

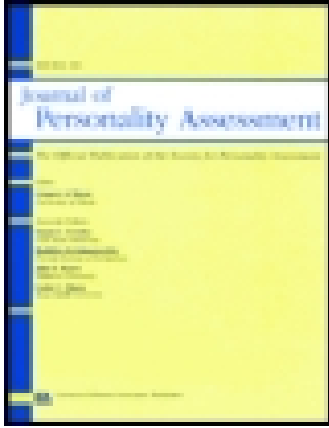
This article was downloaded by: [University of Victoria]

On: 29 January 2015, At: 15:58

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954

Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Projective Techniques

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/hzpt20>

The Rorschach as an Index of Pathological Thinking

Benjamin Pope^a & Arthur R. Jensen^a

^a Psychiatric Institute, University of Maryland, USA

Published online: 16 Nov 2010.

To cite this article: Benjamin Pope & Arthur R. Jensen (1957) The Rorschach as an Index of Pathological Thinking, *Journal of Projective Techniques*, 21:1, 54-62, DOI: [10.1080/08853126.1957.10380747](https://doi.org/10.1080/08853126.1957.10380747)

To link to this article: <http://dx.doi.org/10.1080/08853126.1957.10380747>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

The Rorschach as an Index of Pathological Thinking ¹

BENJAMIN POPE AND ARTHUR R. JENSEN
Psychiatric Institute, University of Maryland

The concept of pathological thinking is used widely in the clinical evaluation of mental patients. Yet it is a poorly defined concept for it has a multitude of theoretical referents and has largely evaded efforts at successful quantification. In this study the Rorschach is used as a basis for a theoretical formulation of pathological thinking and as an index for its quantification. The Index was devised by Watkins and Stauffacher (15) and cross-validated by Powers and Hamlin (11). In the present study its reliability is re-examined and its validity investigated on the basis of criteria that are different from those used until now.

Within the context of this study, and perhaps more generally too, pathology of thought is assumed to come to its clearest focus in schizophrenia. Bleuler's (3) discussion of the associative disturbance in schizophrenia is well known. According to him, social relevance and logic as determinants of thought associations give way to accidental contiguity, clang similarity, condensation, and stereotypy. Also within the realm of associative disturbance are Cameron's (9, pp. 50-64) formulations regarding *asyndetic thinking* and *interpenetration of themes*. Other authors have stressed the schizophrenic's loss of conceptual thinking, his concreteness. Thus Goldstein (9, pp. 17-40) sees the schizophrenic's thinking as similar to that of the organic patient, with words becoming denotative rather than connotative. He also demonstrates an impairment of the capacity to sort objects into conceptual categories. Both Kasanin (9, pp. 1-4) and Benjamin (9, pp. 65-90) have different operational approaches to the same

problem, but their conclusions are similar to Goldstein's. On the other hand, Von Domarus (9, pp. 104-114) and Arieti (1) stress the schizophrenic's modification of accepted logical thought.

The psychoanalytic term, *primary process*, refers to many of the same formal thought characteristics found in schizophrenic thinking, such as *condensation*, *displacement*, and *symbolization* (4). However, it is given a more general significance than the concept of pathological thinking, for it manifests itself in the dream worlds of normals (4) and in such ubiquitous phenomena as slips of the tongue, humor, and the effects of fatigue. Rapaport (12) characterizes the *primary process* as the drive organization of memories and thoughts, with the complete interchangeability of drive representations resulting in the phenomena of *condensation*, *displacement* and *symbolization*. By contrast, the *secondary process* is guided by reality connections and the accepted laws of logic. The structural precondition for the secondary process is an ego with the capacity to delay the immediate, direct discharge of drives. Recently Holt (7) has emphasized the error in assuming that *primary* and *secondary processes* constitute a dichotomy. "In much of what Freud wrote about these concepts, it is fairly clear that he did not think of them dichotomously, but as defining the extremes of a logical continuum. Any actual thought process, even that of a baby or a deteriorated schizophrenic, has to be located somewhere in between the poles" (7, p. 15).

The continuum idea is essential in the current efforts to develop an index of pathological thinking. It implies that pathological thinking is neither totally present nor totally absent, but

¹ Thanks are due Dr. Lester M. Libo for help in developing the manual used in this study.

present to some quantifiable degree. If this is so, such an index should make it possible to discriminate significantly between different diagnostic groups representative of varying degrees of thought pathology and to measure clinical improvement or regression in patients.

The Rorschach has been routinely used for making judgments about the mental status of patients with particular reference to the degree of irrationality of thought and distortion of perception. The usual measure of this is the form level, whether it be estimated as an $F+\%$ (2, 6) or rated on the Klopfer Form Level scale (10). From a theoretical point of view the form level concept has always been a troublesome one because of its discontinuity with general clinical and experimental formulations regarding thought pathology (13, pp. 228-252).

In a recent study, Friedman (5) has attempted to establish referents for the form level concept in perceptual developmental theory. He accepts Werner's (16) definition of regression as a partial return to genetically lower levels within the individual, in which there is less differentiation and hierarchic integration of function than at higher ones. Friedman postulates that the Rorschach reflects "certain aspects of perceptual functioning in schizophrenic patients which suggest that regression has taken place" (5, p. 171). He compared schizophrenics with normal children and normal adults. His more general finding is that "on the whole, the results would suggest that the perceptual functioning of the schizophrenic, in its structural aspects, is intimately related to that of the child . . . From the point of view adopted in this study, its characteristics may be understood as those of a primitive globality, syncretism, lability, diffuseness, and rigidity" (5, p. 184). These phenomena may be subsumed under Werner's

formulations regarding impairment in the capacity for differentiation and hierarchic integration. Friedman emphasized that regression does not return the schizophrenic to precisely the same level as the child occupies, for the adult psychotic still manifests many of the qualities of perceptual functioning that characterized him before regression occurred.

A question may be raised about the adequacy of describing the processes involved in responding to the Rorschach, in perceptual terms alone. Although Friedman intended to stay as close to the "purely structural aspects of perceptual functioning as possible" (5), he could not avoid bringing in certain associative categories as well, such as the *fabulized combination* and the *contaminated response*.

This difficulty in distinguishing between "the purely structural aspects of perception" on the Rorschach and the associative ones would appear to justify Rapaport's (12) use of the perceptual-associative interplay construct. Normal subjects are able to utilize this interplay in order to observe "reality" as it is implied in the test instructions. They ". . . will understand the testing situation and the test instructions to mean that they are to give responses for which sufficient justification may be found in the perceptual qualities on the inkblot; that they must give responses that are completely acceptable to everyday conventional logic; and that, just as they should not give responses which they cannot confirm by reference to the inkblot, so they should not give responses which are so dominated by the perceptual configuration of the inkblot that they are no longer subject to critical control, and thus become absurdly combined or absurdly integrated" (12, p. 236).

Responses that disregard the perceptual qualities of the inkblot represent an *abnormal increase of dis-*

tance from the blots; those that are so stimulus bound as to disregard ordinary logic and plausibility represent an *abnormal loss of distance*. A deviant verbalization on the Rorschach is one that represents an abnormal increase or loss of distance from the blot.

Using Rapaport's categories of deviant verbalizations on the Rorschach, Watkins and Stauffacher (15) developed an "Index of Pathological Thinking". From Rapaport these two authors selected the fifteen categories of verbalization most markedly deviant or most frequent in occurrence. To these, tentative weights were assigned, representing the authors' judgments regarding the degree and significance of pathology. For each Rorschach protocol studied, an average weighted score was calculated. The study by Watkins and Stauffacher (15) and a later one by Powers and Hamlin (11) are in essential agreement regarding the reliability and validity of the Index of Pathological Thinking. In the first study two independent raters obtained the reliability coefficients of .043, .469, and .913 for a normal, neurotic, and psychotic group respectively. Scoring reliability for the three groups combined was .775. In the second study two raters independently scored fifteen protocols selected at random from a total sample of fifty, and obtained an r of .88. In both studies the criterion of validity was the differences in mean scores for various diagnostic groups. Watkins and Stauffacher found significant differences between the means of the normal, neurotic and psychotic groups in the expected direction. Powers and Hamlin arranged five groups in the following assumed order of increasing pathology of thought: normal, anxiety neurotic, pre-schizophrenic, paranoid schizophrenic, and catatonic schizophrenic. An F ratio significantly below the .01 level was obtained, with the scores

increasing as expected.

Problem: In the present study, the validity of the Index for measuring intra-individual changes in three separate groups of schizophrenics, over a three-month period is investigated. Its reliability is also re-examined.

METHOD

Since the original scale devised by Watkins and Stauffacher was used with only minor modifications, it will not be reproduced here. The modified scale of this study permitted a five-point rating for each response with the following values in the order of increasing pathology: .00, .25, .50, .75, and 1.00. In order to increase the reliability of scoring, a manual was developed with more detailed scoring instructions than those presented by Watkins and Stauffacher and including extensive lists of sample responses taken largely from Rapaport (12, pp. 473-491).

According to the general design of this study, changes in Index scores over a three-month period were correlated with psychiatric ratings of clinical change. Three groups of schizophrenic subjects were used. Since the basic data analyses were carried out separately for the three groups, there was actually a sequence of three studies. Comparability of the groups is therefore not a requirement. However, Table I indicates that the three groups are similar with respect to age. Table I presents the composition of each group and the treatment applied.

TABLE I. Subjects of Study

Treatment	Sex		Age	
	N	M F	Rng.	Mean
Insulin Coma	15	15	22-43	31
ECT	14	5 9	23-51	34
Routine Hospital Care	12	5 7	18-55	33

The only selective factor operating in the choice of subjects was the capacity to give at least ten responses to the Rorschach. Pre-treatment pro-

protocols were obtained from patients within a few days after admission to the hospital, and never more than a week before the beginning of Insulin therapy and ECT. Post treatment protocols were obtained approximately three months after the first ones; this was approximately two weeks after the termination of treatment. For the Insulin group only, psychiatric ratings of clinical status were obtained immediately before treatment and both two weeks and six months after its termination. For all three groups psychiatric ratings of clinical change over the three-month period were made. These psychiatric ratings were used as the basic validity criteria.

RESULTS

Reliability

Both the reliability of scoring and the split-half reliability of the Index were determined using only Insulin group protocols. The scoring reliability was estimated by two methods, the first based on the percentage of agreement between two raters of each separate response, the second based on the rank order correlation between the total scores of all the protocols ($N = 38$). The additional 8 Rorschach records were obtained by repeat testing of 8 patients six months after termination of Insulin therapy. In order to guard against the "halo" effect that might result when responses are scored within the context of the entire protocol, each response was typed on a separate card and given a code number. The 1142 such cards were thoroughly shuffled before being scored by two raters working independently. The percentages of agreement between the raters on the sixteen different categories of the Index were very small, indicating low scoring reliability for the individual categories. The scoring reliability of deviation values, however, was quite satisfactory, as shown in Table II, which presents the number of re-

TABLE II. Disagreement Between Two Raters in Scoring Separate Rorschach Responses.

Difference Between Index Values	Number of Responses	Percent
.00	747	65
.25	305	27
.50	47	4
.75	32	3
1.00	11	1
Total Number of Responses	1142	100

sponses on which the two raters' scoring differed by a given Index value. A method of determining reliability by an analysis of variance (8), when performed on these data, yielded a reliability coefficient of .80.

The second determination of scoring reliability was based on the total scores of 38 protocols. Since total scores (i.e. the sum of the deviation values) are positively correlated with the number of responses in the protocol, the number of responses was partialled out. The resulting partial rank order correlation between the two raters gave a reliability coefficient of .85. The Index itself (sum of deviation values $\times 100$ /number of responses) is independent of the number of responses; the correlation between the Index and the number of responses was not significantly greater than zero.

It should be noted that the obtained reliability coefficients of .80 and .85 are not significantly different, though the first is a measure of the reliability of scoring individual responses and the second is the reliability of the total Index score for the entire protocol. Thus it is evident that the comparatively high scoring reliability of the Index represents high inter-rater agreement on each separate response and is not an artifact of the "halo" effect that would result from scoring responses under a global impression of the whole protocol.

The Index would seem to lend itself more justifiably to a determination of split-half reliability than do most other Rorschach scores, since there is a less direct relationship between the kinds of variables scored in the Index and the stimulus properties of the inkblots than is the case with formal factors such as FC, FK, Fc, etc. In order to overcome to some degree the well-known objections to splitting the Rorschach on the basis of the cards, which has been the most usual procedure in other studies, the Index scores were split by taking every other response throughout each protocol. The rank order correlation between the two halves, after correction by the Spearman-Brown formula, gave a split-half reliability coefficient of .52.

Thus, scoring reliability in terms of scale values is high. However, in terms of agreement on individual categories, it is unsatisfactory. Split-half reliability is significant but mediocre in level.

Validity

The validity of the Index for discriminating between groups that represent varying degrees of pathological thinking has been reported previously (11, 15). In the present study the capacity of the Index to reflect clinically observable intra-individual changes is the main consideration. Actually two basic validity tests have been used: (a) the correlation between the psychiatric rating of clinical status and Index scores, and (b) the correlation between the psychiatric rating of clinical change and change in Index scores.

The first validity test was carried out with the Insulin group only. The psychiatrist in charge of the Insulin unit rated the clinical status of each patient on a five-point scale immediately before the beginning of Insulin therapy, two weeks after its termination (approximately three months after the first rating), and six months after its termination. These three ratings are designated as Pre-Insulin, Post Insulin I, and Post Insulin II in Table III. Both the Index scores and psychiatric ratings were dichotomized at the median and correlations were computed by Chi-Square based on four-fold tables. There are no significant Chi-Squares in Table III.

The second validity test was based on the three groups of subjects. Since there were three sets of psychiatric ratings of clinical status for the Insulin group, three ratings of change were made. For both the ECT and Routine Hospital Care groups there was only one psychiatric rating of change. Although the psychiatrists used five-point scales, these ratings were dichotomized into Improved and Unimproved for Chi Square computations. Index changes were similarly dichotomized. In order to achieve this dichotomization with Index scores they were first normalized and converted into standard scores with a mean of 50 and a *SD* of 10. All patients registering a drop on this Index of at least one Standard Error of Measurement in standard score terms were classified as Improved; all others were classified as Unimproved. There are no significant Chi-Squares in Table IV.

In addition to the two basic val-

TABLE III. Chi Squares* for Relationship Between Psychiatric Ratings and Index of Pathological Thinking Scores for the Insulin Group.

Index** Scores	N	Psychiatric Ratings***		
		Pre Insulin	Post Insulin I	Post Insulin II
Pre Insulin	15	.05	.58	1.73
Post Insulin I	15	.05	3.23	.71

* Four-fold tables were used in computing X^2 and Yates' correction applied.

** Dichotomized at the median.

*** Psychiatric Ratings on a five-point scale were dichotomized at the median.

TABLE IV. Chi Squares* for Relationship Between Change in Psychiatric Ratings and Change in Index of Pathological Thinking for Insulin, ECT, and Routine Hospital Care Groups.

Change in Index Scores	Psychiatric Rating of Improvement**			
	N	Pre to Post I	Pre to Post II	Post I to Post II
Pre to Post ***				
Insulin group	15	.08	.05	.04
ECT group	14	.00		
RHC group	12	.04		

* Four fold tables were used in computing X^2 and Yates' correction applied.

** Dichotomized into *Improved* and *Unimproved*.

*** Dichotomized into *Improved* and *Unimproved*. The criterion of improvement was a decrease of one Standard Error of Measurement (3.4 standard score units). Standard scores were based on normalized Index scores with a mean of 50 and a SD of 10.

TABLE V. Rank Order Correlations Between $F+%$ * and Index Scores

Group	N	Rho.	
		Pre	Post
Insulin	15	-.42	-.38
ECT	14	-.623**	-.553**
RHC	12	+.002	-.42
Combined	41	-.40***	-.46***

* $F+%$ scored according to Beck (2). Both $F+%$ and Index Scores ranked from highest to lowest.

** $P < .05$

*** $P < .01$

TABLE VI. Pre and Post Index Scores for the Insulin, ECT, and Routine Hospital Care Groups

Group	N	Pre		Post		Diff.*	<i>t</i>
		Mean	SD	Mean	SD		
Insulin	15	17.65	12.75	15.65	11.35	2.00	.98
ECT	14	23.76	12.75	18.77	13.66	4.99	1.06
RHC	12	19.65	12.63	10.63	7.96	9.02	2.15**
Combined Groups	41	20.32	12.98	15.27	11.80	5.05	2.77***

* For the calculation of differences and their *t*-tests the Index scores were converted to normalized T scores with a mean of 50 and a SD of 10.

** $P < .10$

*** $P < .01$

idity tests, two other analyses were made that have some relevance to validity considerations. In Table V the rank order correlations between the Index scores and $F+%$ for the Pre and Post Rorschach records of the three groups are presented. Since it is assumed that a high $F+%$ would indicate a low level of pathology, negative correlations would be expected. All but one of the correlations are, in fact, negative. When the groups are taken singly, only the correlations for the ECT group are significant. With the groups combined, both correlations are significant.

Other findings with some relevance for validity are presented in Table VI. The mean Index scores for the three groups drop after the three month period of hospitalization. When the groups are considered singly, only the Routine Hospital Care patients register a drop that approaches significance. With the groups combined, a highly significant drop appears.

The data in Table VI may be compared with the means and standard deviations for schizophrenic patients obtained in the previous studies. Thus, Watkins and Stauffacher (15) obtained a mean of 18.15 and a SD

of 21.23 for their psychotic group. Their mean is rather close to the Pre mean in the present study. However, their variability is much greater. Powers and Hamlin (11) obtained mean scores for their pre-schizophrenic, paranoid schizophrenic, and catatonic schizophrenic groups of 20.53, 21.00, and 33.50 respectively. It is apparent that these means are higher than those obtained both by Watkins & Stauffacher and by the present authors.

DISCUSSION

While the two previous studies (11, 15) demonstrated the validity of the Index in discriminating between normal, neurotic, and psychotic groups, the present study fails to demonstrate the validity of the Index in measuring changes within schizophrenic subjects over a period of time. It may be said that the Index is a sufficiently fine measure to distinguish between groups but too gross to reflect intra-individual changes. However, this conclusion should be considered in the light of the known low reliability of psychiatric ratings (14). Certainly the significant drop in level of pathological thinking, as measured by the scale over a three month period of hospitalization, accords with expectation. It presents some hope for more positive results with better validity criteria.

Meanwhile, much can be done to sharpen the scale and perhaps increase its sensitivity. High reliability of scoring has been demonstrated for the scale as a global measure of pathological thought. Agreement is considerably lower for specific categories. Due to the infrequency of occurrence, some categories might well be dropped. The result would be a simplification of the scale with little loss in comprehensiveness. A few of the categories in which agreement was particularly low were found to overlap with others. In such cases categories could be combined, resulting in further simplification of the scale.

During the course of eliminating and combining these categories, a sharpening of scale definition could be undertaken. There might be a further increase in the accuracy of the scale if all the categories with the same weights were grouped together. Such a re-arrangement is suggested by the high level of agreement between raters for degree of pathology, in spite of disagreement for specific categories.

Powers² is following a different course in his revision of the Index. He abstracted ten categories from Rapaport's formulations regarding deviant verbalizations on the Rorschach. These he later combined into four classes, which he designated intellectual disorganization, socially deviant content, inappropriate increase or loss of distance, and affective response. All categories were set up as continua, ranging from a value of 10 to a value of 50 in 5-point intervals. In this manner Powers has eliminated the arbitrary weighting of different categories. Empirical investigation rather than initial assumption then becomes the means of determining the degree of pathology represented by each category and class. The authors of the present study are reluctant to follow this course for two reasons. The first is the high reliability obtained by using the present five-point scale weights and the second is the very low reliability obtained for the separate categories.

Holt's (7) work on developing a primary process index based on the Rorschach is also relevant here. Holt's index is not geared to detect pathological thinking per se, but rather all manifestations of the primary process. It is therefore much broader in scope than the Index of Pathological Thinking, encompassing an "index of drive-directedness of thought", a measure of the formal thought characteristics of the pri-

² Personal communication.

mary process, as well as an evaluation of "the subject's attitude toward the test and toward his own productions, and the extent to which he is master of or is mastered by the primary process elements in his thinking" (7, p. 22). The third section of Holt's index has many elements in it which may well be incorporated in the present scale. For instance, a response that appears pathological may actually be quite benign if it is given in an aesthetic, anthropological, fairy-tale, intellectual, or humorous context. Frequently an apparently bizarre response may be given as a play of fantasy enjoyed by the subject. Considerations such as these must in some way be integrated into the scoring of the Index in order that truly pathological responses may be distinguished from those that are only apparently so.

The moderate but significant correlations between the Index and $F+\%$ accords with theoretical expectation. Although the $F+\%$ is not a pure measure of the structural aspects of perception, it probably encompasses relatively more of perception and less of association in the perceptual-associative interplay than most of the categories of verbal response described in the Index. Powers has incorporated $F+\%$ into his scale and it may well prove advantageous to incorporate it in the present one.

SUMMARY

Two recent studies (11, 15) have shown that an Index of Pathological Thinking on the Rorschach, based on Rapaport's classification of aberrant verbalizations, discriminates between psychotic, neurotic, and normal groups. The present study re-examines the reliability of the Index and investigates its validity against the criterion of observed clinical changes in schizophrenic patients.

The subjects were three groups of schizophrenic patients receiving different forms of treatment: Insulin Coma, Electro-Convulsive Therapy,

and Routine Hospital Care. The Rorschach was administered to all Ss shortly after hospital admission. Insulin Coma and ECT were begun a few days later and terminated after about three months. Rorschachs were repeated two weeks after the termination of treatment. In the non-treatment group the Rorschach was repeated three months after its first administration. The psychiatrist working with the Ss assigned ratings of clinical status before treatment as well as change in status (improved-unimproved) after treatment (or after routine hospital care).

The scoring reliability of the Index as a whole was satisfactory (.85). The split-half reliability (odd vs. even numbered responses in sequence throughout the protocol) was .52.

No significant relationships were found between Index scores and psychiatric ratings of clinical status or between change in Index scores and psychiatric ratings of change. However, the combined groups showed a significant ($p < .01$) average decrease in pathological thinking as measured by the Index over the three month interval covered by the study.

REFERENCES

1. Arieti, S. *Interpretation of schizophrenia*. New York: Bruner, 1955.
2. Beck, S. J. *Rorschach's test: 1. Basic processes*. (2nd ed.) New York: Grune & Stratton, 1950.
3. Bleuler, E. *Dementia praecox; or The group of schizophrenias*. New York: International Universities Press, 1950.
4. Freud, S. *The interpretation of dreams*. (Tr. by Strachey) New York: Boris Books, 1955.
5. Friedman, H. Perceptual regression in schizophrenia, an hypothesis suggested by the use of the Rorschach test. *J. proj. Tech.*, 1953, 17, 171-185.
6. Hertz, Marguerite R. Frequency tables for scoring responses to the Rorschach ink-blot test. (3rd ed.) Cleveland: Western Reserve University Press, 1951.
7. Holt, R. R. Gauging primary and secondary processes in Rorschach responses. *J. proj. Tech.*, 1956, 20, 14-25.
8. Hoyt, C. Test reliability obtained by analysis of variance. *Psychometrika*, 1941, 6, 153-160.

9. Kasanin, J. S. (Ed.) *Language and thought in schizophrenia*. Berkeley: University of California Press, 1954.
10. Klopfer, B.; Ainsworth, Mary D.; Klopfer, W. G.; and Holt, R. R. *Developments in the Rorschach technique*, Vol. I. New York: World Book Company, 1954.
11. Powers, W. T. and Hamlin, R. M. Relationship between diagnostic category and deviant verbalizations on the Rorschach. *J. consult. Psychol.*, 1955, *14*, 120-124.
12. Rapaport, D. *Diagnostic psychological testing*. Vol. II. Chicago: Year Book, 1946.
13. Sarason, S. B. *The clinical interaction, With special reference to the Rorschach*. New York: Harper, 1954.
14. Taft, R. The ability to judge people. *Psychol. Bull.*, 1955, *52*, 1-23.
15. Watkins, J. and Stauffacher, J. An index of pathological thinking. *J. proj. Tech.*, 1952, *16*, 276-286.
16. Werner, H. *Comparative psychology of mental development*. (Rev. Ed.) New York: Follet, 1948.

Received August 27, 1956