

## PERSONALITY<sup>1,2,3</sup>

BY ARTHUR R. JENSEN<sup>4</sup>

*Institute of Psychiatry (Maudsley Hospital), University of London, London, England*

The concept of personality is a result of our observation of individual differences in human behavior. Personality research is an attempt to systematize IDs and to account for them in terms of the interaction of constitutional, developmental, and environmental factors. The writer favors a positivistic and behavioristic orientation in this endeavor. The emphasis in this review is more on research findings and on methods and measurement than on theory. The major theories of personality change comparatively little from one year to the next. The minor theories which are conceived after the findings they are intended to explain are ephemeral. Each year brings forth new findings which more often than not embarrass last year's theories. But theories in psychology are seldom disproved; they just fade away. Of course, all present theories of personality are doomed to pass into history. They should be tolerated only in proportion to their heuristic value to research.

Personality research increasingly overlaps general psychology. Differential psychology, measurement theory, learning theory, perception, and physiological psychology are drawn upon more and more in the personality field. Psychoanalysis may appear to be poorly represented in this review. It seems to the writer that as the phenomena that psychoanalytic theory purports to explain come under the purview of psychological research, these phenomena lose their psychoanalytic identity and are absorbed into the more scientifically adequate framework of general psychology.

The writer would like to have included a section on some of the recent developments of methodological significance had space permitted. For example, the study of language behavior, which has already developed a substantial literature within the past few years, should be encouraged for its potential contribution to the understanding of personality. Why responses to verbal questionnaires are related to other aspects of behavior is a central problem in the methodology of this field and is still obscure. The study of the interview and other forms of interpersonal behavior by such means as the Chapple Interaction Chronograph is a promising development. Psycho-

<sup>1</sup> This review covers the period April, 1956, to April, 1957.

<sup>2</sup> In this chapter the following abbreviations are used: CS (conditioned stimulus); F-scale (California scale for measuring authoritarianism); IDs (individual differences); I-E (introversion-extraversion); MAS (Taylor's Manifest Anxiety Scale); MMPI (Minnesota Multiphasic Personality Inventory); n Ach (need for achievement); n Aff (need for affiliation); P.F. (personality factor); PGR (psychogalvanic response); S (subject); TAT (Thematic Apperception Test).

<sup>3</sup> The writer is indebted to Dr. Lowell Storms and Dr. John Sigal for their critical reading of the first draft of this chapter.

<sup>4</sup> USPHS Research Fellow of the National Institute of Mental Health.

pharmacology—the use of drugs in psychological research—offers a further means of exploring physiological correlates of behavior (29). Since personality research is tending to become an interdisciplinary pursuit, it behoves psychologists to concentrate on developing methods of behavioral measurement and discovering functional relationships between behavior and events in the environment. Without such developments, a liaison with other disciplines such as biochemistry, physiology, genetics, sociology, and anthropology can only be premature and unfruitful.

The reader may note a scarcity of references in this review to studies based on projective techniques. In the writer's judgment the standard projective techniques *qua* projective techniques have been a failure methodologically and substantively in personality research. The one exception seems to be the special adaptation of the TAT by McClelland and his associates in their study of motivation. The Rorschach in particular has been worthless as a research instrument. Though claiming for decades to be the method *par excellence* for studying personality, the Rorschach method has nothing to show for its applications in the personality field. After more than thirty years of research, the vast bulk of Rorschach studies are still attempts to demonstrate some kind of validity of this test. In view of this poor showing, the hopes and claims that continue to be professed (e.g., 20) by the adherents of these methods are indeed cause for wonder.

Two noteworthy books on personality theory have appeared this year. A welcome contribution is *Theories of Personality* by Hall & Lindzey (44), which to date is the only comprehensive textbook on the subject. It presents the theories of Freud, Jung, Adler, Fromm, Horney, Sullivan, Murray, Lewin, Allport, Goldstein, Sheldon, Eysenck, Cattell, Dollard and Miller, Rogers, Murphy, and others. The writer prefers to classify this book as belonging to the literature on the history of psychology, and would recommend its use in courses on the history of psychology rather than as a basic text in courses on personality. In clarity and accuracy of exposition the book is thoroughly first-rate. On the critical side, however, it is weak, but this is due mostly to the fact that the authors' intention was expository rather than critical. The present writer does not share the Hall & Lindzey reverence for theory in general. All of the personality theories are presented in almost equally glowing terms. One wonders what impression of psychology this kind of presentation might make on students who are also taking courses in other disciplines. The appeal is apt to be greater to the humanities students than to those more disposed towards the natural sciences. While Hall & Lindzey liken the function of their book to that of Hilgard's *Theories of Learning*, it should be pointed out that Hilgard's book has the feature, lacking in the Hall & Lindzey presentation, of evaluating each theory in terms of the same criteria of empirical, methodological, and theoretical adequacy.

*Perspectives in Personality Theory*, edited by David & von Bracken (21), contains contributions by twenty-two European and American psycholo-

gists. The chief value of this book is that it brings us into closer touch with current European thought in the personality field and provides a wealth of bibliographical material for those wishing to delve further. We are given an overview of current personality theories and research in Germany, Switzerland, Britain, Italy, and France. With the exception of Britain, there seems to be little of what we would call scientific research in European personality psychology. Existential psychology, characterology, and stratification theory all seem to be more philosophy than psychology. Much of Continental theory has little contact with data; often it is difficult to know exactly what facts the theory is intended to explain. Psychologists trained in the American behavioristic tradition are likely to find many of the contributions perplexing.

### STRUCTURE

*Traits and types.*—In the early stages of personality research, in which we are sorting out the manifest variety of human behavior so that we can ultimately deal with it on an explanatory level, we must resort largely to ratings and questionnaires and various measures of performance. We know of no better methods than those of factor analysis for “making sense” out of these kinds of data. Factor analysis is most valuable in constructing and selecting tests and in finding principles of classification. Neglect of the dimensional analysis of measures that purport to reflect certain consistent aspects of behavior other than the measures themselves can only lead to the proliferation of innumerable labels and descriptions of various kinds of behavior and the reporting of their correlations with innumerable other measures. If we wish to abandon dimensional analysis and still profess faith in scientific endeavor, we must be content to study by experimental or observational methods the functional relationships between variables which are of primary interest in their own right. This is the procedure in most research on sensation, perception, and learning, and is practically the sole method in physiology. There is much to be said in favor of this approach in the field of personality. However, so long as we use measures (e.g., questionnaires) which are themselves not of primary importance but are merely indirect measures of other forms of behavior, we must be concerned with dimensional analysis. This concern does not necessarily carry over to the applied field, where measures are explicitly constructed for the purpose of predicting a particular criterion. In terms of any concept of personality, what is being measured in such cases is usually unknown, and the reason why the test succeeds in predicting the criterion remains a mystery. Such a state of affairs is utterly unsatisfactory to those whose primary interest is the scientific study of personality.

Research workers are therefore indebted to Guilford and Cattell for their continued efforts to improve their factorial measures of personality. Guilford & Zimmerman (43) broke down the 13-factor Guilford-Martin personality inventories (GAMIN, STDCR, O, Ag, and Co), into 69 clusters each con-

taining anywhere from 2 to 10 items, and factor analyzed the matrix of correlations between these clusters to determine if the original 13 personality factors would emerge. The analysis showed that 14 dimensions were needed to account for the intercorrelations. With certain minor qualifications, 13 of the factors could be interpreted as being nearly the same as those in the original inventories. Interpretations of most of the factors were modified and clarified as a result of the reanalysis. The 14th factor—masculinity-femininity—resulted from including the variable “sex membership” in the intercorrelations. All factors were rotated orthogonally and are independent of one another with minor exceptions.

Cattell (12) has also reanalyzed his Sixteen Personality Factor Questionnaire. Cattell describes the reanalysis as consisting of two aspects: validation, i.e., the determination of the construct validity of the items intended to measure each personality factor; and intensification, i.e., the process of raising the saturation of items on required factors and reducing their correlations with factors other than the intended one. Cattell's “Canons of Factored Test Construction” and his technique of “parcelled factor analysis” are significant methodological contributions. Cattell based his factor analysis on the intercorrelations of several hundreds of individual items. The factor loading of every item of the original 16 P.F. (374 items) was determined and items of low validity were replaced by new items of higher validity. Unlike Guilford's factors, Cattell's are not orthogonal, but have been rotated obliquely to approximate simple structure. In another paper Cattell (13) describes the factor analysis of the matrix of correlations between the 15 primary factors of the 16 P.F. (the 16th factor is one of intelligence and was omitted from the analysis). The analysis yielded four second-order factors which Cattell has labelled (a) anxiety vs. dynamic integration, (b) extraversion vs. introversion, (c) cyclothyme vs. schizothyme constitution, (d) unbroken success vs. frustration. It may be pointed out that Cattell has arrived, by quite different means, at three factors which appear very similar to Eysenck's factors of neuroticism, introversion-extraversion, and psychoticism. The most obvious need at present is a direct comparison by correlational methods of the factors of Guilford, Cattell, and Eysenck. The inventories of Guilford and Cattell, at least, purport to cover nearly all the variance in the personality questionnaire realm. The extent to which the two inventories cover the same territory will have to be determined empirically. Cattell's inventory seems to be supported by more validation material and may have greater generality because of the greater size and diversity of the population samples on which the factor analysis was based.

Factors are of interest to personality theorists in that they serve to define and delimit behavioral phenomena. These phenomena can then be brought under experimental analysis in an attempt to explain the factor on a different level than that of factor analysis itself. This approach is exemplified in the work of Eysenck, who began with large-scale factor analytic

studies using a wide variety of questionnaires, objective behavior tests, and physiological measures in order to discover certain basic and pervasive dimensions of personality. He has amassed evidence for three such (orthogonal) dimensions, which he has labeled introversion-extraversion (I-E), neuroticism, and psychoticism. Eysenck and his co-workers have so far been concentrating on the experimental study of the I-E dimension. Eysenck (25) has hypothesized that the underlying cause of I-E is due to constitutional differences in the capacity for developing and dissipating cortical inhibition. It is postulated that in extraverts cortical inhibition is generated more quickly and strongly and dissipated more slowly than in introverts. In the conditioning and learning field Hull's concept of reactive inhibition is, according to Eysenck, an intervening variable on which introverts and extraverts should differ; and in the perception field Köhler's concept of neural satiation is an hypothetical construct on which introverts and extraverts should differ. Functional similarities between reactive inhibition and neural satiation, suggesting that they are basically the same phenomenon, have been discussed by Duncan (22). Eysenck (25) has attempted to demonstrate that differences in I-E are related to differences in kinaesthetic figural aftereffects, a phenomenon attributed to neural satiation, and also to the rate of acquisition and extinction of conditioned responses (eyeblick), one of the determinants of which is reactive inhibition.

This year Eysenck (26) predicted that in pursuit rotor learning extraverts would show a higher degree of the reminiscence phenomenon than introverts. (Reminiscence was taken as a measure of reactive inhibition.) The outcome of the experiment intended to test this prediction is not very decisive, though the prediction is borne out to a degree. The correlations (based on 50 Ss) between extraversion and two reminiscence measures were .29 and .10; only the first is statistically significant. A repetition of the experiment in Eysenck's laboratory by Star,<sup>6</sup> using 100 Ss, produced a correlation of .17 ( $p < .05$ , one-tailed test) between I-E and reminiscence. The correlations between two reminiscence scores and neuroticism in Eysenck's experiment were .40 and .27, which are significant. This correlation between neuroticism and reminiscence, which was not predicted, is interpreted by Eysenck as follows (26, p. 332).

If one regards neuroticism as a drive, and if drive leads to an increase in the amount of reactive inhibition tolerated by the organism before producing a cessation of activity, then individuals with strong drives should produce greater amounts of reactive inhibition and consequently higher reminiscence scores.

Repeating the experiment on 100 Ss, Star obtained a negative correlation of  $-.24$  ( $p < .05$ ) between reminiscence and neuroticism. Since the neuroticism and I-E measures correlate only .115 (not significant) it seems justifiable to interpret the correlations of both I-E and neuroticism with reminiscence as due to the interaction of two different factors, viz., drive and

<sup>6</sup> Personal communication, June, 1957.

reactive inhibition. It is also possible to argue that differences between introverts and extraverts in pursuit rotor performance, including the reminiscence effect, are due to more superficial differences than cortical inhibition. That is, the I-E questionnaire may differentiate people in terms of conscientiousness and willingness to comply with the experimenter's instructions, and these tendencies would be reflected in the S's performance. Eysenck makes it clear that he would not agree with such an interpretation (26, p. 331):

It would not be correct to say that personality factors, such as neuroticism and extraversion, *determine* the degree of reminiscence shown. Both reminiscence and personality factors are conceived of in this theory as determined by more fundamental causes, such as the inhibition/excitation balance, or the amount of autonomic drive present in a person.

Franks (37), working in Eysenck's laboratory, reports further evidence for differences between introverts and extraverts in rate of acquisition and extinction of the conditioned eyeblink reflex. In a previous experiment (35) neurotic patients were used; the present experiment used 60 university students. The findings of the two studies are almost identical. The correlation between extraversion (E) scores and speed of conditioning was  $-.46$  and between E scores and slowness of extinction  $-.34$ . At least two criticisms of Franks' experiments may be made. No evidence is presented that I-E is not related to rate of eyeblink<sup>6</sup> or to sensitivity to the air-puff independently of the conditioning. Also Franks' conclusion that I-E is related to conditionability is not fully warranted since he has used only one measure of conditioning, viz., eyeblink. No general factor of conditionability has been demonstrated. However, a project is now under way in Eysenck's laboratory to determine the existence of a general conditionability factor, based on an analysis of eyeblink, salivary, sensory, PGR, and EEG alpha rhythm conditioning.

Eysenck has hopes of ultimately working out the genetic aspect of his personality factors. The only evidence he has presented for the inheritance of I-E (27) is not convincing. The correlation between I-E factor scores was found to be higher for identical than for fraternal twins. But the factor analysis on which these scores were based must have been somewhat disconcerting to Eysenck. Only one of the tests used by Eysenck to measure I-E in other studies was used in this study (an adaptation of Guilford's R scale) and it had an insignificant loading of  $-.09$  on the I-E factor. The most heavily loaded (.63) variable on the I-E factor was the Rorschach M per cent. If Eysenck puts much stock in the conclusions he draws from this study, one may wonder if he might abandon the I-E questionnaire which he has used in many experiments and use the Rorschach instead. There seems to be little danger of this happening.

The neuroticism and psychoticism dimensions have received attention

<sup>6</sup> Franks has discussed this point at length in his unpublished Ph.D. dissertation (see 35).

from S. B. G. Eysenck (32), who tested groups of neurotics, psychotics, and normals on a number of objective tests and, by means of a discriminant function analysis, showed that two dimensions are needed to describe the differences between neurotics, psychotics, and normals. Her study thus lends further support to H. J. Eysenck's conclusion, based on earlier work, that neurosis and psychosis do not represent merely varying degrees of maladjustment along a single continuum but must be conceived as two different dimensions.

Lorr & Rubinstein (62) factor analyzed the correlations between ratings on fifty variables made on a group of neurotic patients by their psychotherapists. Ten primary factors emerged and two orthogonal second-order factors. The first was identified as the type of personality disorganization that occurs when ego defenses crumble; the second factor represents a tight defense system with extropunitive elements.

Singer *et al.* (82) factor analyzed a number of measures of ego functions such as delaying capacity, fantasy tendencies, level of aspiration, planning ability, motor inhibition, and responsiveness in ward behavior. The battery was administered to 100 male schizophrenics. Factor analysis yielded four factors labeled (a) motor inhibition and planfulness, (b) ambitiousness or need achievement, (c) emotional surgency, (d) introspectiveness or introversiveness. Two second-order factors emerged, one linking emotional surgency and lack of introversiveness, the other linking motor inhibition and ambitiousness.

Jones & Morris (53) factor analyzed Thurstone's Temperament Schedule along with a scale measuring values and "philosophy of life." The measures of temperament and of values rarely have more than 10 per cent of their variance in common; much further investigation would be needed before even this fact could be meaningfully interpreted. All three of the above-mentioned studies would have yielded more valuable information from an integrative point of view if "reference" inventories such as those of Guilford or Cattell had been included in the factor analysis.

Rigidity studies are definitely on the wane, most likely because no one has succeeded in demonstrating a general trait of rigidity or in getting various measures of rigidity to intercorrelate significantly among themselves, let alone with anything else. The literature on the water-jar Einstellung test, the favorite measure of rigidity for almost a decade, has been reviewed by Levitt (59), who concluded: "1. After eight years of research, evidence for the validity of the water-jar test as a measure of rigidity is still lacking. 2. The water-jar test is a poor psychological test *qua* test" (59, p. 368).

*Fundamental processes.*—Perception and learning have rightfully held the center of the stage in psychology for half a century. It is in these fields that psychology has achieved the most substantial and systematic body of knowledge and the most highly developed and satisfactory theories. Here the discovery of general laws has always been the chief aim. In experiments on perception and learning, IDs are regarded as error variance, and person-

ality factors, if they are noted at all, are thought of merely as interfering effects that make the discovery and demonstration of general laws more difficult. It is in just these factors, so long neglected in their own right, that personality research may find some of its most fruitful subject matter. Nowadays few psychologists would wish to identify personality so narrowly as only those aspects of behavior which can be described in terms of questionnaire responses, ratings, projective techniques, or clinical observation. All IDs in the behavioral realm may be regarded as the subject matter of personality research. Perception and learning are perhaps the most fundamental behavioral processes and are the basis of much that we call personality. This is especially true of learning. The systematic investigation of IDs in these processes, as well as of their developmental aspects, is therefore highly germane to personality study. We have the advantage here of entering not a wilderness but charted territory. Years of research have provided us with much substantial knowledge of the phenomena of perception and learning; we know something of the parameters involved, of important functional relationships, of general principles and laws. Not the least important from our point of view is that we are already provided with many experimental techniques for the study of these processes.

Personality researchers have hardly begun to cultivate this territory. True, it is commonly heard that personality factors (or emotional factors) affect learning and perception, as if personality were another part of the individual exerting an influence on certain more fundamental processes. That personality is a product of learning is also a widely held view and is often accompanied by an implicit belief that persons differ from one another in the content or effects of their learning, while the learning process itself is the same for everyone. It is granted that the influence of past experience on perception and the learned aspects of behavior are important subjects for study. They are not being overlooked. But the study of IDs in the processes themselves has not yet come into its own. How can one best proceed in this investigation? Should one start by looking for correlations between personality factors derived from questionnaires and ratings on the one hand and measures of perception and learning on the other? Or is this too wide a gap to be bridged meaningfully by a correlation coefficient? Should one look first for factors, or traits (primary factors) and types (second-order factors), strictly in the realm of perception or learning, and then try to find links with the personality factors derived from other measures? Surely many such questions must be asked. But at the present stage we had best encourage every approach that appears at all promising.

*Perception.*—We are reminded by Granger (41) that from the psychophysiological point of view the peripheral sense receptor in the case of vision is not only a sense organ in the strict sense of that term, but is also a part of the central nervous system. Visual as well as perceptual phenomena may therefore provide a means of approach to the study of brain functioning. Granger cautions, however, that in experiments on IDs in perception, ef-



fects on the sensory level should be excluded or accounted for before postulating differences at a higher level (41, p. 72).

The year's major effort in the perception field is reported in a monograph by Eysenck, Granger & Brengelmann (30). The experimental work on which this monograph is based was completed three or four years ago and is not to be regarded within the framework of Eysenck's present theory of I-E. Furthermore, it is best viewed as a large-scale exploratory study. Forty-three different sensory and perceptual tests, along with a number of cognitive, motor, physiological, and verbal personality measures were obtained on large groups of neurotics, psychotics, and normals. Granger reports the findings on simple sensory and peripheral processes—dark vision, visual acuity, accommodation, color vision, critical flicker frequency, autokinetic effect, etc. Brengelmann describes the results from a number of perceptual techniques which have been developed in Germany but are little known abroad; these represent more complex perceptual processes such as illusions, afterimages, vision through prismatic lenses, perceptual learning, etc. A centroid factor analysis of 77 scores derived from all of the tests is discussed by Eysenck. The results of this analysis are hard to evaluate. The first two factors are defined by the verbal personality measures and the intelligence tests; the third and fourth factors have their highest loadings on the perceptual tests but are not easily defined. The communalities of the various measures are quite small and in the majority of the tests the factors do not account for any reasonable portion of the communality. How much this may be due to specific factors or to error it is impossible to say since the intercorrelations were not corrected for attenuation. In general, however, the results of this study leave no doubt that perceptual processes are somehow related to more molar personality variables, particularly to type and degree of mental illness. Many more of the tests discriminated significantly between normals, neurotics, and psychotics than could be expected by chance. The verbal personality tests of neuroticism generally differentiated the groups more effectively than the perceptual tests, a not surprising fact, since the personality tests were explicitly constructed for this purpose. Physiological tests (salivary output, temperature, pulse rate, blood pressure, PGR) showed no marked differentiation between diagnostic groups, while motor responses (body-sway, dexterity, Luria test) differentiated somewhat less effectively than the perceptual tests. Eysenck points out that the facts revealed in this study cannot be accounted for by any existing theory of personality (30, p. 128):

Most existing theories may be adequate to deal with highly abstract concepts having little or no anchorage in behavior, but they do not enable us to make predictions in the field covered in this monograph. . . . Scientific theories cannot choose the facts that they would wish to explain in any given field of study. If a theory fails to account for plainly relevant facts, this is a serious argument against it. The reader may like to try to explain the phenomena described here [i.e., the relationship between perception and personality disorder] in terms of archetypes, oedipus complexes, life styles, or any other explanatory concepts used by "dynamic" schools.

The "personality through perception" approach of Witkin, which attracted a good deal of attention a few years ago, appears either to be lying dormant or to have died out. It is given attention in only two papers this year (36, 42). Witkin's work represents one of the first concerted attempts to relate perception to personality. The relationship between mode of perception and personality was conceptualized in terms of a person's tendency toward active coping or passive submission with respect to the environment. The Rod-and-Frame Test and the Tilting-Room-Tilting-Chair Test were the principal techniques used by Witkin. This research was methodologically weak and partly for this reason has failed to command the interest of other personality researchers. Gruen (42) presents a thorough critique of this work. Franks (36) failed to find that Witkin's Rod-and-Frame Test correlates with introversion-extraversion, neuroticism, or with the effects produced by a depressant drug (sodium amytal).

We are indebted to Jenkin (52) for his comprehensive and critical evaluation of the literature on affective processes in perception. It is now reasonably well established that certain motivational states are determinants of size judgment; need is a determinant of perception; there is selective sensitization for stimuli presumed to be noxious or threatening to Ss (perceptual defense). Jenkin points out that in designing experiments on perceptual defense it is necessary to take account of certain critical IDs. An interesting illustration of this is seen in a study by Carpenter *et al.* (10) in which it was found that Ss judged as being repressors on a sentence completion test perceived conflict words more slowly than did Ss judged as being nonrepressors or sensitizers. Spence (87) also found that certain Ss had lower recognition thresholds for threatening words than for neutral words (vigilance) while others had higher thresholds for threatening words (defense). The absolute value of the discrepancy between thresholds for threatening and neutral words correlated positively with degree of anxiety.

A novel experiment by Smith & Raygor (84) relates word association to the concept of visual satiation and demonstrates a correlation between satiation and personality. Prolonged visual exposure of a stimulus word resulted in a word-association response less common (in terms of the Kent-Rosanoff frequencies) than that elicited under brief exposure. Ss characterized by a personality inventory as sensitive, flexible, imaginative, and extraverted differed in this satiation effect from Ss characterized as rigid, withdrawn, and introverted. Presumably there is a hierarchy of potential responses to a given stimulus word, and with continued exposure to the stimulus word each response in order will be aroused and then become refractory or satiated, so that in time distantly related response words will occur.

*Learning.*—The writer believes that Skinner's method of analyzing behavior in terms of operant conditioning promises to become a most important contribution to personality research. As applied to the study of personality, Skinnerian methods, too, are just at the beginning. A few years

ago Skinner, Lindsley, Solomon, and their associates at Harvard began studying psychotic behavior by putting schizophrenic patients into human-size Skinner boxes. Skinner's (83) ideas about the study of psychotic behavior are completely consistent with his approach to the study of animal behavior over the past thirty years. Recent reports (60, 61) of the research on psychotics reveal the exploratory nature of this work so far, but they also indicate the exciting possibilities of Skinner's methods. Rate of responding under operant conditioning is related to severity of psychosis; King *et al.* (56) have found this relationship to be curvilinear. There are marked IDs in the effectiveness of various reinforcers (61). The various reinforcers used in the Harvard studies were candy, nickels, food, cigarettes, pictures, and music. Also the S's bar pressing was made instrumental in feeding a hungry kitten, the sight of which by the S acts as a reinforcement. The effect of various drugs on operant behavior is also under investigation.

Conditioning of verbal behavior has been the subject of several studies this year. They suggest that we have here, at least potentially, a means of approach to the understanding of attitude formation, the self concept, interests, defense mechanisms, and questionnaire behavior. McNair (66) has shown that a S's rate of responding verbally to pictures could be markedly influenced by various rates of reinforcement and that this process could take place without the S's awareness. The amount of talk about particular aspects of the pictures was also influenced by reinforcements. Nuthmann (70) found that the experimenter's saying "good" served as a reinforcement for the conditioning of acceptance of self on a personality questionnaire regarding self attitudes. A nonverbal stimulus light was not an effective reinforcer in this situation. This learning, too, came about without the S's awareness. Hildum & Brown (48) administered a questionnaire by telephone and were able to bias the S's responses through the selective interpolation of "good." "Mm-hmm" was not effective. In an ingenious experiment Eriksen & Kuethe (23) demonstrate avoidance conditioning without awareness as an analogue of repression. In order to explain repression in conditioning terms it is necessary to show that implicit verbal behavior or thoughts are analyzable into S-R sequences and that these S-R sequences are learned and modified by the same principles of reinforcement that govern other behavior. In repression it is also necessary that the anxiety-provoking thought be prevented from occurring. This process is automatic, occurring without the S's awareness. Eriksen & Kuethe's experimental analogue meets these criteria of repression. After certain arbitrarily-selected words among the S's chain associations to a word-association test were punished by an electric shock, these words were repressed in the S's later trials on the same word association test even when there was no threat of shock.

*Autonomic and psychomotor responses.*—The investigation of autonomic functions, which hold a prominent place in certain theories of emotion and of neuroticism, has so far not proved fruitful in personality research. Autonomic responsiveness as presently measured does not show reliable systema-

tic relationships with other psychological variables. The highly specific and relatively autonomous nature of the various autonomic functions is probably responsible to a large degree for the failure to find consistent relationships between autonomic activity and personality variables. From the literature on PGR as well as from her own experimental studies of PGR, S. B. G. Eysenck (31) has concluded that little progress is likely to be made in working with the PGR until fundamental problems of measurement are resolved. These difficult and complex problems are being ably tackled by Lacey (58).

In the psychomotor realm even such seemingly simple types of behavior as reaction time and performance on simple repetitive motor tasks have been used effectively by Venables & Tizard (90, 91) as a means of testing hypotheses deduced from Pavlov's little-known theory of schizophrenia.

*Attitudes.*—One of the major preoccupations in the personality field is that of bridging the gap between psychology and sociology. Thus a great deal of recent theory and research is concerned with the integration of basic psychological phenomena with socially and politically relevant behavior. The focus of these efforts is the study of attitudes. In this field the research on authoritarianism continues to hold the center of the stage. Surveying the great amount of work that has been done in this area since the publication of *The Authoritarian Personality* (1) provokes one generalization: the formula for creating a research craze of proliferation and longevity consists of making available an easy-to-use measuring device with a significant label and fascinating content. Factorially it should be as multidimensional as possible, so that it will yield significant correlations with a host of other psychological measures.

Such has been the case with the questionnaires of authoritarian attitudes, particularly the well-known F scale. In past years ethnic prejudice and authoritarianism, as measured by the A-S (anti-Semitism), E (ethnocentrism), and F scales, have been shown to be significantly related to rigidity, concreteness, narrowness of thinking and problem solving, premature closure of perception, intolerance of ambiguity, distortion of memory, intelligence, xenophobia, family ideology, anxiety, reinlistment intent, cooperation in experimentation, and leadership qualities, to name only a few of the variables investigated. The major findings with the F scale from 1950 to 1955 have been reviewed by Titus & Hollander (89). In view of the many unanswered questions concerning the F scale, they caution against its use as a practical instrument in applied settings. The present writer would go a step further and say that even its use in personality and social research should be questioned, except for direct investigations of the scale itself. It is unfortunate that this sort of analysis was not undertaken several years ago, before the accumulation of so many findings that are now practically impossible to interpret. Much of the research on authoritarianism has consisted of correlating one unknown with another. It is now clear that the F scale is multidimensional and all but a minor portion of its variance can be attributed to a number of factors that have little to do with the content

validity of the scale. Factors of intelligence, educational level, response-set (acquiescence), general maladjustment or neuroticism, and probably a social-desirability response factor are involved.

This year for the first time since the publication of the F scale in 1950 we find that an appreciable proportion of the studies in this area have dealt with the nature of the F scale itself. The findings provide a striking demonstration of the importance of dimensional analysis of personality and attitude questionnaires. All of the F scale items are stated positively, so that agreement represents authoritarianism. A number of investigators have devised reverse F scales in which the same item content is worded negatively. When the positive and negative F scale items are combined into one scale, the paradoxical property of negative reliability may be obtained. That is, some Ss agree with pairs of items both of which are mutually contradictory. A response-set of acquiescence, a tendency to agree with generalized statements, is held responsible for this phenomenon. Chapman & Campbell (14) found correlations between individual positive F scale items (F+) and reverse items (F-) to average close to zero. All of the variance in F cannot be due to response-set, however, or the correlations between F+ and F- items would have been much higher. It turns out that the acquiescence response-set is correlated positively with the item content of F. Independent measures of response set and item content correlated .32.

Different investigators usually have quite different ideas as to what constitutes a reversal of any particular F scale item. Obviously there are many ways in which the same content may be worded. A worthwhile investigation would be to factor analyze the items of half a dozen or more reverse F scales and compare the factor loadings of the different wordings of the same item content. It is not unlikely that a larger proportion of the variance will be attributable to the structure rather than to the content of the items.

Jackson & Messick (50), using another reverse F scale, found a correlation of +.03 with the E (ethnocentrism) scale, whereas a negative correlation would be expected on the basis of the item content. In the same study, Gough's *Pr* (prejudice or intolerance) scale of the MMPI correlated +.23 with the reversed F scale, a correlation nearly as high as that between *Pr* and the positive F scale! Since 29 of the 32 items in the *Pr* scale are keyed "true" for intolerance, response-set would seem to account for most of the variance *Pr* has in common with authoritarian measures. Cohn (19) reports a significant correlation of .41 between the F scale and a tendency to answer "true" to a specially constructed scale of 33 MMPI items which discriminated between high and low true responders on the MMPI. Some indication of the confounding effects that the response-set factor can have on the interpretation of correlations is shown in the finding of Jackson *et al.* (51) that rigidity, as measured by the Einstellung water-jar problems, is correlated with F, but only by virtue of the response-set factor rather than the content validity of the scale.

The same problem arises when the F scale is correlated with other multi-dimensional scales, such as those of the MMPI. The interpretation of such correlations can hardly be attempted. The psychopathology of authoritarianism remains one of the important controversial problems in this field; unfortunately it has not yet been investigated by adequate techniques. The principal instrument in most investigations has been the MMPI, and it, too, is afflicted by response-sets (5). Studies of this type should at least include a number of measures of response-set (6, 19, 34) which can then be partialled out of the correlations between the MMPI and authoritarianism scales.

There are many instances in which the F scale continues to show significant correlations with a variety of external, nonquestionnaire criteria which appear to be related to the dynamic concept of the authoritarian syndrome originally formulated in *The Authoritarian Personality*. The conclusion of Freedman *et al.* (38), based on the negative correlation between F and the Hy scale of the MMPI, that repressive tendency is negatively related to authoritarianism, is directly contradicted by an experimental study by Kogan (57) in which low F Ss showed greater recognition of aggressive and sexual statements presented on a tape recorder masked by a noise background. The "authoritarians" showed a greater amount of perceptual defence against sexual and aggressive material, a finding that is consistent with the hypothesis that repressive tendency is a dynamic component of the authoritarian syndrome.

A kind of validation study of the F scale was performed by Wells, Chiavallo & Goldman (92). They asked five college fraternities to fill out a "Guess-Who" questionnaire made up of items reflecting authoritarian characteristics. The fraternities differed significantly on this authoritarian-nonauthoritarian reputation continuum; and they differed in their mean F scale scores, the order of the means being the same as the order on the "Guess-Who" continuum.

The most important contribution to attitude research during the current year is the work of Rokeach (74) and Rokeach & Fruchter (75). Rokeach has argued that the original measures of authoritarianism have to do with right-wing or conservative, rather than with general, authoritarianism and intolerance. He has therefore devised a Dogmatism scale which embraces general authoritarianism and general intolerance regardless of specific ideological content. Rokeach defines the concept of dogmatism as (72)

- (a) a relatively closed cognitive organization of beliefs and disbeliefs about reality,
- (b) organized around a central set of beliefs about absolute authority which, in turn,
- (c) provides a framework for patterns of intolerance and qualified tolerance towards others.

Another questionnaire, the Opinionation scale, yields measures of right and left opinionation. With Rokeach's scales it is possible to reconcile some of the seemingly contradictory or paradoxical findings obtained with the old auth-

oritarian scales, such as the fact that some low authoritarians score high on ethnocentrism and vice versa. Rokeach doubts that the F scale represents an ordinal continuum; there is evidence that it actually measures at least three distinct sorts of authoritarianism. In a number of studies using samples from a variety of populations, the theoretical claims made for Rokeach's Dogmatism and Opinionation scales appear to be well supported (74). The Dogmatism scale correlates highly with the F scale but also correlates positively with both left and right opinionation. A factor analysis of scales measuring ten variables—anxiety, paranoia, self-rejection, dogmatism, authoritarianism, rigidity, ethnocentrism, liberalism-conservatism, left opinionation, and right opinionation—revealed that (a) dogmatism is factorially discriminable from authoritarianism; (b) that dogmatism, paranoia, self-rejection, and anxiety are factorially similar (75).

Most important theoretically is Rokeach's paper on the relationship between belief, as measured by the Dogmatism scale, and thought, as measured by cognitive tasks (73). The concepts used in describing the properties of belief-disbelief systems have much in common with the properties of certain kinds of problem solving, a fact which permits Rokeach to develop a theoretical model subsuming belief systems and cognitive functions.

Another promising attempt at a theoretical integration of attitude research with more general psychological principles is that of Helson *et al.* (47). They have applied the theory of adaptation-level, which has previously related a variety of phenomena in psychophysics, judgment, and perception, to the study of attitudes. According to this theory, adjustive behavior, including the expression of attitudes, is determined by three sources of variance: stimuli immediately confronting the individual, background stimuli, and residual effects of stimuli from past experience. The operation of these factors is demonstrated in a well-designed experiment in which Ss responded to a scale of attitudes under simulated group conditions and alone. Some tentative evidence for the effects of more endogenous factors than past learning is presented by Winthrop (93), who compared various Sheldon somatotypes on a scale measuring consistency of attitudes. Ectomorphs were the most consistent, endomorphs the least, with mesomorphs in an intermediate position. The fact that the Ss somatotyped each other and were all students in a course on Sheldon's constitutional psychology introduces an unknown quantity into this experiment.

One of the boldest attempts in recent years to formulate an integrated theory of personality and social and political attitudes, Eysenck's *The Psychology of Politics* (24), gave rise to one of the most aggressive exchanges of criticism and rebuttal ever to appear in the *Psychological Bulletin* (15, 16, 28). Christie's painstakingly thorough critique of certain aspects of *The Psychology of Politics* is concerned mainly with what he considers defects in Eysenck's methodology and the invalidity of the conclusions based on these methods. Eysenck thanked his critics (also 76) for turning up a few minor misprints in his book, but did not agree with any of the major criticisms.

*Motivation.*—Motivation is today probably the liveliest and most vigorous, if not the most mature, area of psychological research. The current year's publications testify to this generally good state of health. Contributing strongly to this impression is the fourth annual *Nebraska Symposium on Motivation* (7), containing papers by Beach, Koch, Marx, Miller & Swanson, Seward, and Solomon & Brush. The papers are extremely diverse in their approach to motivation. Those of Beach and Solomon & Brush, based mostly on animal studies, are solidly empirical; theory, what little there is of it, is kept scrupulously close to the facts. At the other extreme are the papers by Seward and Koch. Seward presents a stimulating but highly speculative neurological model for motivation, and Koch intimately expounds on the dim view he takes of the contribution of animal research to the understanding of human motivation. He is concerned about what he considers the inadequacy of current theoretical approaches for dealing with "intrinsically" motivated behavior, such as creative and aesthetic experience. Beach summarizes his extensive research on masculine sex drive, which he conceives as an appetite rather than as a drive in the same sense that hunger and thirst are drives. Appetite is a product of experience, and to a much greater extent than is true of hunger or thirst, sexual behavior depends upon external stimuli and learned cues for its arousal. Marx presents an experimental and theoretical analysis of the relations between frustration and drive. Miller & Swanson describe a system for classifying the variables involved in the resolution of inner conflict; they include needs, morals, defenses, and expressive styles; these are related to certain social class variables. The excellent paper by Solomon & Brush on anxiety and aversion is referred to later in this review.

Motivation research based on fantasy measures of motive strength has flourished this year, and since this line was not given attention in last year's *Annual Review*, a fairly complete summarization of the present state of this research will be attempted here. So far most of the work has concentrated on the achievement motive and the affiliation motive. When this approach to the study of motivation began a few years ago with the work of McClelland and his associates, the theory, methodology, and experimental results seemed relatively simple and straightforward. But as new experiments have been performed and new facts discovered, the picture has become increasingly complex, and the multiplication of *ad hoc* hypotheses now characterizes the theorizing in this area. At present the important thing would seem to be to acquire an adequate body of reliable experimental findings. Fortunately, the methodology of this research is becoming more sophisticated and there seems to be little cause for concern that the workers in this field are not equal to the problem of dealing adequately with the complexity of their phenomena.

Little attempt will be made here to discuss the theoretical issues involved. No theory is at present anywhere near adequate to embrace all of



the diverse facts. For example, how can one even begin theoretically to relate the observations (a) that Ss with high *n* Ach show greater preference on the Strong Vocational Interest Blank for occupations involving financial risk than Ss with low *n* Ach (64), and (b) that Ss with high *n* Ach prefer the colors blue and green over red and yellow, while this is not true of Ss with low *n* Ach? (65). The induction of a theoretical framework will become possible after further substantiation of the findings of many one-shot experiments, along with the systematic investigation of what seem to be the important variables.

Prior to the year covered by this review, the main facts concerning *n* Ach were the following: *n* Ach showed a relationship to college grades, speed of learning, output in performance tests (e.g., anagrams and scrambled words), recognition thresholds for tachistoscopically presented achievement-related words, and ability to recall incompleting tasks (Zeigarnik effect). But these relationships are by no means simple. For example, *n* Ach has been found to be related to ability to recall incompleting tasks only when the tasks were presented to the Ss under the guise of being tests of important abilities. The relationship of *n* Ach to performance is apparently a function of situational factors as well as of internal motives. The relationship depends on whether or not the S performs in a neutral or in an achievement-oriented situation. It is at this point that expectancy theory enters the picture. The simplest theoretical formulation is  $B = f(m, e)$ : the strength of a behavioral tendency is a joint function of the strength of a particular motive (e.g., *n* Ach) and the strength of the expectancy that a particular act is instrumental to attainment of the goal of that motive (e.g., a task given to Ss in a competitive or otherwise achievement-oriented setting). This conception has considerable support from a number of studies showing that when an incentive unrelated to *n* Ach is offered, no systematic relationship is found between performance and *n* Ach. The same also has been found true of the affiliation motive (*n* Aff).

In summarizing this year's contributions it is impossible to describe the features that are peculiar to each experiment. *N* Ach and *n* Aff are measured by a variety of techniques (the most common being the TAT or other specially selected pictures), and the method of creating neutral and motivating performance situations differs from one experiment to another. For these details the reader must be referred to the original articles.

Hurley (49) found a positive relationship between *n* Ach and rate of learning (nonsense syllables) when learning took place under neutral (low motivating) conditions, but not when Ss received instructions intended to create high motivation. This finding is not as typical as the reverse: that *n* Ach is correlated with performance only when performance takes place under achievement-oriented conditions.

Karolchuck & Worell (55) found no correlation between *n* Ach and learning, although there was a positive correlation with incidental learning. Because no information is given about the motivating conditions under which

learning took place and since the learning task was not at all commensurate with those of other experiments, these results cannot be interpreted. There are a number of instances in which *n* Ach was positively related to performance only when the performance took place under achievement motivating conditions.

Atkinson & Raphelson (2) found that *n* Ach was reflected in various indices of persistence in task performance and in the recall of interrupted tasks only when the Ss had been led to believe that performance was a measure of personal accomplishment. When instructions for performance were designed to minimize this expectancy, there was no systematic relationship between *n* Ach and behavior. When the situational context was such as to minimize achievement motivation and increase motivation to please the experimenter by being cooperative, etc., there was no correlation between *n* Ach and recall of interrupted tasks; but there was a positive correlation between *n* Aff and recall.

French (39) has demonstrated other behavioral correlates of *n* Ach and *n* Aff. She found that the behavior of a person making a choice between a work partner who was a competent non-friend and one who was a less competent friend can be predicted from the relative strength of the person's *n* Ach and *n* Aff. Ss high in *n* Ach and low in *n* Aff chose the competent non-friend, while Ss high in *n* Aff and low in *n* Ach more often chose the less competent friend.

Another factor in the relationship between motivation and performance is pointed out in a study by Atkinson & Reitman (3). *N* Ach was positively correlated with performance (making Xs in circles) only when the expectancy that performance is instrumental in producing a feeling of pride was aroused and few if any other expectancies of goal attainment were aroused. When motives for other goals were also aroused (affiliation and money) by manipulation of situational cues that activate the S's expectancies, there was no relationship between *n* Ach and performance. Clark *et al.* (18) have demonstrated that *n* Ach has two aspects—hope of success (HS) and fear of failure (FF). A level of aspiration questionnaire related to grades in a college examination was used to obtain measures of the HS-FF continuum. The relationship between *n* Ach scores and the HS-FF continuum proved to be quite complex rather than linear. Ss at the extremes of the HS-FF continuum had lower *n* Ach scores than Ss in the middle of the continuum. However, when the *n* Ach score was broken up into two components, one subscore consisting of positive goal imagery (an approach motive with anticipation of reward) and the other subscore consisting of deprivation imagery (an avoidance motive involving anticipation of punishment), it was found that Ss at the extremes of the HS-FF continuum had higher positive *n* Ach subscores than Ss in the middle of the continuum; Ss in the middle of the HS-FF continuum had higher negative *n* Ach subscores. Further complexities of the relation between *n* Ach and performance measures are revealed in a factor analytic study by Clark & McClelland (17), in which anagrams were

the performance task. A factor analysis of anagrams scores and TAT *n* Ach scores resulted in three factors, one of which increased markedly from neutral to achievement-oriented test conditions. This factor in the anagrams test was interpreted as representing an achievement drive. The TAT measure of *n* Ach, however, did not correlate with this factor, though it did correlate with another factor which decreased from neutral to achievement oriented conditions. These findings are hard to interpret and at present only rather sketchy *ad hoc* hypotheses can be put forward. Attempts at theorizing had better await further substantiation of the findings.

Martire (67) reports that Ss with high *n* Ach showed a greater self-ideal discrepancy in ratings of five achievement-related trials (intelligence, initiative, creativeness, motivation, general success) than Ss with low *n* Ach. Miller & Worchel (68), also studying *n* Ach and self-ideal discrepancy, did not find any such relationship.

Somewhat more remote from the central core of this research are the latest findings of McClelland, that Ss with high *n* Ach have a preference on the Strong Vocational Interest Blank for occupations involving financial risk; contrary to what one might expect, there is no evidence that Ss with high *n* Ach prefer occupations of highest prestige value in society (64). It was also found that children with high *n* Ach take only moderate risks (determined by a ring-tossing game), while those with low *n* Ach played very safe or took excessive risks (65).

Taking a lead from the finding that Ss with high *n* Ach have a lower recognition threshold for achievement-related words, Atkinson & Walker (4) investigated a similar phenomenon with respect to the affiliation motive. Since work recognition thresholds are a function of many factors such as word frequency, the S's verbal habits, etc., Atkinson & Walker used pictures, rather than words, presented tachistoscopically under low illumination. They report a positive relationship between *n* Aff and perception of pictures of faces presented below the threshold of conscious recognition. French & Chadwick (40) found that while *n* Aff is not related to social popularity, Ss with high *n* Aff estimate their popularity level more accurately and estimate it as higher than Ss with low *n* Aff.

**Anxiety.**—The subject of anxiety has inspired a great deal of research in recent years and continues to do so. The reason is not hard to find. Anxiety is a central concept in the field of personality. Few, if any, other concepts sustain so much of the superstructure of personality theory. Anxiety may be most simply regarded as an emotional response conditioned to previously neutral stimuli which have been associated with pain or noxious stimulation. This emotional response, anxiety, is often associated with changes in performance. Anxiety gains theoretical importance when it is conceived as a state having the reinforcing and energizing properties of a drive. The reduction of this drive is held to be the reinforcement for much of social learning; it is the basis for perceptual defense and for all the defense mechanisms in psychoanalytic theory that are attributed major importance

in the development of the personality. Neurotic symptoms, too, are said to be maintained because they afford a degree of escape from anxiety.

The literature on anxiety is more pervaded with theoretical formulations than almost any other aspect of personality research. The multifarious research findings are confusing and contradictory. A few orienting remarks would therefore seem to be in order before reviewing the year's contributions.

On the theoretical side, anxiety has quite generally come to be regarded as a drive state having the properties attributed to drive in Hullian learning theory. Thus any behavior associated with the reduction of drive is reinforced, and the probability, speed, and strength of its occurrence, as well as its resistance to extinction, are increased. Also, according to Hullian theory, the acquisition of simple responses or habits, such as conditioned eyeblink, should be facilitated by an increase in drive. On the other hand, learning or performance of complex tasks, such as discrimination learning and serial rote learning, should be affected adversely by an increase in drive due to the activation of interfering response tendencies which, under low drive, remain below the threshold of reaction evocation.

The bulk of present research has consisted of testing various hypotheses derived from these conceptions. On the experimental side, there are principally three types of procedure. One makes use of questionnaires, usually the MAS, composed of items considered symptomatic of anxiety. High and low scoring Ss on the MAS are compared on their performances on learning, motor, and perceptual tasks. Another method utilizes some form of threat or noxious stimulation, and compares the S's performance under threat and non-threat conditions. There are two main classes of threat (or stress): ego threat (e.g., failure in a competitive situation) and noxious stimulation (e.g., electric shock). The third general method combines the other two. That is, the performances of high and low scoring MAS Ss are compared under threat and nonthreat conditions. This procedure is associated with the idea that the MAS measures anxiety potential as well as chronic manifestations of anxiety, so that high scoring MAS Ss should show greater reactivity to threat than low scoring Ss.

The research prior to the current year based on comparisons between high and low MAS Ss has shown briefly this: (a) There is a positive relationship between rate of eyeblink conditioning and MAS (5 studies). The correlations between MAS and eyeblink conditioning average about .25, indicating that very little of the variance in eyeblink CR can be accounted for by differences in MAS. Spence and Taylor have attributed this correlation to the effects of anxiety as a drive. A different viewpoint is that of Franks (37; see also 25), who has argued that the correlation is due to the I-E dimension, on which the MAS has a small loading; he thereby explains these findings in terms of Eysenck's theory that cortical inhibition is the underlying cause of I-E. At present we are lacking sufficient evidence to decide whether the Taylor-Spence or the Eysenck theory is more satisfactory. (b) There is no evidence of a correlation between MAS and PGR conditioning. (c) In

differential conditioning MAS was positively related to the excitatory strength of the positive CS (5 studies). (d) MAS has been found to be related to serial verbal learning. High MAS Ss were superior on serial lists of nonsense syllables of low intralist similarity and high association value. (e) High MAS Ss require more trials and make more errors in learning verbal and stylus mazes. (f) High MAS Ss have shown greater stimulus generalization, but only when Ss were given strong shocks during their performance. (g) The evidence is very contradictory regarding the effects of stress (or threat) on performance of high and low MAS Ss, so that no conclusion is possible. (It should be pointed out that there is some contradictory evidence for every point mentioned above.) (h) The MAS has shown correlations with psychiatric ratings of about .3 to .4 on the average, approaching an upper limit of about .6 in a couple of studies. For a full account of the major research findings with the MAS, the reader is referred to the review by Taylor (88).

This year has produced many contradictory findings, especially when the MAS was used as the measure of anxiety. This measure has not fared nearly as well this year as it has in the past. For many a positive outcome reported in the literature one can find its negative counterpart. This fact points to the urgent need for greater standardization of experimental procedures in this area. Too few experiments are sufficiently comparable to permit an evaluation of their contradictory results. Under such conditions even findings from various studies that appear to be in agreement cannot be integrated with confidence.

A series of carefully executed experiments by Farber & Spence (33) seems to sum up the situation on the negative side. Using reaction time (RT) as the dependent variable and MAS scores as the independent variable, Farber & Spence failed to find that variations in anxiety level affected RT in any manner, "either as a main effect, or as a function of stress, task complexity, stimulus intensity, or generalization. The effect of experimentally induced stress was also unclear" (33, p. 17). In short, the main relationships between anxiety and performance predicted by the Spence-Taylor conception of anxiety as a drive were not borne out. Probably because of differences in experimental procedure, Castaneda (11) found a significant but complex relationship between the MAS and simple RT; the relationship was positive for a CS (sound) of weak intensity and negative for strong intensity of CS. Response amplitude, as measured by a hand dynamometer, was positively related to anxiety.

In serial rote learning of nonsense syllables high MAS Ss were little affected by threat (shock) (81), but were adversely affected by failure (ego-threat) (79). However, high and low MAS Ss did not differ in serial learning when failure threat was not introduced (79). A threat of shock that could be avoided improved the performance of low MAS Ss, but their performance was impaired by a shock that could not be avoided. High MAS Ss did not show this difference, which was interpreted as suggesting that anxious Ss do not respond adaptively to threat (81). High MAS Ss also showed less in-

cidental learning (80, 81). In learning lists of nonsense syllables some of which were made up of similar (competing) and some of dissimilar (noncompeting) syllables, the high MAS Ss did relatively better on the competing lists than did the low MAS Ss, which is opposite to the outcome predicted by the Spence-Taylor theory that more interfering response tendencies are brought into play by higher drive level (78). High and low MAS Ss showed no differences in learning paired associates (meaningful words+nonsense syllables), although those paired associates that consisted of an emotionally charged word took longer to learn, on the average, for all Ss (46). Anxiety was found to have disruptive effects on more complex intellectual tasks, viz., timed intelligence tests and abstraction (80); and schizophrenics showed more disorganization in solving emotionally charged dissected sentences and arithmetic problems than in solving neutral ones (45).

Anxiety (MAS) was not found to affect stimulus generalization as would be predicted from drive theory (33, 77), but high MAS Ss did show more stimulus generalization than low Ss when given strong electric shock; weak shock or buzzer had no effect. Parallel results were obtained when psychiatric ratings of anxiety were used instead of the MAS (77).

In the perception field, the MAS and Sarason Test Anxiety Scale were found to be positively associated with delay in recognition of tachistoscopically presented words, but there was no interaction between anxiety level and threat as produced by emotionally charged words (85). On the other hand, there was evidence of increased sensitivity (perceptual vigilance) to anxiety associated stimuli (Blacky Test pictures presented tachistoscopically) (86). Threat induced (ego-threat) anxiety enhanced perceptual constancy; it increased frequency of closure, perceptual rigidity, and speed of establishing a stable configuration. The MAS, however, was related only to the stability test (69).

It will be noted that in nearly every case in which significant relationships are found and can be interpreted in terms of drive theory, the results are produced, not by differences in MAS, but by experimentally induced threat. It appears that the kind of anxiety measured by the MAS or by clinical ratings of anxiety is activated as a drive variable only when threatening or noxious stimuli are present; and where anxiety as measured by the MAS does show an effect, it is always weak compared to the effects of threat-induced anxiety. The two kinds of anxiety seem to have little variance in common. The MAS correlates as highly as its own reliability with measures of general neuroticism; it apparently taps chronic symptoms and defenses more than the kind of anxiety that has drive properties. In fact, it can be argued that the latter kind of anxiety may always be situational and that its effects cannot be studied, or even demonstrated, unless it is aroused in relation to the phenomena under investigation. The anxiety that originally caused and perhaps sustains neurotic symptoms may not be a relevant drive in the laboratory experiment. If anxiety is an emotional reaction, it should be reflected in certain autonomic functions, and the evidence regarding the MAS

and Sarason Test Anxiety Scale on this point is completely negative; zero correlations have been found consistently between these questionnaires and such indices of autonomic reaction to threat as GSR, the Palmar Perspiration Index, and respiratory activity (8, 9, 63, 71). The use of questionnaires as criterion measures of anxiety would thus seem questionable at present. The systematic validation of such questionnaires would call for experimental work along the lines suggested by Kamin (54). He rightly maintains that a test of anxiety must predict the magnitude of the effect on a S's performance of a change from nonthreat to threat conditions; also there must be an adequate sampling of performance tasks and of threat conditions if the anxiety measure is to have any generality. Whether or not such a measure of anxiety would be correlated with clinical assessments of anxiety would remain to be seen.

In many anxiety experiments one variable that often shows the greatest statistical significance is that of sex differences (8, 11, 33, 46, 69). There is nothing in theory that would account for these sex differences and it would seem to be an interesting enough phenomenon to merit further investigation in its own right. At least it must be taken into account in the design of experiments.

The biggest gap in anxiety research is the lack of investigations of the reinforcing properties of anxiety reduction on the human level. A search of the literature of this year and of past years has not turned up a single experimental demonstration with human Ss of this theoretically most important function of anxiety. Anxiety responses have indeed been conditioned to previously neutral stimuli in human Ss, but anxiety reduction has never been demonstrated as the reinforcement for the learning of new responses.

There is much excellent research on this subject with animals. It has been extensively reviewed by Solomon & Brush (7) in what is easily the year's outstanding paper in this field. Some of the excellent experiments cited by Solomon & Brush pose serious problems for a theory of avoidance learning based on anxiety reduction. For example, they have described a doctoral thesis by Black, who used cardiac rate in dogs as a measure of anxiety and found that the peak of anxiety follows the avoidance response (the US was shock). A well-learned avoidance response (turning the head to press a lever) did not prevent the cardiac acceleration associated with anxiety. Apparently the avoidance response was not a means of escaping anxiety and thus could not have been reinforced by anxiety reduction. Yet the rate of learning the avoidance response was related to the magnitude of cardiac elevation in response to the CS. Obviously there are many unanswered questions awaiting further research.

## LITERATURE CITED

1. Adorno, T. W., Frenkel-Brunswick, E., Levinson, D. J., and Sanford, R. N., *The Authoritarian Personality* (Harper & Brothers, New York, N. Y., 990 pp., 1950)
2. Atkinson, J. W., and Raphelson, A. C., "Individual Differences in Motivation and Behavior in Particular Situations," *J. Personality*, **24**, 349-63 (1956)
3. Atkinson, J. W., and Reitman, W. R., "Performance as a Function of Motive Strength and Expectancy of Goal-Attainment," *J. Abnormal Social Psychol.*, **53**, 361-66 (1956)
4. Atkinson, J. W., and Walker, E. L., "The Affiliation Motive and Perceptual Sensitivity to Faces," *J. Abnormal Social Psychol.*, **53**, 38-41 (1956)
5. Barnes, E. H., "Response Bias and the MMPI," *J. Consulting Psychol.*, **20**, 371-74 (1956)
6. Bass, B. M., "Development and Evaluation of a Scale for Measuring Social Acquiescence," *J. Abnormal Social Psychol.*, **53**, 296-99 (1956)
7. Beach, F. A., Koch, S., Marx, M. H., Miller, D. R., Swanson, G. E., Seward, J. P., Solomon, R. L., and Brush, E. S., in *Nebraska Symposium on Motivation* (Jones, M. R., Ed., University of Nebraska Press, Lincoln, Neb., 311 pp., 1956)
8. Berry, J. L., and Martin, B., "GSR Reactivity as a Function of Anxiety, Instructions, and Sex," *J. Abnormal Social Psychol.*, **54**, 9-12 (1957)
9. Calvin, A. D., McGuigan, F. J., Tyrrell, S., and Soyars, M., "Manifest Anxiety and the Palmar Perspiration Index," *J. Consulting Psychol.*, **20**, 356 (1956)
10. Carpenter, B., Wiener, M., and Carpenter, J. T., "Predictability of Perceptual Defense Behavior," *J. Abnormal Social Psychol.*, **52**, 380-83 (1956)
11. Castaneda, A., "Reaction Time and Response Amplitude as a Function of Anxiety and Stimulus Intensity," *J. Abnormal Social Psychol.*, **53**, 225-28 (1956)
12. Cattell, R. B., "Validation and Intensification of the Sixteen Personality Factor Questionnaire," *J. Clin. Psychol.*, **12**, 205-14 (1956)
13. Cattell, R. B., "Second-Order Personality Factors in the Questionnaire Realm," *J. Consulting Psychol.*, **20**, 411-18 (1956)
14. Chapman, L. J., and Campbell, D. T., "Response Set in the F Scale," *J. Abnormal Social Psychol.*, **54**, 129-32 (1957)
15. Christie, R., "Eysenck's Treatment of the Personality of Communists," *Psychol. Bull.*, **52**, 411-30 (1956)
16. Christie, R., "Some Abuses of Psychology," *Psychol. Bull.*, **53**, 439-51 (1956)
17. Clark, R. A., and McClelland, D. C., "A Factor Analytic Integration of Imaginative and Performance Measures of the Need for Achievement," *J. Gen. Psychol.*, **55**, 73-85 (1956)
18. Clark, R. A., Teeva, R., and Ricciuti, H. N., "Hope of Success and Fear of Failure as Aspects of Need for Achievement," *J. Abnormal Social Psychol.*, **53**, 182-86 (1956)
19. Cohn, T. S., "The Relation of the F Scale to a Response Set to Answer Positively," *J. Social Psychol.*, **44**, 129-33 (1956)
20. Crandall, V. J., Ricciuti, H. N., Sigel, I. E., Hoffman, M. L., Reichard, S., and Kass, W., "Symposium on the Use of Projective Techniques as Research



- Tools in Studies of Normal Personality Development," *J. Projective Techniques*, **20**, 251-72 (1956)
21. David, H. P., and von Bracken, H., Eds., *Perspectives in Personality Theory* (Basic Books, Inc., New York, N. Y., 435 pp., 1957)
  22. Duncan, C. P., "On the Similarity Between Reactive Inhibition and Neural Satiation," *Am. J. Psychol.*, **69**, 227-35 (1956)
  23. Eriksen, C. W., and Kuethe, J. L., "Avoidance Conditioning of Verbal Behavior Without Awareness: A Paradigm of Repression," *J. Abnormal Social Psychol.*, **53**, 203-09 (1956)
  24. Eysenck, H. J., *The Psychology of Politics* (George Routledge & Kegan Paul, Ltd., London, 317 pp., 1954)
  25. Eysenck, H. J., "A Dynamic Theory of Anxiety and Hysteria," *J. Mental Sci.*, **101**, 28-51 (1955)
  26. Eysenck, H. J., "Reminiscence, Drive, and Personality Theory," *J. Abnormal Social Psychol.*, **53**, 328-33 (1956)
  27. Eysenck, H. J., "The Inheritance of Extraversion-Introversion," *Acta Psychologica*, **12**, 95-110 (1956)
  28. Eysenck, H. J., "The Psychology of Politics and the Personality Similarities Between Fascists and Communists," *Psychol. Bull.*, **53**, 431-38 (1956)
  29. Eysenck, H. J., "Drugs and Personality—I," *J. Mental Sci.*, **103**, 119-31 (1957)
  30. Eysenck, H. J., Granger, G. W., and Brengelmann, J. C., *Perceptual Processes and Mental Illness* (Maudsley Monographs No. 2, Chapman & Hall Ltd., London, 144 pp., 1957)
  31. Eysenck, S. B. G., "An Experimental Study of Psychogalvanic Responses of Normal, Neurotic, and Psychotic Subjects," *J. Psychosomatic Research*, **1**, 258-72 (1956)
  32. Eysenck, S. B. G., "Neurosis and Psychosis: An Experimental Analysis," *J. Mental Sci.*, **102**, 518-29 (1956)
  33. Farber, I. E., and Spence, K. W., "Effects of Anxiety, Stress, and Task Variables on Reaction Time," *J. Personality*, **25**, 1-18 (1956)
  34. Fordyce, W. E., "Social Desirability in the MMPI," *J. Consulting Psychol.*, **20**, 171-75 (1956)
  35. Franks, C. M., "Conditioning and Personality," *J. Abnormal Social Psychol.*, **52**, 143-50 (1956)
  36. Franks, C. M., "Différences déterminées par la personnalité dans la perception visuelle de la verticalité," *Rev. Psychol. Appl.*, **6**, 235-46 (1956)
  37. Franks, C. M., "Personality Factors and the Rate of Conditioning," *Brit. J. Psychol.*, **48**, 119-26 (1957)
  38. Freedman, M., Webster, H., and Sanford, N., "A Study of Authoritarianism and Psychopathology," *J. Psychol.*, **41**, 315-22 (1956)
  39. French, E. G., "Motivation as a Variable in Work-Partner Selection," *J. Abnormal Social Psychology*, **53**, 96-99 (1956)
  40. French, E. G., and Chadwick, I., "Some Characteristics of Affiliation Motivation," *J. Abnormal Social Psychol.*, **52**, 296-300 (1956)
  41. Granger, G. W., "Night Vision and Psychiatric Disorders: A Review of Experimental Studies," *J. Mental Sci.*, **103**, 48-79 (1957)
  42. Gruen, A., "A Critique and Re-evaluation of Witkin's Perception and Perception-Personality Work," *J. Gen. Psychol.*, **56**, 73-93 (1957)

43. Guilford, J. P., and Zimmerman, W.S., "Fourteen Dimensions of Temperament," *Psychol. Monographs*, **70** (10), 26 pp. (1956)
44. Hall, C. S., and Lindzey, G., *Theories of Personality* (John Wiley & Sons, Inc., New York, N. Y., 572 pp., 1957)
45. Heath, D. H., "Individual Anxiety Thresholds and their Effect on Intellectual Performance," *J. Abnormal Social Psychol.*, **52**, 403-08 (1956)
46. Heilizer, F., Axelrod, H. S., and Cowen, E. L., "The Correlates of Manifest Anxiety in Paired Associate Learning," *J. Personality*, **24**, 463-74 (1956)
47. Helson, H., Blake, R. R., Mouton, J. S., and Olmstead, J. A., "Attitudes as Adjustments to Stimulus, Background, and Residual Factors," *J. Abnormal Social Psychol.*, **52**, 314-22 (1956)
48. Hildum, D. C., and Brown, R. W., "Verbal Reinforcement and Interviewer Bias," *J. Abnormal Social Psychology*, **53**, 108-11 (1956)
49. Hurley, J. R., "Achievement Imagery and Motivational Instructions as Determinants of Verbal Learning," *J. Personality*, **25**, 274-82 (1957)
50. Jackson, D. N., and Messick, S. J., "A Note on 'Ethnocentrism' and Acquiescent Response Sets," *J. Abnormal Social Psychol.*, **54**, 132-34 (1957)
51. Jackson, D. N., Messick, S. J., and Solley, C. M., "How 'Rigid' is the 'Authoritarian'?", *J. Abnormal Social Psychol.*, **54**, 137-40 (1957)
52. Jenkin, N., "Affective Processes in Perception," *Psychol. Bull.*, **54**, 100-27 (1957)
53. Jones, L. V., and Morris, C., "Relations of Temperament to the Choice of Values," *J. Abnormal Social Psychol.*, **53**, 345-49 (1956)
54. Kamin, L. J., "The Measurement of Anxiety: A Methodological Note," *Can. J. Psychol.*, **11**, 71-74 (1957)
55. Karolchuck, P. A., and Worell, L., "Achievement Motivation and Learning," *J. Abnormal Social Psychol.*, **53**, 255-56 (1956)
56. King, G. F., Merrell, D. W., Lovinger, E., and Denny, M. R., "Operant Motor Behavior in Acute Schizophrenics," *J. Personality*, **25**, 317-26 (1957)
57. Kogan, N., "Authoritarianism and Repression," *J. Abnormal Social Psychol.*, **53**, 34-37 (1956)
58. Lacey, J. I., "The Evaluation of Autonomic Responses: Toward a General Solution," *Ann. N. Y. Acad. Sci.*, **67**, 125-63 (1956)
59. Levitt, E. E., "The Water-Jar Einstellung Test as a Measure of Rigidity," *Psychol. Bull.*, **53**, 347-70 (1956)
60. Lindsley, O. R., "An Experimental Analysis of Psychotic Behavior," *Progr. Rept. I, Institute of Mental Health, Public Health Service*, 14 pp. (1956)
61. Lindsley, O. R., "New Techniques of Analysis of Psychotic Behavior," *Ann. Tech. Rept. 3* (Office of Naval Research, U. S. Navy, 55 pp. 1956)
62. Lorr, M., and Rubinstein, E. A., "Personality Patterns of Neurotic Adults in Psychotherapy," *J. Consulting Psychol.*, **20**, 257-63 (1956)
63. Lotsof, E. J., and Downing, W. L., "Two Measures of Anxiety," *J. Consulting Psychol.*, **20**, 170 (1956)
64. McClelland, D. C., "Interest in Risky Occupations Among Subjects With High Achievement Motivation," *Tech. Rept., Need Analysis Research Project NR 172-363* (Office of Naval Research, U. S. Navy, June, 1956)
65. McClelland, D. C., "Risk-Taking in Children With High and Low Need for Achievement," *Tech. Rept. NR. 172-363* (Office of Naval Research, U. S. Navy, July, 1956)

66. McNair, D. M., "Reinforcement of Verbal Behavior," *J. Exptl. Psychol.*, **53**, 40-46 (1957)
67. Martire, J. G., "Relationships between the Self Concept and Differences in the Strength and Generality of Achievement Motivation," *J. Personality*, **24**, 364-75 (1956)
68. Miller, K. S., and Worchel, P., "The Effects of Need-Achievement and Self-Ideal Discrepancy on Performance Under Stress," *J. Personality*, **25**, 176-90 (1956)
69. Moffit, J. W., and Stagner, R., "Perceptual Rigidity and Closure as Functions of Anxiety," *J. Abnormal Social Psychol.*, **52**, 354-57 (1956)
70. Nuthmann, A. M., "Conditioning of a Response Class on a Personality Test," *J. Abnormal Social Psychol.*, **54**, 19-23 (1957)
71. Raphelson, A. C., "The Relationships Among Imaginative Direct Verbal, and Physiological Measures of Anxiety in an Achievement Situation," *J. Abnormal Social Psychol.*, **54**, 13-18 (1957)
72. Rokeach, M., "The Nature and Meaning of Dogmatism," *Psychol. Rev.*, **61**, 194-204 (1954)
73. Rokeach, M., "On the Unity of Thought and Belief," *J. Personality*, **25**, 224-50 (1956)
74. Rokeach, M., "Political and Religious Dogmatism: An Alternative to the Authoritarian Personality," *Psychol. Monographs*, **70**, No. 8 (1956)
75. Rokeach, M., and Fruchter, B., "A Factorial Study of Dogmatism and Related Concepts," *J. Abnormal Social Psychol.*, **53**, 356-60 (1956)
76. Rokeach, M., and Hanley C., "Eysenck's Tender-mindedness Dimension: A Critique," *Psychol. Bull.*, **53**, 169-76 (1956)
77. Rosenbaum, G., "Stimulus Generalization as a Function of Clinical Anxiety," *J. Abnormal Social Psychol.*, **53**, 281-85 (1956)
78. Saltz, E., and Hoehn, A. J., "A Test of the Taylor-Spence Theory of Anxiety," *J. Abnormal Social Psychol.*, **54**, 114-17 (1957)
79. Sarason, J. G., "The Effect of Anxiety and Two Kinds of Failure on Serial Learning," *J. Personality*, **25**, 383-92 (1957)
80. Siegman, A. W., "The Effect of Manifest Anxiety on a Concept Formation Task, a Nondirected Learning Task, and on Timed and Untimed Intelligence Tests," *J. Consulting Psychol.*, **20**, 176-78 (1956)
81. Silverman, R. E., and Blitz, B., "Learning and Two Kinds of Anxiety," *J. Abnormal Social Psychol.*, **52**, 301-3 (1956)
82. Singer, J. L., Wilensky, H., and McCraven, V. G., "Delaying Capacity, Fantasy, and Planning Ability: A Factorial Study of Some Basic Ego Functions," *J. Consulting Psychol.*, **20**, 375-83 (1956)
83. Skinner, B. F., "What Is Psychotic Behavior," in *Theory and Treatment of the Psychoses, Some Newer Aspects* (Washington University Studies, St. Louis, pp. 77-99, 1956)
84. Smith, D. E. P., and Raygor, A. L., "Verbal Satiation and Personality," *J. Abnormal Social Psychol.*, **52**, 323-26 (1956)
85. Smock, C. D., "The Relationship Between Test Anxiety, 'Threat-Expectancy,' and Recognition Thresholds for Words," *J. Personality*, **25**, 191-201 (1956)
86. Smock, C. D., "Replication and Comments: 'An Experimental Reunion of Psychoanalytic Theory with Perceptual Vigilance and Defense,'" *J. Abnormal Social Psychology*, **53**, 68-73 (1956)

87. Spence, D. P., "A New Look at Vigilance and Defense," *J. Abnormal Social Psychol.*, **54**, 103-8 (1957)
88. Taylor, J. A., "Drive Theory and Manifest Anxiety," *Psychol. Bull.*, **53**, 303-20 (1956)
89. Titus, H. E., and Hollander, E. P., "The California F Scale in Psychological Research: 1950-1955," *Psychol. Bull.*, **54**, 47-64 (1957)
90. Venables, P. H., and Tizard, J., "Paradoxical Effects in the Reaction of Schizophrenics," *J. Abnormal Social Psychol.*, **53**, 220-24 (1956)
91. Venables, P. H., and Tizard, J., "Performance of Functional Psychotics on a Repetitive Task," *J. Abnormal Social Psychol.*, **53**, 23-26 (1956)
92. Wells, W. D., Chiaravalle, G., and Goldman, S., "Brothers under the Skin: A Validity Test of the F-Scale," *J. Social Psychol.*, **45**, 35-40 (1957)
93. Winthrop, H., "The Consistency of Attitude Patterns as a Function of Body Type," *J. Personality*, **25**, 372-82 (1957)