the religious counter-pole of Kierkegaard's, is like Kierkegaard's in his contrast between the authentic self and "*das Man*"—the "One," or the "They," who is lost in the anonymity of what others think. Through resolute anticipation of one's death as one's nonrelational, not-to-be-outstripped, ownmost reality, one is called back to authentic existence.

With Sartre, the existential subject becomes still

more sharply defined: first, by cutting off from the self every link with Being or transcendence that would serve as a guide to value decisions; and second, through his dialectic between *pour soi*—the subjectivity of the self from within, and "for itself"—and *en-soi*—the self regarded objectively, whether by another or oneself, as "in itself," in the same sense that any definite object is.

Martin Buber finds the authentic self in the sharing of the I-Thou relationship, in the Single One, who is responsible to its interhuman Thou. One realizes one's unique direction ever anew in one's meeting with the concrete situation in which one finds oneself: "All real living is meeting."

Intersubjectivity

In Kierkegaard, the relationship between person and person tends to be secondary and inessential—an obstacle to becoming a Single One and to having an absolute relation to the Absolute. In contrast, the twentieth-century existentialists all recognize intersubjectivity in one form or another as essential to human existence. Yet even here a distinction must be made between such thinkers as Heidegger, Sartre, and Paul Tillich, for whom the intersubjective tends to remain a dimension of the self, and such thinkers as Martin Buber, Gabriel Marcel, Karl Jaspers, and Albert Camus, who in one way or another see the relationship between person and person as central to human existence.

Even between Heidegger and Sartre there are important differences. Heidegger's intersubjectivity remains the vague we of his "*Mitsein*" or "*Mitdasein*"—a being with others that expresses itself in solicitude but not in that sharp conflict between one particular person and another, which for Sartre enters into intersubjectivity.

Buber criticizes Heidegger's "solicitude" as monological. Heidegger's treatment of death as one's ownmost, ultimate, nonrelational reality does, in fact, show that *Mitsein* is not as basic for him as *Dasein*. On the other hand, Sartre's emphasis on conflict and particularity never take him beyond what Buber would call the "I-It" relation, in which I know the other only as a subject or because I am aware of his looking at me as an object or because, in lovemaking, I am trying to possess his freedom and make it subject to my own. This also leaves Sartre short of the more rationalistic notion of *Kommunikation*, which is so central to the thinking of Karl Jaspers, and of the existence "for others," which Merleau-Ponty recognizes in his phenomenology.

Like Sartre, Albert Camus starts with Descartes's *cogito ergo sum*, yet he goes on to the dialogue between persons in which human beings really come to exist and sees both the interchange and the limitations of that dialogue as the key to real humanity. Gabriel Mar-

cel arrives, like Buber, at a radical philosophy of I and Thou (*je et toi*), which he also understands, like Buber, as an approach to epistemology as well as to ethics and religion.

Atheist, Humanist, Religious, and Theological Existentialists

The distinction between atheist and theist existentialists, which Jean-Paul Sartre put forth in his famous essay "Existentialism Is a Humanism," obscures real differences and similarities of attitude, which are far more important even in terms of religion. Camus never ceased to speak of himself as an atheist, yet the latter Camus is closer in attitude to the theist Buber than he is to the atheist Sartre. Camus himself confirmed this by saying that he would not mind being called religious in Buber's sense of the I-Thou relationship.

As Heidegger's early thought represents a progression from phenomenology to "fundamental ontology," so his later thought represents a progression from "fundamental ontology" to metaphysics. Metaphysics, to Heidegger, begins by asking why there is anything instead of nothing, and ends with a mystical Nothingness and a wonder in the face of it reminiscent of the seventeenth-century Lutheran mystic Jacob Boehme's *Ungrund*. While Heidegger's goal—reaching the truth of Being—has not changed, his way to that goal is different. In *Being and Time*, Heidegger is exclusively occupied with an existential analysis of *Dasein*, whereas in his later thought he proceeds more directly to Being or Nothingness as such, even though it is a Being which he carefully guards from any confusion with the static or ideal Absolutes of traditional metaphysics.

Nietzsche, Sartre, Heidegger, and Buber all speak of the "death of God," but to each it means something essentially different. To Nietzsche it means the loss of a base for values that makes way for the will to power that creates new values and leads to the superman, or overman. For Sartre it means the necessity of inventing one's own values and choosing oneself as an image of the human for all persons. For Heidegger it means a void that cannot be filled by any overman, but the occasion, nonetheless, for a succession of new divine images arising out of the human being's clarifying thought about being. For Buber it means the "eclipse of God," which comes when God answers the human turning away—the predominance of the I-It relationship—by seeming to be absent himself.

Paul Tillich has said that existentialism provides the questions, the religious traditions the answers. Actually, an essential difference among the so-called religious existentialists is that some of them understand the "answers" in as thoroughly existentialist terms as the questions, while others follow an existentialist analysis of the human condition with an appeal to traditional theology as the only valid response to that situation. In

fact, we must distinguish between religious existentialists, such as Martin Buber, the German-Jewish philosopher Franz Rosenzweig, the Russian Orthodox philosopher Nicolas Berdyaev, the Austrian Catholic thinker Ferdinand Ebner, and the French Catholic philosopher Gabriel Marcel, and existentialist theologians such as the German-American Protestant Paul Tillich, and the French Catholic Thomist Jacques Maritain.

Not only has Paul Tillich incorporated his existential analyses into his systematic theology, he had also attempted to use his existential approach as a specific proof of the superiority of Protestant Christianity to all other forms of religion. Tillich accepts Buber's I-Thou relationship with God, but ultimately wants to go beyond Buber's "eternal Thou" to "the God beyond God," the "ground of Being," which he sees as superior to both mysticism and theism. Buber, on the other hand, offers "the Absolute Person," the eternal Thou, who is not a person but becomes one only in relation with us. Tillich, in contrast, desires a *gnosis*—a knowledge which will give a more secure foundation to faith than that existential trust that knows meeting and presence but no continuity and security.

Existentialism and Hermeneutics

Existentialism has also had a significant impact on the postmodern emphasis on hermeneutics—the science of interpretation. Here we need only think of the writings of the French philosopher Paul Ricoeur, the impact of both Heidegger and Buber on Hans Georg Gadamer, Jurgen Habermas, Emmanuel Levinas, and through Levinas on Jacques Derridas, and Buber's central impact on the highly influential Russian literary theorist Mikhail Bakhtin and a number of other hermeneuts.

Existential Psychology and Psychotherapy

A number of existential thinkers have made significant contributions to psychology and psychotherapy—Kierkegaard with his concepts of *Angst* (anxiety or dread) and "sickness unto death" (the despairing will not to be oneself or the defiant will to be oneself); Jaspers with his concept of limit situations and his critique of the objectification of freedom by psychoanalysis; Buber with his concepts of distance and relation, confirmation, "imagining the real," existential guilt, and healing through meeting; Sartre with his concepts of bad faith, the lability of consciousness, freedom and choosing one's own project, existential analysis, and sex as the incarnation of subjectivity and the subjection of freedom to domination of the other; Tillich with his concepts of ontological anxiety and the courage to be.

Three explicitly existential psychotherapists are the Viennese neuropsychiatrist Viktor Frankl, founder of "logotherapy," and the two Swiss psychiatrists Ludwig Binswanger, founder of "existential analysis," and Me-

dard Boss, founder of "Daseinanalysis." In America, the spearhead of existential psychotherapy was Rollo May, who was strongly influenced by Kierkegaard and Heidegger, and to a lesser extent by Buber. Boss was strongly under the influence of Heidegger. Binswanger attempted to combine Heidegger's phenomenology ontology, which he called "world design," with Buber's categories of the interhuman as well as Kierkegaard's "sickness unto death."

Phenomenological analysis can certainly help in understanding, but it is not the same as direct communication between one person and another. Binswanger's analytic-synthetic "world-design" cannot capture the uniqueness and wholeness of a person, for these are only revealed in the dialogue between I and Thou. "The configuration of self and world or self to self is not existential," Paul Goodman has remarked. "It is interpretation just in the Freudian sense. Real existential psychotherapy would try to do as far as possible without interpretations and stick to particular situations." When Binswanger's analysis of the dead Ellen West as "Thou" takes the place of the meeting with a live Ellen West in therapy, the existential itself has been submerged in the waters of a new essentialism.

Also important for the development of existential psychotherapy is the movement of dialogical psychotherapy, based on Buber's philosophical anthropology and his healing through meeting. This movement began with Hans Trüb, who moved from Carl Jung's dialectical psychology to Buber's dialogical anthropology. It has been carried forward by Leslie H. Farber with his "psychology of the will," and after him by Maurice Friedman and Richard Hycner, codirectors of the Institute of Dialogical Psychotherapy in San Diego, by William Heard, California psychologist, and Ivan Boszormenyi-Nagy, M.D., and Barbara Krasner with their "contextual [intergenerational family] therapy." Because a number of existentialists have been influenced by Harry Stack Sullivan's interpersonal psychiatry, it is important to recognize that the "interpersonal" cannot be equated with Buber's concept of the "interhuman." Many interpersonal relations are really a mixture of direct I-Thou relationships and indirect I-It ones, and some are almost purely I-It.

Existentialism has also had an impact on the movement of humanistic psychology. Most Humanistic Psychologists emphasize the present and presentness, and are concerned with the dynamic and the concrete and with the self as the existential subject. Rollo May was a leading figure in both existential and humanistic psychology. Carl Rogers, another central figure in humanistic psychology, was decisively influenced by both Søren Kierkegaard and Martin Buber, and some of the most prominent Gestalt therapists have been strongly influenced by Buber's concept of the I-Thou relationship. On the other hand, both Viktor Frankl and Mau-

rice Friedman have strongly criticized that emphasis on self-realization and self-actualization, which has been central for Rogers, Abraham Maslow, and many other humanistic psychologists, pointing out that self-realization is the by-product and not the goal.

[See also Hermeneutics; Humanistic Psychology; Phenomenological Psychology; and Phenomenology.]

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EXISTENTIAL PSYCHOLOGY. See Existentialism; and Phenomenological Psychology.

EXPECTANCY EFFECTS refer to the situation in which expectations we hold for ourselves or for others come to serve as self-fulfilling prophecies, a concept introduced to the social sciences by Merton (1948). [See Self-Fulfilling Prophecy.]

Two Types of Expectancy Effects

The two main types of expectancy effects are intrapersonal expectancy effects and interpersonal expectancy effects. *Intrapersonal expectancy effects*, sometimes called *self-expectancy effects*, refer to the situation in which expectations we hold for our own behavior help

to bring about that behavior. When athletic coaches tell their athletes, “you can do it,” they are trying to bring about an intrapersonal expectancy effect or an intrapersonal self-fulfilling prophecy. Creating a more favorable self-expectancy is believed to improve actual performance. Another everyday example of an intrapersonal expectancy effect is the well-known placebo effect in which the patients' expectation that they will respond favorably to the treatment administered actually leads them to improve even though no real treatment has been administered. (See Placebo Effect in Research Design.)

Interpersonal expectancy effects refer to the situation in which it is the expectation of one person for the behavior of a different person that actually helps to bring about that behavior. This phenomenon has been investigated experimentally since the late 1950s, both in the laboratory and in everyday life. One example of interpersonal expectancy effects in everyday life was described by Robert Rosenthal and Lenore Jacobson (*Pygmalion in the Classroom*, New York, 1968/1992). In the Pygmalion experiment, all of the teachers of an elementary school were told that a newly devised computer program was able to predict the intellectual development potential of children in their classroom. At the very beginning of the school year, a handful of children's names were selected completely at random and given to their teachers, who were told that those children would bloom intellectually in the academic year just begun. At the end of the school year those children whose names had been placed arbitrarily on the list of bloomers did, in fact, show greater intellectual gains than did the children in the control group.

Perhaps more surprising than these results from everyday life were the results showing that interpersonal expectancy effects could operate even in the controlled environs of a psychological experiment in such a way that psychological experimenters who expected a certain type of result were more likely to obtain that result because they expected it.

Research on Experimenter Expectancy Effects

The first experiments designed to investigate the effects of experimenters' expectations on the results of their research employed human research participants. Graduate students and advanced undergraduates in psychology were employed to collect data from introductory psychology students. The experimenters showed a series of photographs of faces to the research participants and asked participants to rate the degree of success or failure reflected in the photographs. Half the experimenters, chosen at random, were led to expect that the research participants would rate the photos as being of more successful people. The remaining half of the experimenters were given the opposite expectation.

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EXPECTANCY EFFECTS. Table 1. Strategies for the control of experimenter expectancy effects

-
1. Increasing the number of experimenters:
 - Decreases learning of influence techniques,
 - Helps to maintain blindness,
 - Minimizes effects of early data returns,
 - Increases generality of results,
 - Randomizes expectancies,
 - Permits the method of collaborative disagreement,
 - Permits statistical correction of expectancy effects.
 2. Observing the behavior of experimenters:
 - Sometimes reduces expectancy effects,
 - Permits correction for unprogrammed behavior,
 - Facilitates greater standardization of experimenter behavior.
 3. Analyzing experiments for order effects:
 - Permits inference about changes in experimenter behavior.
 4. Analyzing experiments for computational errors:
 - Permits inference about expectancy effects.
 5. Developing selection procedures:
 - Permits prediction of expectancy effects.
 6. Developing training procedures:
 - Permits prediction of expectancy effects.
 7. Developing a new profession of psychological experimenter:
 - Maximizes applicability of controls for expectancy effects
 - Reduces motivational bases for expectancy effects
 8. Maintaining blind contact:
 - Minimizes expectancy effects (see Table 2).
 9. Minimizing experimenter-subject contact:
 - Minimizes expectancy effects (see Table 2).
 10. Employing expectancy control groups:
 - Permits assessment of expectancy effects.
-

EXPECTANCY EFFECTS. Table 2. Blind and minimized contact as controls for expectancy effects

Blind Contact

- A. Sources of breakdown of blindness
 1. Principal investigator
 2. Subject (side effects)
- B. Procedures facilitating maintenance of blindness
 1. The total-blind procedure
 2. Avoiding feedback from the principal investigator
 3. Avoiding feedback from the subject

Minimized Contact

- A. Automated data collection systems
 1. Written instructions
 2. Tape-recorded instructions
 3. Filmed instructions
 4. Televised instructions
 5. Telephoned instructions
 6. Computer-based instructions
 - B. Restricting unintended cues to subjects and experimenters
 1. Interposing screen between subject and experimenter
 2. Contacting fewer subjects per experimenter
 3. Having subjects or machines record responses
-

Despite the fact that all experimenters were instructed to conduct a perfectly standard experiment, reading only the same printed instructions to all participants, those experimenters who had been led to expect ratings of faces as being more successful obtained such ratings from their randomly assigned participants. Those experimenters who had been led to expect results in the opposite direction tended to obtain results in the opposite direction. The idea that experimenters' expectations could actually affect participants' responses in the laboratory were at first so controversial that several replications, and eventually scores of replication experiments, were conducted, the combined evidence from which was quite robust (Rosenthal & Rubin, 1978).

If the results of those experiments employing human participants were surprising, the results of experiments employing animal subjects were even more so. In the first of those experiments, experimenters were told that their laboratory was collaborating with another laboratory that had been developing genetic strains of maze-bright and maze-dull rats. The task was explained as simply observing and recording the maze-learning performance of the maze-bright and maze-dull rats. Half the experimenters were told that they had been assigned rats that were maze-bright, whereas the remaining experimenters were told that they had been assigned rats that were maze-dull. None of the rats had really been bred for maze-brightness or maze-dullness, and experimenters were told what type of rats they had been assigned purely at random. Despite the fact that the only differences between the allegedly bright and dull rats were in the minds of the experimenters, those who believed that their rats were brighter obtained brighter performance from their rats than did the experimenters who believed that their rats were duller. Essentially, the same results were obtained in a replication of this experiment employing Skinner boxes instead of mazes.

Control of Experimenter Expectancy Effects

The cumulative evidence from nearly five hundred studies demonstrates the occurrence, magnitude, and importance of interpersonal expectancy effects. To the extent that these effects occur in everyday life, we have a substantive phenomenon of great importance that is discussed in other articles. To the extent that these effects occur among psychological experimenters, we have a methodological problem that must be addressed. Although it is not possible to give the details here of various procedures that have been proposed to help control the problems created by experimenter expectancy effects, Tables 1 and 2 give a brief overview; detailed resources are listed in the Bibliography.

[See also *Artifact*, article on *Artifact in Research*.]

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Robert Rosenthal

EXPERIENTIAL PSYCHOTHERAPY. The phrase *experiential psychotherapy* is generally recognized as being introduced in the 1950s and 1960s to refer to the distinctive psychotherapeutic approach of Carl Whitaker, Thomas Malone, John Warkentin, and Richard Felder, four American psychiatrists. Since then, the phrase has been used to identify at least two dozen different psychotherapies, and an additional two dozen or so claim membership in a rather large and somewhat loose family of experiential psychotherapies.

Even though the family is not especially tightly knit or easily identified, perhaps the main kinship is in regard to what is and what is not relied upon as the way of helping to bring about psychotherapeutic change. In general, this family declines such common ways as the client's gaining insight and understanding, the development of a new and better way of thinking, modifying

what the client's behavior is supposed to be contingent upon, or changing the group of which the client is a part.

Members of the experiential family share a trusted belief that psychotherapeutic change occurs mainly through "experiencing." At a rather loose and general level, this refers to discovering and accessing, facilitating and enhancing, opening up and carrying forward, what the person is experiencing, undergoing, and feeling, both on the surface and at a deeper level inside the person.

Beyond a shared belief in this rather loose and general, but perhaps distinctive avenue of bringing about psychotherapeutic change there is plenty of healthy diversity among family members. They differ a great deal in underlying philosophies and philosophies of science, in their specific meanings of experiencing, in their underlying theories of how a person comes about in the first place, in how a person develops and changes, in conceptions of personality structure, in what a person can become, and in their methods for psychotherapeutic change.

Where is the experiential family to be placed relative to other families of psychotherapy? If families are organized into psychoanalytic-psychodynamic, cognitive-behavioral, existential-humanistic, and eclectic-integrative, then the experiential family would probably fall under the existential-humanistic umbrella. If experiential psychotherapy is thought of as valuing experiencing as the avenue of change, and if its philosophy and theory are allowed to be a little flexible, the family can be stretched to include, for example, existential therapy, client-centered therapy, Gestalt therapy, and a few others.

What are some up-close, actual examples of the experiential psychotherapies? There are perhaps four rather different cornerstones.

One is the pioneering experiential psychotherapy of Whitaker, Warkentin, Malone, and Felder, with contributions by others such as Jourard and Moustakas. Psychotherapeutic change is understood as occurring mainly through the direct, clashing encountering-meeting of the whole self of the person and the whole self of the therapist. The whole self includes not only what the person or therapist is feeling, undergoing, or aware of on the surface, but especially the world of inner, deeper, ordinarily sealed off and withdrawn, hidden thoughts, feelings, and experiencings. Change is the product of the wholesale, unrestricted opening up, disclosing, and revealing of what is deeper inside both the therapist and patient. This is the encountering-meeting. Although the theory of psychotherapy may be relatively distinctive, this experiential psychotherapy is cast within a larger psychoanalytic-psychodynamic theory of human beings and personality.

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A second cornerstone experiential psychotherapy evolved from the client-centered therapy of Carl Rogers, and is exemplified by the existential writings and the psychotherapeutic approach of Eugene Gendlin. In this approach, change occurs mainly through the progressively deeper exploration, carrying forward, and unfolding of internally felt meanings. Experiencing starts by clearing a space, selecting some personal problem, and directing attention to the ensuing inner-felt sense. By enveloping this sense with the sensitively right words and images there is a release, a "give," a palpable experiential shift in the concretely and bodily felt inner sense, or meaning.

A third cornerstone experiential psychotherapy is associated with the work of Laura Rice, Leslie Greenberg, Jeremy Safran, Robert Elliott, Fred Zimring, Shaké Toukmanian, and others. Therapy opens with the identification of a problematic concern and continues with an explicit focus on and processing of feeling-affective-emotional material. This processing is important because change is held as occurring largely through the contribution of processed feeling-affective-emotional material to the reorganization or reevaluation of the cognitive-perceptual framework, the cognitive structure or schema, frame of reference, or mode of information processing in regard to oneself, one's world, or the problem of concern.

The fourth cornerstone of experiential psychotherapy is from the philosophical, theoretical, and clinical writings of Alvin Mahrer. Each session opens with the identification of a scene of powerful feelings. By entering into and living in this scene, the actual moment of peak feeling serves as an entry into the inner world of deeper experiencing. Once a deeper potential for experiencing is discovered, the person is enabled to (a) welcome and appreciate the deeper potential for experiencing; (b) undergo the radical shift out of the ordinary continuing person and into the wholesale new person, who is the deeper experiencing; and (c) become a transformed, qualitatively new person, with the formerly deeper experiencing as an integral part of the new person. Each session is an opportunity for deep-seated transformation and for being free of whatever scene of bad feeling was front and center for that session.

Inside the field of psychotherapy, the experiential family has its own distinctive ways of working with dreams, infants and children, couples and groups, and patients labeled as psychotic. Outside the field of psychotherapy, the family's conceptualizations of personality structure, the origins of personality, infant and child development, how and why change occurs, and what people can become are largely borrowed from humanistic and psychodynamic theories. However, distinctively experiential conceptualizations are emerging

from the philosophies and theories of Eugene Gendlin, Alvin Mahrer, and other existential-experiential writers.

Research on experiential psychotherapy is weak and is generally directed toward the study of in-session process work rather than assessment of outcome. Indeed, a review of research on experiential psychotherapy candidly concludes that "there is relatively little systematic research on the outcomes of experiential treatments" (Greenberg, Elliott, & Lietaer, 1994).

[See also Gestalt Therapy.]

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Alvin R. Mahrer

EXPERIMENTAL DESIGN. See Research Methods.

EXPERIMENTAL NEUROSIS. Experimental neurosis is a laboratory-induced emotional reaction that was dis-

covered in the context of animal conditioning experiments. The discovery was made in the laboratory of Ivan P. Pavlov (1849–1936), the Russian physiologist. Pavlov's research focused on digestion and responses such as salivation and secretion of various glands as a way of understanding neurological processes. This work led to the study of learning—specifically, how reflexive responses could be elicited by various stimuli unrelated to digestion.

Experimental neurosis emerged serendipitously in conditioning of dogs in two separate experiments in 1912 and 1913. These experiments, conducted by Mariya Yerofeyeva (1867–1925) and Nataliya Shenger-Krestovnikova (1875–1947), showed that under special circumstances, conditioning of animals was disrupted; the animals became visibly agitated and lost all of the responses that had been trained up to that point. For example, in one of the experiments a dog learned to salivate in the presence of a circle, which had been paired with food, but not in the presence of an ellipse, which had not been paired with food. The animal made the discrimination between a circle and ellipse, even after the ellipse was altered gradually to resemble the circle. With a difficult discrimination, the dog became very agitated, barked violently, and attacked the apparatus, and all simple discriminations that had been learned were lost. This disturbance of the conditioned reflex and the resulting emotional reactions were termed *experimentally induced neurosis* (Pavlov, *Conditioned Reflexes: An Investigation of the Physiological Activity of the Cerebral Cortex*, London, 1927) and later came to be called *experimental neurosis*. Other researchers extended the ways of inducing these reactions and the range of species in which the reactions were demonstrated, including goats, sheep, pigs, rabbits, cats, and dogs. The range of responses that characterized experimental neurosis was vast and, depending on the species, included irritability, aggression, regressive behavior, escape and avoidance, and disturbances in physiological activity, such as pulse, heart, and respiration rates.

Pavlov hypothesized that when in conflict, two processes of the brain, inhibition and excitation, led to a disruption of behavior. His views and those of others were extended to account for psychiatric disorders and emotional reactions in humans. Over the years, reservations have been expressed as to whether laboratory-induced reactions in animals bear any more than a superficial resemblance to human anxiety and fear. Nevertheless, investigation of experimental neurosis has had significant impact on the conceptualization of psychological disorders and their treatment. For example, Joseph Wolpe, a physician working in South Africa in the early 1950s, induced experimental neurosis in cats, devised procedures to eliminate these reactions, and then extended the procedures in such a way that

they could be applied to treat anxiety in humans (Wolpe, *Psychotherapy by Reciprocal Inhibition*, Stanford, CA, 1958). This work culminated in the development of systematic desensitization, an effective treatment for anxiety.

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Alan E. Kazdin

EXPERIMENTAL PSYCHOLOGY. Edwin G. Boring, a historian of experimental psychology, claimed that “the application of the experimental method to the problem of mind is the great outstanding event in the history of the study of mind, an event to which no other is comparable.” Producing a comparison by manipulating independent variables and observing their effects on dependent variables (measured behavior) defines the basic methodology of experimental psychology. This method allows the psychologist to determine causal relations between the manipulated and measured variables.

The Nineteenth Century

The birth of experimental psychology usually is cited as 1879, when Wilhelm Wundt opened his psychology laboratory at the University of Leipzig. Wundt, however, had many precursors who experimented on psychological phenomena. Important compatriots include Ernst Weber, who studied the sense of touch and Gustav

Fechner, who developed psychophysical methods. Hermann von Helmholtz made a variety of experimental contributions in sensory and neural physiology and is known for his books summarizing the psychology and physiology of vision and hearing.

In the United States, William James and his students at Harvard University scientifically studied psychology while Wundt was developing his laboratory. James had a psychological laboratory at Harvard that may have opened prior to Wundt's at Leipzig, although there is controversy about this possibility.

Wundt rates as founder of experimental psychology because of two legacies. The first relates to his written contributions to early psychological thought, which counted over 50,000 pages in 491 items. One of his books went through 15 editions, and Wundt founded the first journal devoted to experimental psychology, *Philosophische Studien*, in 1881.

The second legacy results from his teaching and advising. Wundt directed 186 doctoral dissertations, and the Leipzig laboratory was cosmopolitan, with students coming not only from Europe but also from Russia and the United States. Many of his students became major figures in the history of experimental psychology.

Although Wundt's importance should not be underestimated, many early figures in experimental psychology did not have direct ties to him. Some prominent ones include: Franciscus Donders (reaction time), Hermann Ebbinghaus (human memory), Ewald Hering (color vision), Oswald Külpe (perception), and Edward L. Thorndike (animal learning).

The laboratories of James and Wundt were quickly emulated. This was the case especially in North America, where over 40 psychological laboratories were established by the end of the nineteenth century.

Schools of Psychology

Around 1900, different approaches to experimental psychology cohered into schools of thought that dominated theory and research for nearly four decades. These schools are: structuralism, functionalism, behaviorism, and Gestalt psychology. Their research and theoretical disagreements provided an intellectually rich background for contemporary experimental psychology.

Structuralism. Edward B. Titchener studied with Wundt and later went to Cornell University. Titchener proclaimed that psychology's subject matter is mind with consciousness as the direct object of examination. Consciousness represented the sum of current mental processes, and the task of the experimenter involved selecting some point to obtain data. To obtain these data, structuralists used introspection as their primary method of investigation. Because introspection required well-trained observers to make accurate verbal reports of their conscious elements, structuralists studied the "generalized normal adult mind," ignoring behavior as

data and ignoring animals, children, and humans with limited verbal skills.

Titchener thought his approach was rigorous and experimental; however, the school ran into serious difficulties owing to heavy reliance on introspection. Introspective reports lack reliability across observers, and they lack validity because they cannot be independently corroborated. Thus, moot controversies arose between introspectionists in different laboratories, resulting in vigorous attacks against introspection, especially by the behaviorists and Gestalt psychologists. Structuralism as a school died when Titchener died, but its legacy was profound. Structuralism served as a target on which the other schools practiced their theories and methods.

Functionalism. If structuralism examined the *is* of mental life, then functionalism studied what mental life *is for*. Functionalism tried to apply Darwinian survival notions to psychology by minimizing introspection of consciousness and emphasizing how basic psychological processes fit into an organism's adaptation. Thereby, animals, children, and the demented became objects of study in contrast to structuralism.

The broader scope demanded methodology other than introspection, and the functionalists were among the first to study animals in controlled circumstances. One aim involved studying how learning led to adaptation. Thorndike, among the first animal experimentalists, developed procedures now known as instrumental conditioning. Thorndike and his colleagues at Columbia University, James McKeen Cattell and Robert S. Woodworth, were a prominent group of functionalists, along with those at the University of Chicago, who included James Angell and Harvey Carr. One of Angell's students, John B. Watson, later rebelled against the remnants of mentalism in functionalism and founded a new school of thought.

Behaviorism. John B. Watson's agenda focused on ridding psychology of mentalistic concepts that he believed led to sloppy science:

Psychology as the behaviorist sees it is a purely objective, experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods nor is the scientific value of its data dependent on the readiness with which they lend themselves to interpretation in terms of consciousness. The behaviorist, in his efforts to get a unitary scheme of animal responses, recognizes no dividing lines between man and brute. ([1913], *Psychology as the behaviorist sees it*, *Psychological Review*, 20, 158-177)

Watson's manifesto rested on the success of his early animal research. His dissertation, written in 1907, as well as other research he did at Chicago, concerned how rats learned mazes. These methodologically clever experiments had a major impact on experimental psychology that is still seen today. While still in graduate

school, he conducted field studies on bird behavior, as well as research on a variety of animals. He accepted a position in the department of psychology at Johns Hopkins University in 1908.

In his 12 years at Hopkins, Watson's influence on psychology grew. He undertook famous studies on the classical conditioning of emotions in children, and he popularized the conditioning methods of Ivan Pavlov. Watson was fired in 1920 as a result of a marital scandal, and he had only occasional ties to academic psychology thereafter. Nevertheless, Watson had a substantial impact on experimental psychology. Because its main dependent variables are behaviors, experimental psychology today can be characterized as behavioristic.

Gestalt Psychology. On the basis of perceptual phenomena such as apparent movement, the Gestalt psychologists developed theories contrary to the atomistic and analytic approaches of most experimentalists. The school began in Germany around 1912 under the aegis of Max Wertheimer and his students Wolfgang Köhler and Kurt Koffka. With the rise of Nazism, these psychologists came to the United States.

Gestalt roughly means "whole" or "form," and this notion appears in the creed of Gestalt psychology: the whole is different from the sum of its parts. Thus, breaking a percept into its components is a counterproductive way of understanding it. This idea was also applied to animal learning by emphasizing insight and intelligence rather than conditioned reflexes. Later, Kurt Lewin extended the notion to motivation and social behavior. Although the molar approach of the Gestaltists tempered the excesses of structuralism and behaviorism, their early impact was limited. Later, a Gestalt flavor appears in contemporary cognitive psychology.

Learning Theory

From the middle 1930s to the late 1950s, a major topic of concern of experimental psychologists was learning. Students of animal learning, such as Edwin Guthrie, Clark Hull, B. F. Skinner, Kenneth Spence, and Edward C. Tolman, dominated the literature of psychology and broadened the conditioning techniques of Pavlov, Thorndike, and Watson. Hull's influence extended to personality theory and social psychology, and Skinner's ideas were applied to teaching and the treatment of behavior disorders.

Contemporaneously, several experimentalists focused on human learning. Extending the general method used by Ebbinghaus, Arthur Melton and Benton Underwood studied the learning and memory of simple verbal items under controlled conditions.

Contemporary Experimental Psychology

Much of contemporary experimental psychology focuses on cognition leading to cognitive psychology and

experimental psychology often being used as synonyms. Interest in cognition began with information processing theory. George Miller and Herbert Simon were the pioneers of this approach, in which data processing by digital computers provided a metaphor for cognition. Cognitive psychologists use experiments to test theories of the inner workings of the mind/brain in contrast to a behavioristic approach. This appealing method resulted in a reliance on experimentation to study language, social psychology, human factors, and industrial psychology. Furthermore, cognitive psychology has led to a dramatic increase in the use of physiological methods as tools for understanding. Thus, experimental psychologists may use magnetic resonance imaging or electroencephalography to study cognition.

The behavioristic heritage is not dead. Conditioning remains a focus of many experimental psychologists, and conditioning techniques are widely used to investigate the physiological substrates of behavior.

[See also *Animal Learning and Behavior*.]

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David G. Elmes

EXPERIMENTATION. See Ethics, *article on Ethics in Research*.

EXPERTISE. See Thinking, *article on Problem Solving*.

EXPERT TESTIMONY. Psychologists testify as expert witnesses in legal settings on a variety of issues. The most frequent appearances are by clinicians who assist courts in making evaluations that involve judgments about mental health, such as competency to stand trial and custody decisions. Psychologists in nonclinical specialties also appear as expert witnesses. For example, psychologists testify on scientific findings concerning eyewitness accuracy and present survey results measuring potential jury prejudice in support of motions for a change of venue. Psychologists also testify on topics such as test construction and about employee recruitment and evaluation in cases involving allegations of employment discrimination.

Expert witnesses are permitted to offer scientific, technical, and other specialized information that will assist the trier of fact (Federal Rule of Evidence 702). Psychologists who are called upon to testify as experts should be prepared to demonstrate how their training, education, and experience have qualified them to provide relevant information that will aid in the resolution of the issues under consideration. Evidence of relevant expertise may include coursework and degrees, research and publications, and employment experience.

Unlike ordinary fact witnesses, experts are permitted to offer reports about behavior not involving the parties in the case at hand, give opinions, and derive their testimony from methods used by professionals in the expert's field. The admissibility and boundaries of permissible expert testimony are frequently matters of controversy, particularly in jury trials, in part due to concerns that experts will exert undue influence on the jury. For example, although the Federal Rules of Evidence (F.R.E.) permit experts to offer any helpful information, experts testifying about the mental state or condition of a defendant in a criminal trial are explicitly prohibited from offering an opinion on the so-called ultimate issue, that is, whether the defendant did or did not have the mental state or condition constituting an element of the crime charged or of a defense offered to that crime (F.R.E. 704 [b]). As a result, a psychologist in a federal court would be permitted to testify that the defendant was suffering from psychosis, but might be prohibited from giving an opinion on the defendant's ability to "appreciate the nature and quality or wrongfulness of his acts" (*U.S. v. Meader*, 914 F. Supp. 656 [1996]). There is little evidence that jurors are more

likely to be influenced by an expert opinion on the ultimate issue than by other case-specific testimony that has clear implications for the ultimate issue.

Courts have struggled with the expanding scope of expert testimony based on scientific evidence that parties have attempted to introduce in recent years. In *Daubert v. Merrell-Dow Pharmaceuticals* (113 S. Ct. 2786 [1993]), the U.S. Supreme Court focused attention on the role of judge as gatekeeper in determining what allegedly scientific evidence a jury should be permitted to hear. The Court held that federal judges must evaluate not only the expert's qualifications, but also the validity of the expert's methodology. The Court provided a nonexhaustive list of four factors that could be used in making these evaluations: (1) testability (or falsifiability) of the theory or technique; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error and the existence and maintenance of standards controlling the technique's operation; and (4) acceptance within a relevant scientific community. Although *Daubert* applies in all federal courts and has been followed in a number of state courts as well, some states follow the so-called Frye rule in evaluating scientific testimony. Under *Frye v. United States* (293 F. 1013 [D.C. Cir. 1923]), scientific testimony is admissible if the witness's tests and procedures have gained "general acceptance" within the relevant scientific or technical community. In *Kumho Tire Co. v. Carmichael* (526 U.S. 137 [1999]), the U.S. Supreme Court extended the reach of *Daubert* beyond scientific testimony to expert testimony based on technical and other specialized knowledge. The Court held that the trial court judge has a gatekeeping obligation to condition the admissibility of expert testimony on a determination of reliability, which may involve an application of the factors described in *Daubert*. Thus, psychologists offering clinical evaluations in federal courts or in states following *Daubert* may be subject to the factors outlined in *Daubert*.

Experts who agree to serve as witnesses may see themselves as serving in a number of potentially conflicting roles. They may see themselves as educators whose obligation is to provide the fact finder with information about their area of expertise. As representatives of their field, educators do not see themselves as representing a partisan position. An alternative role is as an advocate for a particular cause or position who presents evidence that favors only that position. Some experts are said to play a third role, that of a "hired gun." Hired guns do not merely offer testimony that supports a party when that position is consistent with their own analysis; they are willing to offer an opinion helpful to any party willing to pay for their services.

The ambiguity of these potentially conflicting roles may be one reason why fact finders are often suspicious

of experts who are hired by the parties. Resourceful attorneys may be able to identify an expert whose views are sympathetic to the position of the attorney's client but are not well grounded. Moreover, the adversary system can sometimes bias even disinterested witnesses in favor of the side for whom they are testifying. Both jurors and judges seem to agree that court-appointed experts are a promising means of improving impartiality. Nevertheless, most judges, reluctant to interfere with the adversary system, rarely appoint experts. Attorneys also resist the use of court-appointed experts, preferring to maintain greater control by hiring their own experts.

Although courts depend on scientific experts to assist the trier of fact in resolving a variety of complex disputes, the relationship between experts and the legal system is sometimes uncomfortable for both. Judges and jurors express some dissatisfaction with lack of clarity in the testimony that experts present, complaining that some experts use unnecessarily technical language. Experts who wish to qualify their opinions find that attorneys press them to be less tentative or to express opinions that are outside their area of expertise. Experts also know that the attorneys who retain them use a variety of strategies to influence the expert to present testimony that is favorable to their client. These perceptions appear to discourage some experts from participating in legal proceedings, but it is not clear how much this affects the expert testimony that finds its way to court or the extent to which it would be changed by greater use of court-appointed experts.

One concern about expert testimony is that it will exert undue influence on the trier of fact. However, most research suggests that experts have a limited impact on fact finders and that lay persons do not accept the claims of experts uncritically. The testimony of a disinterested lay witness may be perceived as more persuasive than that of an expert who is paid by one of the parties. Expert testimony is most persuasive when it is case specific (e.g., based on the evaluation of an eyewitness versus based on a summary of general eyewitness research findings), provides a causal explanation (i.e., fact finders are told the reasons behind the expert's findings versus simply presented with the findings), and uses concrete examples (e.g., the majority of rapists watch for a victim and approach her with rape in mind) as opposed to abstract statements (e.g., the majority of rapes are planned in advance). Moreover, expert testimony on some topics can influence how fact finders evaluate other types of testimony. For example, expert testimony on the conditions under which eyewitness testimony is more or less trustworthy can sensitize the trier of fact to considerations that may affect the accuracy of an eyewitness identification.

Another concern regarding expert testimony is that fact finders may fail to understand or apply it accu-

rately. For example, experts may use technical jargon or present complex quantitative information that challenge the fact finders' ability to absorb and comprehend the testimony. Fact finders may react in one of two ways. In some cases, they may discount the expert's message due to the lack of clarity, resulting in a reduction in the expert's influence. In other cases, they may turn to peripheral cues, like an expert's credentials or demeanor, to determine what weight the message should receive. We currently know little about how often and the conditions under which each of these reactions occurs. If either occurs, however, the fact finders' conclusions will not be influenced by the substantive information in the expert's testimony.

The adversarial nature of the legal system provides some potential checks on the influence of defective expert testimony. In theory, cross-examination and the opportunity to present an opposing witness can be relied upon to provide appropriate countervailing forces. It is unclear how effective such correctives actually are in counteracting the influence of an experienced witness. In particular, if the witness is presenting a position that is consistent with strong juror values, the adversarial process may fail to prevent unwarranted acceptance of the expert's testimony. The influence of evidence that contradicts the expert's testimony is likely to depend on a variety of factors. For instance, fact finders find eyewitness testimony to be quite compelling—perhaps even more compelling than they find many kinds of scientific evidence that are arguably more reliable.

When the contradictory evidence is an opposing expert's testimony, a common hypothesis is that the two experts will cancel each other out either because fact finders will infer that the lack of consensus means that science has little of probative value to say about the issue or because it will cause fact finders to dismiss both experts as obviously partisan. Fact finders may also rely on other strategies to evaluate conflicting expert opinions, such as taking the average of competing damages award estimates, or deferring to the expert who is more confident or better credentialed. Although there is some evidence to support these hypotheses, more systematic research is necessary.

Some legal scholars, scientists, and judges (e.g., Supreme Court Justice Stephen Breyer's concurrence in *General Electric Co. v. Joiner*, 118 S. Ct. 512, 520 [1997]) have identified court-appointed experts as a promising way to improve the caliber of expert information in the courtroom. Others have raised concerns that fact finders will unquestioningly accept the testimony of a court-appointed expert without giving it the degree of scrutiny they would afford evidence presented by the parties. What little research exists in this area suggests that fact finders are not unduly impressed by court-appointed expert testimony. Moreover, if a court-

appointed expert is used, the parties are entitled to cross-examine the expert witness, just as they would the witness of an adversary, and to put their own rebuttal experts on the witness stand. However, issues of both cost and control may limit expansion of the use of court-appointed experts.

Although most work on the influence of expert testimony has focused on lay fact finders, cognitive limitations and leaps in inference are not the exclusive province of the jury. Thus, judges may be susceptible to some of the same limitations.

Expert testimony may also exert a strong influence on cases before trial, affecting the many cases in which parties settle or a defendant pleads guilty. For example, the identity of the expert hired by the opposing side or the report or testimony of an opposing expert at a deposition may influence an attorney's assessment of the risk in going to trial. At this time, there is little information about the role played by experts in the pretrial phase.

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Shari Diamond and Jason Schklar

EXPERT WITNESSES. See Expert Testimony.

EXPLICIT MEMORY. See the overview article on Memory.

EXPLORATORY DATA ANALYSIS (EDA) is a statistical tradition originated by John Tukey with the aim of understanding data in the broadest possible set of circumstances. EDA is primarily a bottom-up or data-driven approach that seeks to find patterns in data that suggest tentative hypotheses for subsequent assessment using traditional statistical methods which Tukey called confirmatory data analysis (CDA).

Tukey conceptualized EDA as a part of the continuum of data analysis that could be broken into three general stages. First, EDA deals with answering the question, What is going on here? in an attempt to learn from data even when the classical statistical assumptions do not hold. In a second stage, called rough confirmatory data analysis, researchers undertake the tasks of refining hypotheses and conducting rough tests, often using confidence intervals or other estimation techniques. In the final stage, called strict CDA, researchers test well-specified hypotheses following the decision-making approach to statistical tests. Some authors discuss the idea of working in the "exploratory mode." This reference to *mode* reflects the idea that it is not mathematical technique per se that makes an analysis EDA, but rather the set of assumptions and the range of valid conclusions that can follow from the work. For example, a factorial analysis of variance can be computed and interpreted in an exploratory mode if the hypotheses are not strictly held, if the goal is to get a rough understanding of the structure of the data, and if the conclusions are considered provisional with nothing tested or proven in the probabilistic sense. True EDA, however, would also employ the common tools of that tradition.

In their book *Understanding Robust and Exploratory Data Analysis* (1983), D. Hoaglin, F. Mosteller, and John Tukey argue that the tools of EDA are arranged around four themes: resistance, residuals, reexpression, and revelation. Resistance refers to the use of estimators that are not easily affected by small perturbations in the data. This arises from the recognition that data of-

appointed expert is used, the parties are entitled to cross-examine the expert witness, just as they would the witness of an adversary, and to put their own rebuttal experts on the witness stand. However, issues of both cost and control may limit expansion of the use of court-appointed experts.

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EXPLICIT MEMORY. See the overview article on Memory.

EXPLORATORY DATA ANALYSIS (EDA) is a statistical tradition originated by John Tukey with the aim of understanding data in the broadest possible set of circumstances. EDA is primarily a bottom-up or data-driven approach that seeks to find patterns in data that suggest tentative hypotheses for subsequent assessment using traditional statistical methods which Tukey called confirmatory data analysis (CDA).

Tukey conceptualized EDA as a part of the continuum of data analysis that could be broken into three general stages. First, EDA deals with answering the question, What is going on here? in an attempt to learn from data even when the classical statistical assumptions do not hold. In a second stage, called rough confirmatory data analysis, researchers undertake the tasks of refining hypotheses and conducting rough tests, often using confidence intervals or other estimation techniques. In the final stage, called strict CDA, researchers test well-specified hypotheses following the decision-making approach to statistical tests. Some authors discuss the idea of working in the "exploratory mode." This reference to *mode* reflects the idea that it is not mathematical technique per se that makes an analysis EDA, but rather the set of assumptions and the range of valid conclusions that can follow from the work. For example, a factorial analysis of variance can be computed and interpreted in an exploratory mode if the hypotheses are not strictly held, if the goal is to get a rough understanding of the structure of the data, and if the conclusions are considered provisional with nothing tested or proven in the probabilistic sense. True EDA, however, would also employ the common tools of that tradition.

In their book *Understanding Robust and Exploratory Data Analysis* (1983), D. Hoaglin, F. Mosteller, and John Tukey argue that the tools of EDA are arranged around four themes: resistance, residuals, reexpression, and revelation. Resistance refers to the use of estimators that are not easily affected by small perturbations in the data. This arises from the recognition that data of-

ten come in unexpected forms, with aberrant individuals or subgroups that may mislead the summary from the bulk of the data. Accordingly, in EDA, the median is the most common measure of central tendency, even though its standard error is larger than that of the mean. This is because in the early stages of research a primary goal is to avoid being misled by outliers. After general patterns are well understood and the goal shifts to estimating and testing specific parameters, an emphasis on the efficiency of an estimate is more appropriate.

Residuals lie at the heart of EDA. Residuals are the deviations of observations from the value predicted by a tentative model. In both CDA and EDA, residuals are summarized to get a sense of overall fit. In EDA, however, residuals are also examined individually to see in what ways the model fits and does not fit the data. Here the goal is to find out which observations are well predicted and which are poorly fit. This matches the adage from the EDA tradition, that one must "impose structure to reveal structure." For example, it is common for those working with regression models to assume the underlying function is linear whether or not evidence has been collected to support this. The use of linear regression imposes a linear prediction structure and creates residuals that will have an observable nonlinear pattern if the data themselves are not linear in form. In EDA, residuals are used to modify tentative models until the form of the model fits the form of the data. This provides an accurate, yet tentative, model that can be tested in subsequent analyses on different data.

Reexpression is the term used in EDA for rescaling or transforming. Reexpression is a mainstay of EDA because data often are collected in forms based on convenience or habit rather than careful attention to scaling. Tukey's *Exploratory Data Analysis* (1977) and F. Mosteller's and John Tukey's *Data Analysis and Regression: A Second Course in Statistics* (1977) provide detailed discussions of the EDA view of data types and techniques for finding more easily interpreted scales through reexpression. Appropriate reexpression is preferred insofar as it leads to symmetric distributions that promote the interpretation of general linear models, improve comparison across groups, and reflect the structure of the sampling distributions. A number of reexpressions commonly used in EDA are also common in the psychological literature, including logarithmic, arcsine, and reciprocal transformations. Writing in volume 5 of *Memory and Cognition* (1977), H. Wainer argued that while many researchers assume that reaction time is the appropriate scale of measure, $1/\text{(reaction time)}$ = speed. Because speed is easily interpreted and often has a more symmetric distribution than reaction time, it is likely to be preferred on empirical grounds if no forceful theoretical reason for choosing between the two scales exists.

To promote the revelation of unexpected aspects of the data, EDA emphasizes the use of graphic representations of data and statistical summaries. To portray data, Tukey devised a number of plots that are now standard options in computing packages, including stem-and-leaf plots and the box plot. To portray statistical summaries, Tukey devised schematic plots for detecting patterns in time-series data, representing the predicted values in additive factorial models, plots for the comparison of empirical distributions with theoretical ones, and variations of residual plots. Tukey's work in EDA greatly influenced the development of statistical theories for graphic data analysis and data visualization.

Most psychological research programs emphasize the importance of theory-generated hypotheses and the application of strict statistical tests via confidence intervals, or p-values. This emphasis on the final analyses of data tend to leave the preliminary stages, where EDA is most valuable, overlooked and undervalued. However, statements of discontent with the sole use of statistical tests have led to increased interest in EDA. EDA supplements rather than supplants CDA, and exploratory data analysis is seen as a way to increase the breadth of appropriate questions and tools.

[See also Data Analysis.]

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Wainer, H. (1977). *Memory and Cognition*, 5, 278–280.

John T. Behrens

EXTRASENSORY PRECEPTION. See Parapsychology.

EXTRAVERSION AND INTROVERSION. Extraversion-introversion (hereafter called extraversion, or E) is a broad personality trait that refers most generally to a person's overall orientation to the social world. People whose overall orientation falls closer to the extravert end of this trait continuum are especially sociable, outgoing, gregarious, spontaneous, talkative, and energetic. By contrast, those at the introverted end are described as relatively more withdrawn, retiring, reserved, inhibited, quiet, and deliberate. In a general sense, extraverts are more oriented to the external social world, whereas introverts are more oriented to the internal private world. In that individual differences in E are usually thought to assume a normal distribution in any given group or culture, many individuals may be placed in the middle of the continuum, showing a mixture of extraverted and introverted tendencies.

The Evolution of the Concept

The idea that some people are outgoing and sociable while others are more private and withdrawn is an extraordinarily common attribution of human individuality and appears to be well represented in many, if not most, of the world's languages. In addition, E has an impressive historical pedigree. In the ancient Greek typology of the four temperaments (attributed to Galen, around 200 CE), the cheerful sanguine type and the volatile choleric type are both generally extraverted, while the stoic phlegmatic and depressive melancholic types exhibit the introversion pole of this dimension. The distinction between extraversion and introversion

was reframed in the philosophical writings of Immanuel Kant in the eighteenth century and brought forward to modern times in the writings of such pioneers in psychological science as Wilhelm Wundt, Ivan Pavlov, Charles Spearman, and J. P. Guilford. Within modern psychology, the concept of E is most closely associated with the clinical writings of Carl Jung and the wide-ranging empirical work of Hans Eysenck.

In *Psychological Types* (1923/1971), Carl Jung couched the distinction between extraversion and introversion in terms of psychic energy. For the extravert, psychic energy tends to flow outward, in the direction of people and objects. The extravert is engaged by the outside world, is drawn to social activities and real-world pursuits, is strongly influenced by the social world and often seeks to have strong influence on it as well. By contrast, the introvert finds that psychic energy flows generally inward. The introvert turns away from social life and invests instead in the subjective world of private thought, feeling, and fantasy. Jung tended to view E as a bimodal trait: People tend to be either extraverted or introverted in the overall. Furthermore, the person who is extraverted in conscious daily life is likely to be introverted in the unconscious (e.g., in dreams), and vice versa.

Beginning with *Dimensions of Personality* (1947), Hans Eysenck sought to establish a rigorous scientific program for investigating the manifestations, origins, and consequences of E. He eschewed Jung's speculations about psychic energy and intrapsychic harmony in favor of an approach that emphasized precise measurement, careful laboratory experimentation, and neurophysiological explanations for individual differences in personality traits. Eysenck's factor analytic studies of self-report trait scales convinced him that extraversion (E) and neuroticism (N) were the two basic traits in all of personality, accounting for the most important individual differences seen in socio-emotional functioning. (Later, Eysenck added to the mix a third broad trait, called psychoticism.) Nonetheless, both Jung and Eysenck described extraverts as outgoing, sociable, and enthusiastic, but also somewhat impulsive and heedless. Introverts were seen as more quiet and withdrawn, but also more deliberate and contemplative.

Since the time of Jung's and Eysenck's original formulations, the concept of E has evolved in at least three different directions. First, the aspect of E having to do with energy level and social dominance has assumed more prominence in definitions of the construct. To that effect, some theorists prefer the label of "surgency" over "extraversion." Second, while both Jung and Eysenck viewed the extravert to be more impulsive than the introvert, the construct of impulsivity has migrated away from the center of E and, in some current conceptualizations, has found itself aligned with other groups of traits. Jeffrey Gray, for example, recast

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Eysenck's two-dimensional trait space—bisected by the orthogonal dimensions of extraversion and neuroticism—in terms of two alternative dimensions, impulsivity and anxiety, each of which is positioned at 45-degree angles to E and N. In Gray's scheme, the highly impulsive individual is high on both E and N.

In another formulation, many contemporary trait theorists now divide up the universe of broad individual differences into five basic domains—the “Big Five” trait clusters, labeled by Paul Costa and Robert McCrae (1990) as extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience. In this five-factor scheme, impulsiveness is viewed to be a facet of neuroticism rather than extraversion.

In a third change in the meaning of E, some theorists have found the empirical literature (described below) linking E to positive emotional experiences so impressive that they have argued that E itself is fundamentally a tendency to experience positive affect. David Watson and Auke Tellegen, for example, have reconceptualized the dimensions of E and N as positive affectivity and negative affectivity, respectively. While many psychologists are reluctant to reduce extraversion to a matter of emotional valence, a tendency toward positive emotionality has become a salient feature in current characterizations of E.

Correlates of Extraversion

Extraversion is arguably the most well-researched and scientifically well-established dimension of personality. Stimulated in large part by Eysenck's ambitious agenda for this trait, researchers have published hundreds of studies documenting associations between extraversion and a wide range of cognitive, emotional, and social variables. For example, extraverts talk more and sooner in a variety of social interactions than do introverts; they engage in more eye contact; they have larger friendship networks and more social support; they seek out social activities for leisure-time pursuits; they do more gambling; they engage in more sexual activity; and they are more likely to reside in households with other people rather than living alone. In the occupational realm, extraverts are more drawn to and tend to excel in occupations that involve dealing directly with other people, such as sales, marketing, personnel work, and teaching. By contrast, introverts tend to prefer jobs and professions in which they are more likely to work alone or in which social interaction is less sustained and intense, sharing interests with artists, mathematicians, engineers, researchers, and the like.

Laboratory research has also examined relations between E and various forms of cognitive performance. Extraverts and introverts show different cognitive strengths and weaknesses. For example, extroverts tend to show superior performance to introverts on tasks requiring divided attention, resistance to distraction,

and resistance to interference. Relative to introverts, extraverted locomotive drivers show better detection of railway signal stimuli, extraverted post office trainees tend to perform better on speeded mail-sorting tasks, and extraverted television viewers show better short-term recall of television news broadcasts. Conversely, introverts tend to perform better on tasks requiring vigilance and careful attention to detail. Some evidence suggests that introverts show better long-term memory for words and superior performance under conditions of very low arousal, as when deprived of sleep. To the extent that differences are found in learning styles, extraverts tend to show a preference for speed over accuracy, whereas introverts focus more on accuracy over speed. Extraverts are “geared to respond” and introverts are “geared to inspect.”

A significant body of research has found that E is positively associated with reports of feeling good about life. In other words, extraverts report greater levels of positive affect in everyday life than do introverts. E is consistently and positively associated with measures of subjective well-being. Typically, subjective well-being includes assessments of both positive and negative emotions. E tends to predict positive emotions, but tends to be unrelated to negative emotions. By contrast, the trait of neuroticism tends to be associated with measures of negative emotions but not positive emotions. Put simply, extraverts, compared to introverts, tend to report higher levels of positive affect but not necessarily lower levels of negative affect, and individuals high in N tend to report higher levels of negative affect but not necessarily lower levels of positive affect than individuals low in N.

Researchers have begun to examine possible reasons for the connection between E and positive affect. Among the explanations that have been offered include the possibilities that individuals high in E tend to ignore negative or punishing stimuli in their environment, recall past events in especially positive ways, enjoy higher levels of social skill and interpersonal competence, and receive more social support and experience more social reinforcement, compared to introverts. Despite the consistent associations displayed between positive feelings and E, evidence also suggests that under certain circumstances E can be linked to lower levels of well-being. For example, extroverts report lower levels of positive affect than do introverts when they are alone.

The Nature of Extraversion

In the last twenty years, a number of longitudinal studies have shown that interindividual differences in many personality traits tend to be relatively stable over time, especially during the adult years. Among the most impressive evidence is that garnered for the trait of extraversion. In one study, for instance, self-report assessments of E showed test-retest correlations of over +.70

across a 6- to 12-year span among individuals ranging in age from 17 to 85. In a 50-year longitudinal investigation, self-report and spouse ratings of personality descriptors indicative of E showed striking interindividual consistency. Cross-sectional studies suggest that older adults tend to be slightly more introverted as a group than younger adults. Still what appears to show substantial consistency is the relative rankings of individuals on the trait of E. Furthermore, as with many other traits, twin studies suggest that individual differences in E can be accounted for by genetic differences between people to a moderate extent, revealing heritability quotients in the $+.40$ to $+.50$ range.

Given the empirical evidence for heritability, many psychologists now suspect that E has a substantial biological substrate. In *The Biological Basis of Personality* (1967), Hans Eysenck proposed that individual differences in E are grounded in differences in arousal mediated by the brain's ascending reticular activation system. In a nutshell, he argued that introverts are dispositionally more aroused than extraverts. In that all people seek out an optimal level of cortical arousal, social stimulation moves introverts to that level more quickly than it does extroverts, causing introverts to inhibit social responding and avoid social situations that push them past the optimal arousal level. By contrast, extraverts seek out more and more stimulation; they are "stimulus hungry," and it therefore takes considerably more stimulation to get them to the optimal level of arousal.

Hundreds of studies, incorporating methodologies ranging from drug tests to EEG profiles, have tested hypotheses drawn from Eysenck's biological model. In the overall, results are mixed. There does appear to be reasonable empirical support for the general idea that extraverts prefer higher levels of stimulation than introverts and that introverts, compared to extraverts, are more physiologically reactive to sensory input at low-to-moderate levels of stimulation. But support for characteristic differences in resting levels of arousal for introverts versus extraverts is weak and inconsistent. Today, many researchers are skeptical about the viability of a concept of general cortical arousal, pointing out that while one region of the brain may appear underaroused other regions may be highly aroused at the same time.

Other researchers have begun to explore the possibility that individual differences in E may be mediated by what has been termed a *behavioral approach system* (BAS). As a functional system in the brain, the BAS is hypothesized to govern positive approach behaviors in response to incentives. Important components of the BAS may be dopamine pathways and electrical activity in the left anterior portion of the brain. A small but growing body of research evidence links dopaminergic activity and frontal-left brain activity to positive affect

and approach behaviors in some animals and humans. It has been proposed that individuals with a relatively strong BAS, being more sensitive and responsive to positive incentives, may be more likely to be highly extraverted and/or highly impulsive. Scientists have yet to flesh out an articulated picture of the BAS and have yet to offer compelling evidence linking the BAS to E. Nonetheless, this line of investigation would appear to offer many promising leads for future research on the origins and concomitants of extraversion-introversion.

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Dan P. McAdams

EYE. See Vision and Sight.

EYEWITNESS TESTIMONY is the act of reporting from memory about an event previously observed. In criminal cases, the justice system relies heavily on eyewitnesses to investigate crimes and to serve as trial witnesses to bring evidence against a defendant. In civil cases, eyewitnesses can be critical to reconstructing the details of previous events, such as accidents. Researchers in social and cognitive psychology have developed an extensive set of findings on the accuracy of eyewitness testimony, most of this work being done since the mid-1970s. The principal methods of research on eyewitness testimony involve staging live events (e.g., simulated crimes) for unsuspecting people or having people view material on video. Because the researchers created the event, they know the actual details and can thereby score the witness's recollections for accuracy. Control over the witnessed event allows for the systematic manipulation of various event and testing factors in order to study the conditions that cause accuracy and inaccuracy in eyewitness reports.

The scientific eyewitness literature borrows from both cognitive psychology and social psychology in order to account for many of the findings. Cognitive psychologists tend to study the roles of attention, perception, memory, and interference as factors affecting the accuracy of eyewitness testimony, whereas social psychologists tend to study the roles of witness beliefs and

social influences on eyewitness testimony. Commonly, however, the phenomena observed in the experiments are both cognitive and social.

Eyewitness testimony research includes studies of the accuracy of witnesses' firsthand reports of memory for objects, actions, time, distance, and people. Memory for people has received a great deal of research attention because the identification of suspects from lineups (and photo spreads) is particularly powerful, direct evidence of guilt at criminal trials. Numerous general conclusions about the accuracy of eyewitness identifications can be derived from staged crime experiments. False identifications are surprisingly common in staged crime experiments. Rates of false identification can range from 5 to 95%, depending on various factors. Among those that affect the accuracy of eyewitnesses, a useful distinction has been made between factors that are beyond the control of the justice system (such as the cross-race factor) and those that are under the control of the justice system (such as instructions to an eyewitness prior to viewing a lineup). The former are called estimator variables and the latter are called system variables. System variables have proven particularly useful for linking eyewitness identification research to specific proposals for improving the accuracy of eyewitness evidence.

One of the most important factors determining the risk of mistaken identification is whether or not the actual perpetrator is in the lineup. When the perpetrator is in the lineup, the perpetrator is the person most commonly identified. When the actual perpetrator is not in the lineup, eyewitnesses often have great difficulty recognizing the perpetrator's absence. The process of identification from lineups seems to be one in which the eyewitness tends to select the person who looks most like the perpetrator relative to the other members of the lineup, a process called the relative judgment process.

When the perpetrator is not in the lineup, there is still someone who looks more like the perpetrator than do the other lineup members, and eyewitnesses tend to identify that person. The tendency to identify someone from a perpetrator-absent lineup is less pronounced if the eyewitness is explicitly warned that the perpetrator might or might not be in the lineup and is explicitly provided with the option of identifying no one. Failure to give this instruction is known as an instruction-biased lineup. Importantly, giving the warning does not have an appreciable effect on the rate of identifications of the culprit when the culprit is present, but only serves to protect innocent lineup members when the culprit is absent. In addition, false identifications increase if the suspect is the only one in the lineup who matches the general description of the culprit. Failure to use a lineup in which all members match the general

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The scientific eyewitness literature borrows from both cognitive psychology and social psychology in order to account for many of the findings. Cognitive psychologists tend to study the roles of attention, perception, memory, and interference as factors affecting the accuracy of eyewitness testimony, whereas social psychologists tend to study the roles of witness beliefs and

social influences on eyewitness testimony. Commonly, however, the phenomena observed in the experiments are both cognitive and social.

Eyewitness testimony research includes studies of the accuracy of witnesses' firsthand reports of memory for objects, actions, time, distance, and people. Memory for people has received a great deal of research attention because the identification of suspects from lineups (and photo spreads) is particularly powerful, direct evidence of guilt at criminal trials. Numerous general conclusions about the accuracy of eyewitness identifications can be derived from staged crime experiments. False identifications are surprisingly common in staged crime experiments. Rates of false identification can range from 5 to 95%, depending on various factors. Among those that affect the accuracy of eyewitnesses, a useful distinction has been made between factors that are beyond the control of the justice system (such as the cross-race factor) and those that are under the control of the justice system (such as instructions to an eyewitness prior to viewing a lineup). The former are called estimator variables and the latter are called system variables. System variables have proven particularly useful for linking eyewitness identification research to specific proposals for improving the accuracy of eyewitness evidence.

One of the most important factors determining the risk of mistaken identification is whether or not the actual perpetrator is in the lineup. When the perpetrator is in the lineup, the perpetrator is the person most commonly identified. When the actual perpetrator is not in the lineup, eyewitnesses often have great difficulty recognizing the perpetrator's absence. The process of identification from lineups seems to be one in which the eyewitness tends to select the person who looks most like the perpetrator relative to the other members of the lineup, a process called the relative judgment process.

When the perpetrator is not in the lineup, there is still someone who looks more like the perpetrator than do the other lineup members, and eyewitnesses tend to identify that person. The tendency to identify someone from a perpetrator-absent lineup is less pronounced if the eyewitness is explicitly warned that the perpetrator might or might not be in the lineup and is explicitly provided with the option of identifying no one. Failure to give this instruction is known as an instruction-biased lineup. Importantly, giving the warning does not have an appreciable effect on the rate of identifications of the culprit when the culprit is present, but only serves to protect innocent lineup members when the culprit is absent. In addition, false identifications increase if the suspect is the only one in the lineup who matches the general description of the culprit. Failure to use a lineup in which all members match the general

description of the perpetrator is known as a structurally biased lineup. A lineup that is structurally fair serves to lower false identifications when the perpetrator is not present, but has little or no effect on the eyewitness's chances of selecting the perpetrator when the perpetrator is present.

Eyewitnesses making false identifications may express considerable confidence that the identified person is the culprit. There are conditions in which the confidence/accuracy correlation is higher and lower, but the overall correlation between confidence and accuracy in eyewitness identifications is a modest one. Some of the variables that drive up the confidence that an eyewitness holds in his or her identification are at odds with those that affect the accuracy of the identification. For instance, structurally biased lineups and biased instructions serve to increase the confidence of eyewitnesses even while increasing the frequency of false identifications. In addition, the confidence of an eyewitness who has made a false identification increases dramatically if the eyewitness is told that the person selected is the actual suspect in the case or is told that a cowitness identified the same person. These confidence-inflation effects are particularly problematic because the confidence of an eyewitness is the primary determinant of whether or not jurors will believe the eyewitness.

Other eyewitness identification phenomena that are relatively well established include "weapon focus," which is the tendency for eyewitnesses to focus on a weapon involved in a crime and thereby pay less attention to the perpetrator's face, and the cross-race effect, which is the tendency for people to have more difficulty identifying the faces of those of another race than those of one's own race.

Child eyewitnesses generally show the same pattern of mistakes as adult eyewitnesses, but their error rates are often higher. The younger the child, the more difficulty they have in recognizing the absence of the perpetrator in a lineup and the more suggestible they are regarding what they witnessed.

The scientific eyewitness literature has been instrumental in articulating the view in psychology that memories of an event can be changed after the event has been experienced. The work of Elizabeth Loftus using "postevent information" has received wide attention (1979). After witnessing an event, people are randomly assigned to receive information consistent or inconsistent with what they viewed, often in the form of a question. For example, an eyewitness might see a yield sign as part of a scene and later be asked a misleading question, such as whether a car that was stopped at a stop sign was blue or red. Later, when asked what kind of sign it was, those who were asked the misleading question tend to report that it was a stop sign. Some con-

troversy still exists as to whether these postevent information effects are actually affecting the original memory, whether they are a separate memory that competes for retrieval, or whether the effect is a form of social influence having little to do with memory per se. From a practical perspective of relevance to the courts, it matters little whether the effect is due to memory impairment or social influence because in either case the effect is one of changed testimony. From a theoretical perspective, however, the issue is of considerable import. Among other things, the phenomenon is relevant to the issue of whether long-term memory is permanent or whether later events can actually delete or change the original memories.

Research and theory on the creation of false memories have been particularly controversial when applied to claims about the recovery of repressed memories. People who claim that they were sexually abused as children but, due to repression, did not recall the abuse until adulthood are thought by many memory experts to be recalling false memories, a phenomenon dubbed the false memory syndrome. These memory experts note that false autobiographical memories can be created by suggestion, repeated imagination, belief in the concepts of repression and recovery of repressed memories, and hypnosis or hypnoticlike interventions. The issue of false memory syndrome remains controversial and has not been fully clarified.

Controversy exists over whether expert testimony on eyewitness issues should be admitted in criminal trials. Some states and some federal jurisdictions allow eyewitness researchers to give opinion testimony regarding the research on eyewitness accuracy while other states and federal jurisdictions do not. The use of forensic DNA tests in the 1990s using trial evidence from persons convicted by juries in the 1970s and 1980s has resulted in the exoneration of several dozen of these people. This has resulted in a new line of evidence that eyewitness evidence is fallible because, in the vast majority of these DNA exoneration cases, false eyewitness identification was the primary evidence leading to their wrongful conviction. An increasingly larger and more sophisticated body of scientific evidence on eyewitness accuracy, along with evidence from the recent DNA exoneration cases, has led to an increasing trend by courts to permit expert testimony on eyewitness issues.

[See also *Children's Eyewitness Testimony*.]

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As an empiricist, Eysenck had little patience with and withering rebuttals for those who posited unfounded claims. Often considered a devil's advocate who championed mind-stretching positions, he frequently espoused private opinions different from those of his public pronouncements. He goaded his students and the lay reader of his popular books into expanded realms of thinking through his gadfly manner.

Eysenck was adept with using the media; he became one of the world's most published popularizers of psychology through trade book publications that encouraged people to measure their own IQs, assess and describe their own personality constructs, and engage in thoughtful journeys of self-exploration. This skill brought him a degree of scorn and ridicule from his fellow psychologists. Some of his bestselling works include *Know Your Own IQ* (New York, 1962), *Uses and Abuses of Psychology* (London, 1953), *You and Neurosis* (London, 1977), *For Better, for Worse—A Guide to Happy Marriage* (London, 1983).

Born in Berlin, the only son of an economically stable but emotionally fractured family of actors, Eysenck was raised by his maternal grandmother. Following graduation from the Gymnasium and prior to enrolling at the University of Berlin, he left Berlin, where, as an aspiring physicist he would have been expected to become a member of the Nazi party. Following 2 years of study in France, he moved to London, where he took up the study of psychology by accident because the University of London would not accept his German school credits, except in the study of psychology.

Eysenck earned a first-class bachelor's degree from University College, London, where Cyril Burt was professor of psychology. Eysenck recounts in his aptly titled autobiography *Rebel with a Cause* (1990, rev. 1997) that because Burt could not read his handwritten examination protocols he earned his degree based on coursework. Posthumously, when Burt was charged with falsification of data, his former student loyally attempted to explain away the idiosyncracies of his former department head. He earned his doctorate at London University in 1941 and became professor of psychology in 1955. During his tenure, he founded the department of psychology at the Institute of Psychiatry, Maudsley Hospital, University of London. At the time of his death he was professor emeritus at the Institute of Psychiatry, University of London.

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Eysenck's approach to the contribution of environmental variables to *g* (the presumed general factor in intelligence) softened as he grew older. His later work acknowledged the mediating effect of environmental forces on biological processes. For example, he acknowledged the importance of nutrition on the development of intelligence. In his autobiography, he also noted that Afrikaans-speaking Whites in South Africa once scored lower than English-speaking Whites on intelligence tests, but that the gap closed over time. "Whatever the reason for this change, it suggests that differences between groups may not necessarily be genetically caused and may be susceptible to change," he wrote (Eysenck, 1990, rev. 1997).

Known as challenging and demanding by fellow academics, in the British public's mind Eysenck was synonymous with all that comprised academic psychology. Sought out by journalists, he became an icon and explanatory voice for the science of psychology in Great Britain. Never at loss for an opinion about anything related to the psyche, Eysenck generated widespread public enthusiasm for exploring the human condition, which in turn led many to study applied human psychology. Very many contemporary practitioners and academics were spurred to study psychology based on Eysenck's earliest forays at bringing psychology to his public.

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EYSENCK PERSONALITY QUESTIONNAIRE. Considered by his peers to be one of the greatest contributors to the field of clinical psychology during its first century, Hans J. Eysenck (1916–1997) was coauthor with Sybil B. G. Eysenck of the Eysenck Personality Questionnaire-Revised (EPQ-R). Eysenck was a prolific scholar, one of the most widely cited psychologists in the world, and author of over one thousand scientific papers. Controversial and provocative, he was particularly noted for his classic criticisms of psychotherapy efficacy and for his emphasis on the principles of quantification and measurement. An important legacy for generations of students and colleagues who were influenced by his work is a series of personality tests, several of which bear his name.

The original theory of specifying traits of personality into two major dimensions was postulated by Eysenck in the late 1940s; this conceptualization has stood the test of time. Two main factors, termed N (neuroticism) and E (extraversion) have formed the basis of Eysenck's personality model, later expanded to a third factor, termed P (psychoticism or tough-mindedness). Other models have raised challenges and questions as to what additional dimensions lie beyond the Big Three trait factors. Nevertheless, Eysenck's personality framework remains fundamental to other theories and at least in the case of the first two factors, has been consistently replicated in research studies. The EPQ-R is the preeminent measure of Eysenck's personality dimensions.

Historically, Eysenck's trait quantification work began with the Maudsley Medical Questionnaire (assessment of N only) then the Maudsley Personality Inventory (N and E). Next followed the Eysenck Personality Inventory (N and E, as well as an L [Lie] scale to measure deception, an important factor for establishing the validity of self-report tests). The Eysenck Personality Questionnaire introduced the third factor (P), added to N, E, and L; the EPQ-R revised the P scale to address specific psychometric concerns and derived an Addiction scale. The exact relationships among the various Eysenck tests is not entirely clear. Considerable overlap exists, for example between the EPI and EPQ, including up to about 75% of the N and E scale items, but other modifications have been made that make different test version subscales not identical.

Different editions of the EPQ-R have been developed based on American versus United Kingdom normative samples. The item format for the one hundred questions requires simple yes/no answers. The administration time is approximately 30 minutes; the test is easily scored. A short form and a children's version are available. High scores on the EPQ-R E scale are interpreted as reflecting friendly sociability, with less emphasis on the impulsive rowdiness associated with earlier test versions. Findings with the Junior EPQ have generally

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shown E scores to increase with age. The N scale is a solid measure of nervous worrying that is predictive of emotional maladjustment. The P scale has been fraught with controversy both on psychometric grounds (low reliability and skewed normative distribution with resultant over-diagnosis of normals as "psychotics") and theoretical criticisms (challenging Eysenck's construct as questionably related to actual psychosis and more closely linked to aggression and empathy defects); this has partly led to terming the P scale by the attribute "tough-minded." The L scale attempts to measure "fake-good" tendencies, which is especially important for the N scale because some test respondents try to appear better or worse off emotionally.

Some technical aspects of the test are presented in the manual. Any scales that are supposed to measure stable personality characteristics must demonstrate consistency over a period of time. This psychometric attribute, termed *test-retest reliability*, has been found to be reasonable for the EPQ-R with subscale reliabilities ranging from 0.71 to 0.92 over a one-month period. Internal consistency is another important psychometric property and has been shown to be adequate for E, N, and L; the content of the P items is more heterogeneous. Validity issues are critical to establishing whether the test is assessing what it purports to be measuring. The N scale has been successful in discriminating neurotic patients from normal controls. The L scale has demonstrated good sensitivity to detecting individuals who were instructed to try and fake their answers to look good. However, it is still possible for sophisticated respondents to notice these L-scale items because they are somewhat obvious; some psychologists believe the L scale actually measures its own trait, namely, the need for social approval.

The importance of the Eysenck tests rests on its worldwide use and broad applicability in varied though mainly research contexts. Surveys of North American clinical psychologists find that the test is not at all commonly used for psychodiagnosis. Hundreds of research studies, however, have relied upon the test to evaluate such diverse topics as personality trait predictors associated with the speed of medical surgery recovery, twin studies of the genetic predisposition to mental illness, correlations with behavioral health problems, mediating factors in psychopharmacology trials and relationship to cognitive performance on attention, memory and other neuropsychological tasks. Cross-cultural re-

search has produced translations into several languages, including versions in Japanese, Polish, Spanish, Hindi, German, Hungarian, and African (Zimbabwe). Studies have been conducted in every continent, providing a global picture of personality trait profiles ranging from peasant farmers in India, to churchgoers in Wales, anxious children in the United States, cancer patients in the Netherlands, teenagers in Mexico, and college students in Japan and Australia. The Eysenck test profiles of mental patients tend to show neurotic, introverted, and sometimes psychotic patterns, while prisoner groups are generally extraverted. People active in the work force show more stable (low N) scores with sales people in particular showing stable N patterns but with more extraverted traits. The Eysenck instruments have shown their greatest utility in scientific investigations of the importance of personality factors in everyday life.

[See also the biography of Eysenck.]

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