The Grid Test of Thought Disorder: A Concurrent and Construct Validity Study

Kenneth R. Gamble
Loyola University Chicago

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THE GRID TEST OF THOUGHT DISORDER:
A CONCURRENT AND CONSTRUCT VALIDITY STUDY

by
Kenneth R. Gamble

A Dissertation Submitted To The Faculty Of The Graduate School Of Loyola University Of Chicago In Partial Fulfillment Of The Requirements For The Degree Of Doctor Of Philosophy

March 1974
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VITA

The author, Kenneth R. Gamble, is the son of the late Kenneth Joseph and Rose E. Gamble. He was born on July 31, 1940, in Erie, Pennsylvania.

His elementary education was obtained in the public schools of Erie, Pennsylvania. He was graduated from Strong Vincent High School in May, 1959.

In February, 1960, he entered Gannon College, and in May, 1963, he received the degree of Bachelor of Arts with a major in psychology. In September, 1963, he began graduate studies at Boston College and received the degree of Master of Arts in general-experimental psychology in May, 1966. In September, 1969, he was granted a United States Public Health Service Pre-doctoral Fellowship and entered Loyola University of Chicago where he began working toward the degree of Doctor of Philosophy in Psychology. From September, 1970 to August, 1971 he held a traineeship in clinical psychology at the Illinois State Psychiatric Institute. From September, 1971 to August, 1972 he held a clinical research traineeship at the Illinois State Psychiatric Institute.

From September, 1964 to August, 1965 he was an instructor of psychology at Newton Junior College in Newtonville, Massachusetts. In 1965, he received an appointment as instructor in the Department of Psychology at Gannon College in Erie, Pennsylvania. He was promoted to Assistant Professor in 1967. In January, 1973, he received an appointment as clinical supervisor at the Erie County Drug Abuse Program. In November, 1973, he received an appointment as research consultant to the Erie County Drug Council.
His published works include the following articles: The effect of verbal reinforcement on perceptual closure (1968); Color-word performance as a joint function of manifest anxiety and stimulus conflictfulness (1968); Creative functioning and cognitive regression (1968); The Holtzman Inkblot Technique: A Review (1972).
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CHAPTER I

REVIEW OF THE LITERATURE

The purpose of this study was to test the validity of Bannister's Grid Test of Schizophrenic Thought Disorder (Bannister & Fransella, 1967) by 1) examining the relationship between Grid scores and clinical ratings of thought disorder and 2) by testing several hypotheses concerning personal construct organization and clinical and performance characteristics of schizophrenic patients.

The general aim of this research is to determine whether or not the Grid Test is a useful device for dividing schizophrenics into different sub-groups on the basis of psychometric criteria. The need for refinement of schizophrenic sub-grouping arises from several considerations. First, findings in studies of performance deficits of various types have been inconsistent. Attempts to explain the inconsistencies have many times used the qualification "some schizophrenics" (are "distractible," "overinclusive," etc.). Unfortunately, the qualification is usually made after the data have been collected. Documentation of this point may be found in recent reviews by Sutton, 1971, McGhie, 1970, and Broen, 1968. A logical step to take in light of the excessive variances in these studies - one possible source of inconsistent results - is to subdivide samples on the basis of classic subdivisions of schizophrenia. To some extent, this has been done and amidst all of the confusion about the
"schizophrenias," McGhie (1970) points out:

. . . the paranoid and hebephrenic categories remain as reasonably stable subdivisions. The clear-cut clinical differences between the paranoid schizophrenic and all other schizophrenic patients have led many workers to suggest the paranoid-nonparanoid dichotomy as one of the most viable methods of demarcating within the schizophrenic group (McGhie, 1970, p. 2).

With regard to the variable of distractibility, McGhie (1970) asserts that paranoid schizophrenics were found to be least distractible of any clinical groups tested. Payne (1961, 1966) suggested that over-inclusion is associated primarily with paranoid schizophrenia. Here, however, findings have not been consistent (Payne, Caird, & Laverty, 1964; Payne & Caird, 1967). Another source of qualification may be found in Venables and Wing, (1962), who suggest that a better delineation of schizophrenics might be found if the paranoid category were further restricted to "coherent" paranoid patients. It is clear from even this small sampling of "noise" in the literature that other bases for delineating schizophrenic groups might well be sought.

It is interesting to note that though many studies of schizophrenic deficit deal with cognitive tasks of one sort or another, little attention has been paid to the refinement of criterion groups with respect to thought disorder. Similarly, theoretical constructs used to explain schizophrenic deficit are rarely used disjunctively, that is, to specify a disorder in some, say, "thought disordered," schizophrenics, before the data are collected. Many of these constructs, however, imply the presence of thought disorder though it may be called overinclusion, inadequate filtering, poor conceptual boundaries, or partially collapsed response hierarchies. It is largely in the interest of checking the utility of
the thought disordered vs non-thought disordered dimension as a basis for classifying schizophrenics that the present study was designed.

The model and measure of thought disorder used in the present study (Bannister, 1960; 1962) was inspired by the theory of Personal Constructs developed by George A. Kelly (1955). Bannister's Grid Test of Thought Disorder (hereafter referred to as the Grid Test) may be thought of as a variant of the Repertory Grid Technique developed by Kelly (Kelly, 1955; Bannister & Mair, 1968). Since the basic concepts of Personal Construct Theory form the theoretical backdrop of the Grid Test, a brief account of this system is presented below. More extensive summaries may be found in Bannister & Mair (1968), Bonarius (1965) and Sechrist (1963).

**Personal Construct Theory**

The basic postulate of Kelly's theory is that a person's processes are psychologically channelized by the ways in which he anticipates events. The organism uses personal constructs to anticipate events. Constructs are concept-like processes which guide a person's transactions with his world. Operationally, constructs are defined as ways in which some things are seen to be alike and at the same time different from other things. For example, "kindness" might be one way in which a given person construes two people as being alike and different from a third person whom he construes as "cruel." For another person, kindness might represent the opposite of "toughness." Constructs imply both similarity and contrast. Unless constructs have this essentially bi-polar nature they are meaningless in the sense that everyone for whom the construct is relevant would be seen as kind, and, therefore, the construct would not have
discriminative or predictive utility. Another implication of a uni-polar construct is that, since it would not afford any basis for differential predictions, it would not be useful in the guidance of differential behavior.

A major corollary in Kelly's system states that a person anticipates events by construing their replications. In terms of the example we have been using, the construct "kindness" is useful because it relates to a replicable aspect of one's experience. Once it has been established that persons may be thought of as kind or not kind, one can then avoid cognitive and/or behavioral chaos by superimposing this meaning system upon his experience with people.

As mentioned above, the opposite of "kind" might be "cruel" for one person and "toughness" for another. There are many more constructive possibilities than these. Persons differ in the kinds of constructs they use. One person may evolve a construct system in which the world is seen as "kind-cruel" while another may find that seeing persons as "intelligent-stupid" is more meaningful.

What does "meaningfulness of constructs" mean? This is one of the most important notions for the present research. Kelly conceptualized the meaningfulness of constructs in the Organization Corollary which states that each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs. In terms of this corollary, "meaningfulness" is tantamount to saying "leads to a prediction." To illustrate, if one could imagine an individual with only one construct, such as our by now well-worn "kind-cruel," he will have envisioned meaningfulness in its
ultimate form. Once this person has decided that another person is "kind," he has nowhere else to go. To have meaning, and "somewhere else to go," one must have constructs which are interrelated. Something, a construct, must lead to something else, another construct. More formally, for meaningfulness to exist in a cognitive system there must be an hierarchical organization of constructs within a system such that some constructs, called superordinate constructs, imply others, called subordinate constructs. The essence of prediction and anticipation is contained in this notion of interrelationships among constructs within a cognitive system. For example, a person may have a construct system in which "kind-cruel" is subordinate to "good-bad" but superordinate to "approach-avoid." It is relations such as these that can exist among constructs that give them their utility in organizing human functioning. We will return to this question of intraconstruct organization later in this paper.

The Development of Constructs

How are constructs formed and changed? Kelly does not provide anything resembling a neuropsychological or neurophysiological model of constructs. Constructs themselves, theoretically conceived, represent a construct. They are a conception of the human process which Kelly's system accepts as a postulate, the implications of which are contained in the corollaries of the system. There is no theory about the "nature" of constructs nor is there a separate theory about their formation beyond the suggestion that a learning process is involved in which expectations are the major acquisitions (Pervin, 1970). It is easier to think about the modification of constructs and their linkages once these are formed.
The process is very much like the scientific venture of hypothesis testing as described by Bannister and Mair (1968):

Each construct represents a pair of rival hypotheses, either of which may be applied to a new element which the person seeks to construe. Thus, just as the experimental scientist designs his experiments around rival hypotheses, so each person is seen as designing his daily explorations of life around the rival hypotheses which are yielded by the constructs within his system. Moreover, just as the scientist cannot foresee possibilities that he has not, in some manner, conceptualized in terms of hypotheses, so any individual can prove or disprove only that which is construction system allows him to see in terms of possible alternatives (Bannister & Mair, 1968, p. 27).

Just as with the hypotheses of the experimental scientists, constructs lend themselves to verification. The key concepts in construct theory which account for the similar process in "non-scientists" are validation and invalidation. When an individual chances a prediction, say in the form of a choice, he is putting his constructs "on the line," as it were. More specifically, he is testing a relationship between constructs. Concretely, the situation might be as follows: a person for whom the construct "intelligent" is positively and closely linked to the construct "understanding" is likely to predict that a particular "intelligent" person he has met will also be "understanding" and he might choose to share some personal problem with him. If it turns out that the person construed as intelligent did in fact turn out to be "understanding" as the latter is construed, then we would say that this construct system was validated and, thus, strengthened. There are data available which show that the correlations among constructs are in fact increased when validation is provided experimentally (Bannister, 1963; 1965; Rehm, 1971). To return to our example, invalidation would occur if the person turned out to be either the opposite of "understanding" or something entirely
unrelated to this construct system. Experimentally, the latter situation has been found to change the pattern of relationships among constructs and ultimately lower the intercorrelations among them (Bannister, 1963; 1965).

It should be noted that validation-invalidation is not equivalent to the concepts of reward or reinforcement used in connection with theories of operant or instrumental behavior. Individuals do not simply seek the avoidance of pain or the acquisition of some positive pleasure in relation to their constructions. If a person's construct system predicts that intelligent persons typically lack understanding, then finding an intelligent and understanding person is likely to be upsetting. Theoretically, this would also constitute an invalidation of the construct system. In general terms, persons seek to anticipate events, not just "good" or "bad" events by some eternally "valid" external construct system.

In review, constructs are the tools by which persons discriminate, organize, and anticipate events. Their utility in guiding behavior is predicated upon the interrelationships among them which form the basis for expectancies or predictions. As indicated previously, a single construct has no meaning. Meaning is derived from linkages between or among constructs. Just as individuals vary in the content of the constructs they employ, so do they vary in the kinds and strengths of the interlinkages that exist among their constructs. Linkages of some magnitude, as measured by correlational techniques, are pertinent to basic expectancies, prediction, or choices in which it is decided by a person that a given element A, construed as "X" will "lead to" or be "consonant with" the construct "Y" which is associated with "X".
Bannister's theory of schizophrenic thought disorder and its related measurement technique are both consonant with the notion that the condition of disordered thought represents "weak conceptual structure" or "loosened construing (Bannister, 1965)." Operationally, thought disorder is reflected in a pattern of low and inconsistent inter-correlations among constructs as these are revealed on a form of repertory grid test (Bannister, 1960; 1962; 1963; 1965; Bannister & Fransella, 1966; Bannister, Fransella & Agnew, 1971). As indicated in the previous section, some interlinkage between constructs is required for expectancies and predictive processes. Since this interlinkage is lacking in thought-disordered schizophrenics to a significantly greater degree than in non-thought-disordered schizophrenics, the former group may be seen as bereft of the basis for interpreting and anticipating events; in short, they are unprepared for organized thought and action.

How do schizophrenics become thought disordered? Bannister's view (1963, 1965) is that thought disorder results from a process of serial invalidation. Bannister argues:

... that if a person is repeatedly invalidated in his construing of an element, then his initial reaction may be to reconstrue this element in the opposite pole of the construct (e.g., this person is not a "loving" person, he is a "hating" person), but that after shuffling a person to and fro across the poles of the construct, the eventual response (aimed at avoiding further invalidation) may be to loosen and weaken the relationships of this construct with constructs constellated around it. Thus, the predictions and anticipations arising from the construct become vague and multi-directional instead of brittle and uni-directional. Further invalidation is avoided at the cost of the inability of the person to produce testable anticipations. For example, if we loosen the relationships of the construct "loving-hating," with those normally constellated around it, then we cease to anticipate from a "loving" person say "kind," "sincere," "tender," "dependable," etc. behavior, since these constructs are no longer closely linked together and invalidation is thereby avoided (Bannister, 1963, p. 681).
It is evident that this theory specifically ties the genesis of thought disorder to the interpersonal environment. He acknowledges (Bannister, 1965) the relevance to his model of other interpersonal theories such as the "double-bind" model of Bateson, Jackson, Haley, and Weakland (1956) and the notions of Lidz (1964) in regards to the effects of parental generation of distorted meanings. Bannister feels, however, that the notion of serial invalidation is clearer operationally and, thus, more readily lends itself to experimental verification. At this point only one empirical study has tried to relate thought disorder in schizophrenics defined in construct terms to thought disorder in their parents (Muntz & Power, 1970). This study found a highly significant association between thought disorder in patients and in their parents when Grid test results were used as criteria for thought disorder.

The Grid Test of Thought Disorder

As indicated previously, this test of thought disorder is essentially an evaluation of the inter-correlations among constructs as these are revealed on a form of repertory grid test (Bannister, 1960; 1962; 1963; 1965; Bannister & Fransella, 1966; Bannister, Fransella and Agnew, 1971). The basic test procedure involves presenting the subject (S) with an array of eight passport-type photographs. The S is asked which of the people whose photographs he had examined is most likely to be kind. The photograph thus selected by S is turned face down and its number (on the reverse side) is entered by the examiner (E) in a booklet as ranked first for kind. S is then asked to select the person most likely to be kind from the seven remaining photographs and this is turned
face down and its number noted. In this way, $S$ ranks all photographs from most kind to least kind. The photographs are then turned face up, shuffled and $S$ is asked to select the person most likely to be stupid. The chosen photograph is turned face down, its number is noted, and $S$ is asked to select the next most stupid and so forth. In this way $S$ rank-orders eight photographs on the following six constructs: kind, stupid, selfish, sincere, mean, and honest. $S$ is then told that the test is to be repeated using the same photographs and the same qualities. He is told to undertake the test as if he were doing it for the first time, since it is not intended to test his memory.

Two scores, Intensity and Consistency are derived from the protocols (Bannister & Fransella, 1966). Consistency refers to the degree to which the pattern of intercorrelations between constructs is maintained from the first to the second grid and Intensity is a measure of the total amount of interrelationship among constructs in both grids. These scores are obtained from the grid rankings described above. Intensity is measured in the following manner: Spearman rank order correlations are computed between all possible pairs of constructs on each administration of the grid (there are fifteen rhos for each grid). These are then squared and multiplied by 100 (retaining sign) to yield percentage variance in common scores. The total of the 30 scores is the Intensity score for the $S$. High scores indicate relatively "tight" (correlated) construing and low scores indicate relatively "loose" (orthogonal) construing. To obtain Consistency scores, the 15 rhos of the first grid are rank ordered from the highest positive to the highest negative as are the rhos of the second grid. The Spearman rank order correlation coefficient is then obtained for these two rankings and this
is the Consistency measure. It reflects the degree to which the subject has maintained the pattern of relationships of his constructs on the two grids. Though mathematically independent, these scores are frequently significantly correlated (Bannister & Fransella, 1966). In practice these two scores are combined for purposes of segregating subjects into thought-disordered (TD) and non-thought-disordered (NTD) groups. The rationale for this procedure will be explained below.

It is important to note that these measures represent non-content aspects of cognitive functioning. They are meaningful as specifications of formal attributes of conceptual structure and they therefore transcend the elements from which they are derived. Thus, it is as meaningful to derive these measures from grid sorts of cows or farm equipment as it is to base them on photographs of humans. Interestingly, a study was carried out in which schizophrenic structure was determined for both objects and persons (Bannister & Salmon, 1966). Although the conclusions are open to question, it was found that schizophrenics were relatively more disordered when construing people than objects. What is important is the recognition that, in any given situation, we are likely to be looking only at one significant construct subsystem rather than the whole conceptual functioning. The present study deals with constructs and elements relevant to person construing.

Grid Test Validity Studies

Unless otherwise stated, the studies reported in this section utilize essentially the same procedure for measuring thought disorder as was outlined above. Also, studies in which Grid Test assessments of thought disorder are validated against clinical judgments of thought disorder
have been very uniform in the criteria used for the clinical assessment, namely those described by Mayer-Gross, Slater and Roth (1954) and summarized in Bannister (1960).

Bannister (1962) compared thirty adult normals, twenty clinically judged thought-disordered schizophrenics, twenty non-thought-disordered schizophrenics (all sub-groups of schizophrenia were included in the sample), twenty depressives (including reactive, endogenous and mixed types), and twenty neurotics (hysterics, obsessionals, anxiety states, and mixed types). All groups had equal numbers of males and females, and there were no significant differences in age, intelligence, and chronic-acute status. Neither did any test measure correlate with any of these variables or with length of hospitalization. With regard to Intensity, the ranking from highest to lowest was as follows: Neurotics, non-thought-disordered schizophrenics, normals, depressives, and thought-disordered schizophrenics. The last group differed significantly from neurotics, schizophrenics, and normals (p=.001) and from depressives (p<.002). The ranking with respect to Consistency from highest to lowest was as follows: Normals, neurotics, non-thought-disordered schizophrenics, depressives, and thought-disordered schizophrenics. Normals were not found to be significantly different from neurotics, but thought-disordered schizophrenics were significantly different from depressives (p<.05), and non-thought-disordered schizophrenics, neurotics, and normals (p<.001). Normals were significantly different from depressives (p<.05). (The Mann-Whitney U Test was used throughout and all probability levels are two-tailed). In a further analysis, rank order correlations between test measures for the thirty normals used in the study, Intensity and
Consistency correlated .71 (p < .01, two tail). When combinations of these scores were used, it was found that discrimination levels were improved - suggesting that the discriminating variance of the related measures is not entirely held in common.

In another study (Bannister & Fransella, 1966) high-to-low ranking in terms of Intensity was: neurotics, normals, non-thought-disordered schizophrenics, depressives, organics (a wide range of types) and thought-disordered schizophrenics. The latter group was significantly different from all others (p < .0001) with the exception of organics. On Consistency, the high-to-low ranking was: normals, depressives, neurotics, organics, non-thought-disordered schizophrenics, and thought-disordered schizophrenics. Again, the latter group differed significantly from all others (p < .0001; from organics at p < .0005). As with the previous study, neither sex nor intelligence could account for observed differences among groups; and, with the exception of the organics, nor could age. Intensity and Consistency were intercorrelated significantly for all groups except normals. However, a graph plot of results showed that not all of the discriminating variance of the two measures is held in common. Using a cutoff point of 1000 on Intensity and .49 on Consistency, 20 percent of the thought-disordered group and 6.4 percent of other subjects were misclassified.

Bannister, Fransella, and Agnew (1971) related grid scores to clinical judgment of thought-disorder, diagnosis, and prognosis in a sample of 316 psychiatric admissions. An analysis of the relationship between the grid measures and the clinical judgment of thought-disorder yielded a chi-square value of 12.261 (d.f.=1; p < 0.001). This is
impressive considering the fact that the sample was not selected to form extreme groups on this dimension. In relation to psychiatric diagnosis, it was found that, with the exception of a small group of organics, schizophrenics in general were significantly different from all other groups. Neurotics had higher Consistency scores than depressives ($p \leq .01$) and organics ($p \leq .001$) and depressives were higher on this dimension than organics ($p \leq .001$). Neurotics were significantly higher in Intensity than alcoholics ($p \leq .05$), depressives ($p \leq .001$) and organics. Alcoholics were significantly higher in this dimension than organics ($p \leq .05$; all tests two-tailed). With respect to prognosis, 128 patients who were judged to be in "good" condition on discharge had significantly higher Intensity scores ($p \leq .025$, one-tailed) than the 27 rated as being "poor" at the time of discharge. A group of patients ($n=73$) found to be thought-disordered by grid criteria had a mean number of previous admissions of 1.67 (S.D.=.99) while this figure for the non-thought-disordered group ($n=242$, including schizophrenics and non-schizophrenics) was 1.16 (S.D.=.93). These means were significantly different ($p \leq .05$, one-tailed). In reference to this last comparison, the data were not presented in a way that would permit a comparison between thought-disordered and non-thought-disordered schizophrenics.

As part of a study which investigated various features of grid methodology, Williams (1971) compared 17 schizophrenics with 12 normals on Intensity and Consistency using Bannister's test. The groups were found to differ significantly on both Intensity (Mann-Whitney $U$ test, $U=24$, $p \leq .001$) and Consistency ($U=34$, $p \leq .002$). Foulds, Hope, McPherson and Mayo (1967a) related Intensity and Consistency scores to clinical
ratings of thought disorder and measures of over-inclusion in 48 patients diagnosed as schizophrenic. There were no significant correlations between the grid measures and over-inclusion when the latter was assessed by either the Payne-Hewlett (1960) method of evaluating proverb responses or the Payne-Friedlander (1962) method for analyzing responses on the Object Classification test. The two measures of over-inclusion were not significantly correlated with each other nor with clinical ratings of thought disorder. The findings with respect to the grid measures and clinical ratings of thought disorder are somewhat complex. The test scores of the present group of subjects were found to be intermediate between those of Bannister's thought disordered and non-thought-disordered subjects. The results, then, must be evaluated in light of this. In acute patients (diagnosis made less than two years prior to testing), both Intensity and Consistency (signs reversed) were positively correlated with clinical ratings, but only Consistency reached significance ($p < .05$). These correlations for chronic patients were low and non-significant. Foulds, Hope, McPherson, and Mayo, (1967b), reanalyzed these data with special attention to acute-chronic and paranoid-non-paranoid differences, the latter being determined both clinically by the patient's own therapist and psychometrically by Foulds' (1965) Symptom-Sign Inventory. There were no significant differences between the chronic and acute groups on either Intensity or Consistency. Clinically diagnosed paranoids had higher scores on both Intensity and Consistency than non-paranoids, but the differences were not significant. The paranoid vs non-paranoid schizophrenic scale of Foulds' Symptom-Sign Inventory correlated positively ($r = .30$) with Consistency ($p < .05$) and with Intensity, but the latter relationship was nonsignificant. Significantly more non-paranoid than
paranoid schizophrenics did score within the thought-disordered range of grid scores established by Bannister and Fransella (1966) (i.e., under 1,000 on Intensity and under +0.49 on Consistency).

Foulds, Hope, McPherson, and Mayo (1969) reported on the relationship between retardation measures (Weschler Digit Symbol and three tests from the Babcock-Levy battery, 1940) and measures of thought-disorder previously reported (Foulds, et.al, 1967a, 1967b). No significant associations were found between the speed measures and any of the other measures or psychiatrist's ratings of thought-disorder.

Supportive of the findings of Foulds and his colleagues in relation to the Grid Test and measures of over-inclusion is a study by Romney (1969) in which intercorrelations between several measures of over-inclusion and the Grid scores were found to be low and non-significant. In contrast to Foulds' findings with respect to the relationships between grid-assessed and clinical ratings of thought-disorder is a study by Costello (1966) in which both Consistency (rho=.57, p<.05) and Intensity (rho=.79, p<.01) were significantly related to clinical ratings.

Further evidence of the discriminating power of the Grid test comes from a study by Mellsop, Spelman, and Harrison (1971) who compared manic patients with schizophrenics and non-psychotic psychiatric patients. The manics were found to be not significantly different from the non-psychotic patients, but both of these groups were significantly different from the schizophrenics on Intensity (Mann-Whitney U Test, p<.002, two-tailed) but not on Consistency. There were no significant differences between chronic and acute schizophrenics.
The studies described above have concentrated largely on the question of the ability of the Grid test to discriminate nosological groupings and sub-groupings. The handful of studies remaining deal with the relationship between grid-assessed thought disorder and certain clinical signs and symptoms within the schizophrenic syndrome. Using Foulds' (1965) distinction between persecutory delusions ("I am being plotted against") and delusions of non-integration (including hallucinations, a disruption of body image, feelings of ineffectiveness), McPherson (1969) tested the hypothesis that a stable, psychological construct system (even though bizarre) is required for persecutory delusions. The hypothesis was supported in samples of 24 acute and 24 chronic schizophrenics. Those with relatively high Consistency and Intensity scores were more likely to exhibit persecutory delusions and those with low scores on these scales were more likely to exhibit delusions of non-integration.

Several studies have found that, in schizophrenics, the degree of "flattening of affect" is negatively and significantly related to the frequency with which "psychological" constructs ("happy," "sad," "looks angry") are used in describing photographs depicting human activities (McPherson, Borden, and Buckley, 1970; Dixon, 1968). The use of non-psychological constructs ("standing," "sitting," "tall," "short") was not related to this variable. In a later study, McPherson, Buckley, and Draffan (1971) directly related the ability to use psychological constructs spontaneously in describing photographs to measures of Intensity and Consistency taken from the Grid test. Both grid indices were significantly and positively correlated with the frequency of usage of psychological
constructs in both chronic and acute schizophrenics. There was practically no association between Grid-assessed thought disorder and the use of any construct in a "non-human" category. This study lends further support to the notion that, in schizophrenia, not all constructs are equally disordered (Bannister & Salmon, 1966).

In summary, several studies, some using fairly large samples from a psychiatric population have shown the Grid test to be an effective discriminator of diagnostic groups. This instrument has been shown to be especially consistent in discriminating schizophrenics from other groupings and, within the schizophrenic samples, clinically-assessed thought-disordered schizophrenics from those not showing clinical signs of thought-disorder. Important control variables such as age, sex, intelligence, chronic-acute status, and length of hospitalization could not be held to account for the observed relationships between test scores and psychopathology. This instrument's discriminant validity has also been upheld in studies where other tests of conceptual processes have been included (e.g., tests of over-inclusion). Moreover, and this holds especially in relationship to the notion of thought-disorder in schizophrenia, this instrument is imbedded in a theoretical framework that offers suggestions for research into etiology and constructive intervention (e.g., validation-invalidation). Also, since this framework is a general theory of personality (Kelly, 1955), the possibility of bringing thought pathology within the domain of concepts used to describe non-pathological behavior is enhanced.

The purposes of the present study are threefold: (1) To further determine whether the Grid Test can discriminate between schizophrenic
and non-schizophrenic patients and between thought-disordered and non-
thought-disordered schizophrenic patients as judged by clinical criteria; 
(2) to determine the relationship between Grid Test scores and other 
clinically relevant individual difference variables; and (3) to obtain 
data on the construct validity of the Grid Test and its associated theory 
of thought disorder in relation to certain performance deficits in 
hospitalized patients. Specific predictions, the hypotheses upon which 
they are based, and the measurements used to test them are presented in 
separate sections below.
CHAPTER II

METHODOLOGY

Subjects

Selection Strategy

Ss were obtained from the inpatient populations of the Illinois State Psychiatric Institute and the Psychiatric Unit of Billings Hospital. The goal of subject selection was to obtain three groups for comparison: 1) Thought-Disordered Schizophrenics (TD), 2) Non-Thought-Disordered Schizophrenics (NTD), and 3) Non-Schizophrenic (NS) hospitalized psychiatric patients. Schizophrenic Ss were placed in either the TD or NTD group based on Grid Test performance. Following the suggestion of Bannister and Fransella (1966), Ss with scores below +.49 on Consistency and below 1,000 on Intensity were classified as thought-disordered. The differential diagnosis of schizophrenic versus non-schizophrenic was made by each S's primary therapist and independently corroborated by one other staff member, the latter being the Staff Psychologist for Ss obtained from the Illinois State Psychiatric Institute and the Assistant Service Chief for Ss obtained from Billings Hospital. Ss were eliminated from consideration as part of the study when the primary therapist's diagnosis of schizophrenia was not corroborated. Patients with a history of organic brain pathology and those below 19 years of age and over 50 years of age were also excluded from the study.

Participation in the study was voluntary. Each S was told that he was being tested for research purposes and that neither the fact of his
participation (or non-participation) nor the results of the tests would have any influence on hospital decisions concerning his case. Ss were also assured of the confidentiality of the test results. Of all Ss contacted, only three refused to participate. One of the latter was diagnosed Schizophrenia, Paranoid Type, one was diagnosed Schizophrenic, Catatonic Type, and one was diagnosed Neurotic Depressive.

Sample Characteristics

The schizophrenic sample used in this study consisted of the following sub-types: Paranoid (n=13), Catatonic (n=3), Undifferentiated (n=6), Simple (n=3), and Unspecified (n=1). The non-schizophrenic sample included the following categories: Depressive Neurosis (n=6), Depressive Reaction (n=3), Borderline Personality (n=3), Adjustment Reaction, Adult Life (n=1), Psychopathic Personality (n=1), Obsessive-Compulsive Neurosis (n=1), and Hysterical Personality (n=1).

Descriptive statistics for the three criterion groups used in this study are presented in Table 1. With respect to the thought-disorder variable, the schizophrenics (TD and NTD groups pooled) were found to be significantly different from the non-schizophrenics on both Intensity (Mann-Whitney U transformed to $z = 2.09, p < .02$) and Consistency ($z = 2.25, p < .02$). The TD and NTD groups were also found to be significantly different on both Intensity (Mann-Whitney $U = 22, p < .001$) and Consistency ($U=0, p < .001$). The NTD and NS groups are not significantly different on Intensity ($U=88$) or Consistency ($U=104$).

Significance tests were also carried out for age, education, days in hospital, sex, race and motivation (see Test Instruments below) in order to determine whether these variables might contaminate criterion group
TABLE 1

Characteristics of Criterion Groups

<table>
<thead>
<tr>
<th>Item</th>
<th>TD</th>
<th>S.D.</th>
<th>NTD</th>
<th>S.D.</th>
<th>NS</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>560.46</td>
<td>168.75</td>
<td>1016.61</td>
<td>409.96</td>
<td>1266.18</td>
<td>729.70</td>
</tr>
<tr>
<td>Consistency</td>
<td>.08</td>
<td>.22</td>
<td>.69</td>
<td>.12</td>
<td>.62</td>
<td>.29</td>
</tr>
<tr>
<td>Age</td>
<td>24.84</td>
<td>4.41</td>
<td>27.15</td>
<td>8.03</td>
<td>28.50</td>
<td>6.77</td>
</tr>
<tr>
<td>Education (years)</td>
<td>12.61</td>
<td>2.06</td>
<td>13.30</td>
<td>2.05</td>
<td>12.87</td>
<td>1.50</td>
</tr>
<tr>
<td>Days in Hospital</td>
<td>66.92</td>
<td>51.69</td>
<td>65.23</td>
<td>51.78</td>
<td>30.87</td>
<td>30.30</td>
</tr>
<tr>
<td>Motivation</td>
<td>4.15</td>
<td>.89</td>
<td>4.06</td>
<td>.99</td>
<td>3.23</td>
<td>.83</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>N</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Females</td>
<td>8</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Blacks</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Whites</td>
<td>10</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Chronic</td>
<td>8</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Acute</td>
<td>5</td>
<td>7</td>
<td>-</td>
</tr>
</tbody>
</table>
comparisons. By analysis of variance, and with $p \leq .05$ as a criterion, no significant differences were found among the groups on age ($F=1.109$, $df=2,39$), education ($F=.448$, $df=2,39$), or days in hospital ($F=3.07$, $df=2,39$). Nor were the groups significantly different in sex ($x^2=1.65$, $df=2$) or racial composition ($x^2=.99$, $df=2$). No significant association was found between thought disorder as assessed by the Grid Test and chronic or acute status ($x^2=.62$, $df=1$). It appears, then, that none of these variables may be held to account for observed differences among the groups on the major criterion variables of this study. The groups did differ significantly in motivation ($F=4.083$, $df=2,39$ $p \leq .03$). Separate $t$ tests indicate that, while the TD and NTD groups are not significantly different ($t=.260$, $df=24$, n.s.), the NS group is significantly different from both the TD ($t=2.85$, $df=27$, $p \leq .005$) and the NTD ($t=2.41$, $df=27$, $p \leq .025$) groups. Therefore, since both schizophrenic groups showed a higher degree of motivation than the non-schizophrenic group, and assuming a positive relationship between motivation and performance, this factor will have to be considered in situations where schizophrenics might perform at a higher level than non-schizophrenics. Since the TD and NTD groups did not differ significantly on this variable, it is doubtful that motivational factors can be held to account for other observed differences between these groups.

Test Instruments

A brief description of each measure used in this study is presented below:

The Grid Test. This instrument is described in Chapter I. The instructions used in administering the Grid Test are presented in Appendix A.
Probability Learning Task. The stimuli for this task consisted of 3" by 3" white, square cards cut from poster paper. On each card was drawn either a circle or a square using a black felt marking pen. Two separate decks were made, each containing 100 cards. In one deck there were 50 circles and 50 squares; in the other there were 70 circles and 30 squares. The order of circles and squares in each deck was randomized. The instructions for this task are presented in Appendix B.

Foulds Symptom-Sign Inventory. This instrument is a self-report, true-false type questionnaire. Twenty-one items representing paranoia, schizophrenia, integrated psychosis, and non-integrated psychosis were selected from a larger inventory (Foulds, 1965). This inventory and instructions for administration are presented in Appendix C.

The General Information Questionnaire. This instrument was used to assess each S's status on the process-reactive continuum. The questionnaire (see Appendix D) was rated on the amplified and standardized version of the Phillips Scale provided by DeWolfe (1968). Each protocol was rated independently by E and by a research assistant who was also an advanced graduate student in psychology.

Rosenwald's Proverbs. This instrument consists of twenty proverbs (see Appendix E). Ss were presented each proverb orally by E and asked "What does this proverb mean?" Each protocol was independently rated by two highly experienced clinical psychologists who were familiar with the test. The following instructions were given:

Using your own frame of reference for deciding on the presence or absence of thought-disorder, simply give each protocol (not each proverb) a global rating of schizophrenic thought disorganization using a number from 1 to 7. A rating of "1" would signify your judgment that there is definitely no evidence of schizophrenic thought disorganization in the protocol. A rating of "7" would indicate definite, strong evidence of disorganization. The points on the scale from "2" to "6" reflect varying degrees of disorganization between the two extreme points.
Stroop Color-Word Test. This instrument was used to assess attentional deficit. The test consists of three kinds of stimuli printed on three different cards. Card A consists of 100 color words ("red," "blue," and  "green") which are printed in black ink and arranged in random order. The S must read the words as quickly as possible. Card B is made up of rectangular patches of the colors red, blue, and green arranged in random order. S is required to correctly name the colors as fast as possible. Card C, the "conflict card," consists of 100 color-words ("red," "blue," and "green") printed in ink the color of which is different from the color designated by the word (e.g., the word "red" might be printed in blue ink). The task on Card C is to name as rapidly as possible the color of the ink in which the word is printed.

The measures taken from this task included the total time (in log seconds to the base 10) to complete Card C minus this score on Card B and a count of intrusion errors (i.e., reading the word instead of naming the color) on Card C.

Instructions for administration of the Stroop Test are presented in Appendix F.

Thought-Disorder Rating Scale. This scale appears in Appendix G. The scale was constructed using the criteria of thought-disorder presented in Mayer-Gross, Slater and Roth (1954). Each S's primary therapist was asked to give a binary rating on each of the thought-disorder categories. Since the rating scale distinguishes between present and past manifestations of thought-disorder, each rater was required to complete the scale either on the same day or one day after S was given the test battery.

Motivation Scale. At the conclusion of the test battery, each S was presented with a five point scale (see Appendix H) designed to elicit
his subjective assessment of his motivation during testing. The scale included the following categories: highly involved/very involved/moderately involved/slightly involved/not at all involved. Each S was asked to indicate by a check mark which of these phrases best described how he felt about his efforts during all of the tests.

The theoretical rationale, hypotheses and predictions concerning each instrument are presented in Chapters III and IV.

**Procedure**

To minimize the influence of such variables as loss of interest, fatigue, and, in general, any order effects that might be present, the tests (with the exception of the Motivation Scale) were randomized over all Ss by means of a table of random permutations (Cochran & Cox, 1957). Each test procedure was given a number and the ordering of tests for a given S was determined by sampling orderings (without replacement) from the list of random permutations of six digits taken from the table.

All test procedures were completed for each S within one or two days.
CHAPTER III

THOUGHT DISORDER: THE GRID TEST AND CLINICAL CRITERIA

This section examines the relationship between Grid Test indices of thought disorder and clinical assessments of thought disorder. Thus, this part of the study may be regarded as an investigation of the Grid Test's concurrent validity.

Using the criteria outlined by Mayer-Gross, Slater, and Roth (1954) to assess thought disorder clinically, several previous studies have found a significant association between Grid Test scores and clinical signs (Bannister, 1962; Bannister and Fransella, 1966, Foulds, Hope, McPherson, and Mayo, 1967a; McPherson, Blackburn, Draffan, and McFadyen, 1973). In these studies, the goal of clinical judgment was to categorize each schizophrenic as either thought disordered or non-thought-disordered. Considering the fact that the Mayer-Gross, Slater and Roth criteria consist of eight different categories (see Appendix G), it is impossible to tell from these studies which criterion or combination of criteria led to the generally positive findings in relation to Grid Test scores. Although Bannister has shown that each of these criteria can be subsumed under Personal Construct Theory (Bannister, 1960), it does not follow that the Grid Test measures every aspect of thought disorder suggested by the clinical criteria. Further, by requiring clinicians to make a binary choice (thought-disordered vs non-thought-disordered) potentially useful information on varying degrees of thought disorder is lost.

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The present study tried to ascertain more precisely what aspect of clinically judged thought disorder is measured by the Grid Test by requiring that each S's primary therapist give a binary rating on each thought disorder category in the Thought Disorder Rating Scale. In addition, separate ratings were made for clinical signs that were "presently manifest" and "previously manifest" to determine whether ratings of current status and past status relate differently to Grid Test scores. A thought disorder "score" was then derived for each S by simply summing the categories in the Thought Disorder Rating Scale in which thought disorder was judged present by S's primary therapist.

Additional clinical assessments of thought disorder were made using Rosenwald's Proverbs Test. Proverb interpretations elicited from patients have long been used by clinicians to assess thinking disturbances. Recently investigators have made attempts to systematize scoring schemes for proverb interpretations (Gorham, 1956; Shimkunas, Gynther, and Smith, 1967). It was felt that clinical ratings of thought disorder as reflected in proverb interpretation might serve as a useful additional clinical criteria of thought disorder in the present investigation. For purposes of quantitative analysis, the ratings of two highly experienced clinical psychologists were added together to form a combined index of thought disorder.

Results and Discussion

The means and standard deviation of the Thought Disorder Rating Scale data for the TD, NTD, and NS groups are presented in Table 2. While the one way analysis of variance yielded highly significant F ratios for both present (F=14.32, df=2, 39, p < .001) and past (F=18.69, df=2, 39, p < .001) clinical ratings of thought disorder, separate t tests computed for the TD
### TABLE 2

Thought Disorder Rating Scale Data

<table>
<thead>
<tr>
<th></th>
<th>TD</th>
<th></th>
<th>NTD</th>
<th></th>
<th>NS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{X}$</td>
<td>SD</td>
<td>$\bar{X}$</td>
<td>SD</td>
<td>$\bar{X}$</td>
<td>NS</td>
</tr>
<tr>
<td>Present</td>
<td>4.15</td>
<td>1.86</td>
<td>4.23</td>
<td>2.58</td>
<td>0.93</td>
<td>1.18</td>
</tr>
<tr>
<td>Past</td>
<td>5.15</td>
<td>2.26</td>
<td>5.53</td>
<td>2.33</td>
<td>1.43</td>
<td>1.45</td>
</tr>
</tbody>
</table>
and NTD groups show that their ratings of thought disorder are not significantly different (present $t = .27$, past $t = 1.38$). The Mann-Whitney U test applied to these data show that NTD and NS are significantly different (present $U = 19, p < .001$; past $U = 16, p < .001$) as are TD and NS (present $U = 12, p < .001$; past $U = 19, p < .001$).

Pearson Product-Moment Correlation Coefficients between Thought Disorder Rating Scale scores and Grid Test scores are presented in Table 3. None of these coefficients is significantly different from zero. Additionally, phi coefficients were computed for each category in the Thought Disorder Rating Scale and the dichotomous groupings, TD and NTD, and these were done separately for the present and past rankings. None of these coefficients was significantly different from zero at the .05 level.

The means and standard deviations of ratings taken from Rosenwald's Proverbs are presented in Table 4. The analysis of variance performed on these data shows that the groups are not significantly different ($F=1.418$, df=2,39, $p < .25$). The Mann-Whitney U test applied to the TD and NTD groups pooled and the NS group yielded a $z$ transformation of 1.60 which is significant at $p < .055$.

While both the Thought Disorder Rating Scale and the Proverbs ratings (with borderline significance) differentiated between schizophrenics (TD and NTD combined) and non-schizophrenics (NS), neither of these measures differentiated between the TD and NTD groups. Rosenwald's Proverbs have never been used in concurrent validity studies with the Grid Test, and therefore clear comparisons with previous studies cannot be made. However, Foulds, Hope, McPherson, and Mayo (1967a), have shown that overinclusiveness as measured by a proverbs task is unrelated to Grid-Test scores. Apparently, Grid-assessed and Proverb-assessed thought disorder have little in common.
**TABLE 3**
Correlation Between Grid Test Scores and Thought Disorder Rating Scale

<table>
<thead>
<tr>
<th></th>
<th>All S's</th>
<th>Schizophrenics Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intensity</td>
<td>Consistency</td>
</tr>
<tr>
<td>Present</td>
<td>-.186</td>
<td>-.145</td>
</tr>
<tr>
<td>Past</td>
<td>-.225</td>
<td>-.149</td>
</tr>
</tbody>
</table>
**Table 4**

Proverbs Rating Data

<table>
<thead>
<tr>
<th>Group</th>
<th>$\bar{X}$</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>9.76</td>
<td>3.19</td>
</tr>
<tr>
<td>NTD</td>
<td>8.92</td>
<td>4.11</td>
</tr>
<tr>
<td>NS</td>
<td>7.56</td>
<td>3.38</td>
</tr>
</tbody>
</table>
The findings of the present study with respect to the clinical criteria of Mayer-Gross, Slater and Roth (1954) are inconsistent with the findings of several previous studies (Bannister, 1962; Bannister & Fransella, 1966; Bannister, Fransella and Agnew, 1971; Foulds, Hope, McPherson, & Mayo, 1967a; & McPherson, Blackburn, Draffan, & McFadyen, 1973). In accounting for the difference between this and previous studies, it is important to note the manner in which thought disorder was judged clinically. In previous studies, clinicians were "forced" to place schizophrenics in one of two categories, while in the present study, Ss were assigned a "score" based on ratings performed on the same criteria (Mayer-Gross, et al.) The conflicting results raise questions about how the Mayer-Gross signs were used to arrive at a binary decision in these previous studies. None of these studies describes exactly how the criteria were used; they merely assert that they were used. There is no way of telling, for example, whether those judged clinically-non-thought-disordered displayed none of the signs, only a few of the signs, or some unspecified number with an intensity dimension or a-degree-of-confidence notion applied to each sign. In light of the results of this study, it would seem that future studies ought to give more careful attention to the precise manner in which criteria are used to formulate clinical judgments of thought disorder.

Thought Disorder and Medication

On the day he was tested, each Ss case record was examined to determine the kind and amount of medication he was receiving. These data were collected to determine whether there was any relationship between phenothiazine dosage and Grid Test scores and also to check on whether there was any relationship between phenothiazine prescription and Grid Test indices.
of thought disorder. The latter might be regarded as a relatively unobtrusive test of the relationship between Grid indices and the perceived need for phenothiazines on the part of the therapist.

For those Ss who were receiving medication at the time of testing, the PDI, a measure of individual differences in daily dosage level (Spohn, Thetford, and Cancro, 1971) was determined. The PDI represents each Ss' daily dosage level in proportion to his body weight in kilograms, multiplied by a variable representing the potency of the particular phenothiazine being used relative to chlorpromazine. Chlorpromazine was represented by 1 and the potency ratios for trifluoperazine and thioridazine were 1:20 and 1:75 respectively.

Results and Discussion

No significant correlation was found between either Intensity ($r_s = -.066$, n.s.) or Consistency ($r_s = -.24$, n.s.) and the PDI for the 22 Ss receiving medication at the time of testing. Of course, since this is a purely correlational analysis, these data cannot be used to determine the effect of medication on Grid indices of thought disorder.

Data on phenothiazine prescription are presented in Table 5. It is unlikely that this pattern of frequencies is the result of chance ($X^2 = 10.29$, df=2, $p < .01$). From an inspection of Table 5 it can be seen that while TD Ss are more likely to be given phenothiazines, NS Ss are much less likely to be given this form of medication. NTD Ss, on the other hand, have about a 50-50 chance of having phenothiazines prescribed for them. Thus, while there is no significant association between degree of thought disorder as measured by the Grid Test and amount of medication, there does appear to be a relationship between Grid-assessed thought disorder and whether or not
**TABLE 5**

Phenothiazine Prescription for TD, NTD and NS Ss

<table>
<thead>
<tr>
<th></th>
<th>TD</th>
<th>NTD</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenothiazines</td>
<td>11</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>No Phenothiazines</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>
These results are interesting in view of the fact that clinicians refer to phenothiazines as "anti psychotic" medication and typically view them as having a therapeutic effect in relation to thought disorder. In the present study, the clinicians had no knowledge of Grid Test scores, and yet, by Grid Criteria, only 2 of the 13 TD Ss were not given phenothiazines, while 6 of the 13 NTD Ss were not given phenothiazines. It is important to note that this study was limited to a concurrent analysis and did not take into account such factors as the length of time that Ss had been taking phenothiazines and possible clinical and/or Grid assessed changes that might have taken place as a result of this variable. In light of the present findings, however, it would seem that more elaborate future studies relating Grid assessments and the "prescribing behaviors" of therapists ought to be attempted.
CHAPTER IV

PREDICTIONS FROM PERSONAL CONSTRUCT THEORY

As was indicated previously, the Grid Test is tied to a theoretical model of schizophrenic thought disorder (Bannister 1960, 1962). Thus, to obtain data relevant to the construct validity of the Grid Test, it was possible to generate predictions about the behavior of TD and NTD Ss based on hypotheses derived from the model. Specifically, this study tested hypotheses about the relationship between grid-assessed thought disorder and probability learning, paranoid integration, chronicity and attentional deficit. In reference to each of these variables, attempts were made to link empirical predictions with expectations from Bannister's theory. The derivation of hypotheses from the theory was based on the assumption that the Grid Test is an adequate measure of construct loosening.

Probability Learning

Surprisingly little attention has been given to probability learning in schizophrenics. One study directly relevant to this variable (O'Neil, 1964) compared paranoid and non-paranoid schizophrenics with alcoholics on the ability to predict outcomes in a binary series. Using cards with two different symbols on them, Ss were presented with stimuli using a 70/30 ratio and a 50/50 ratio. No significant differences were found among the groups in their ability to generate prediction series that approximated the stimulus series. It is possible that this study failed to find differences because thought-disorder, as it is construed in the present study, was not
taken into account.

As indicated previously, Personal Construct Theory views the construct loosening in thought-disordered schizophrenics as a condition in which there are few resources for anticipating events. Theoretically this is the result of repeated invalidation which has had the effect of lowering the correlations among constructs. This theoretical notion and the general finding that performance deficit in schizophrenia shows up most strikingly when the task involves some uncertainty and decision making (McGhie, 1967) leads to the expectation that probability learning situations—since they involve both uncertainty and decision making—would be especially difficult for thought-disordered schizophrenics.

Since non-thought-disordered schizophrenics are supposed to retain the basis for anticipating the outcomes of events by virtue of their relatively tight construct organization, no deficit in probability learning was expected in the NTD group. This prediction, however, requires qualification in relation to the two different empirical event probabilities used in this study, a 70/30 condition and a 50/50 condition. In the 70/30 situation, the NS and NTD groups are expected to perform significantly better (i.e., achieve more matches) than the TD group. When the empirical event probabilities are 50/50, however, NTD Ss and NS Ss are not expected to perform better than the TD Ss. Thus, a group by event probability interaction is predicted. The latter prediction follows from the notion that the 50/50 situation is more congruent with the conceptual structure of the TD group whose expectancies are geared for invalidation because of repeated experiences of this sort. The NTD and NS groups might be expected to achieve matching in the 50/50 chance-like situation because they learn to do so. It might be said that the TD group will perform as well as the others in this
situation because they have no alternative.

The two different event probabilities used in this study were counterbalanced within each of the groups. This made it possible to analyze for order effects and for interactions between group, event probability and order. In the shift from 70/30 to 50/50, for example, the TD group might perform better in the 50/50 situation because they do not have to learn a strategy which is very different from their usual set. The NTD group might be hampered in this situation because of their supposed greater susceptibility to invalidation. These expectations can be formalized in a prediction of a three-way interaction between group, order and event probability.

The Probability Learning Task described in Chapter II was used to test these hypotheses. Each S was given one hundred trials under each of the two event-probability conditions. Kintsch (1970) suggests that this number of trials is optimal for eliminating the influence of fatigue and/or boredom. For purposes of deriving scores for each S the data were broken down into ten blocks of trials, each block consisting of ten trials. Criterion scores included both the number of blocks in which matching occurred and the number of blocks until matching occurred. The latter measure was used to test for the possibility of the "shift" effects discussed above.

At the conclusion of the last trial, each S was interviewed to determine his level of awareness of the event probabilities. An S was judged aware if he noticed a difference between the event probabilities in the two decks used (i.e., he knew that there were more circles in all decks), and he could state roughly the differences in proportion of squares and circles in each condition (e.g., for the 70/30 condition from 75/25 to
Results and Discussion

The data on awareness were cast in a 3 x 2 contingency table. A $\chi^2$ analysis performed on these data indicate that the TD, NTD and NS groups do not differ significantly on awareness of the event probabilities ($\chi^2 = 2.12$, df=2, n.s.). Thus, it is doubtful that awareness can account for any between-group differences in probability learning.

The mean blocks of trials in which matching occurred in the three groups are presented in Table 6. Separate analyses of variance were carried out for the two different event probabilities. In the 70/30 condition, the groups are not significantly different ($F = 2.75$, df=2,39, n.s.) while in the 50/50 condition the differences among the groups yielded a significant main effect ($F = 3.31$, df=2,39, $p < .05$). Separate $t$ tests carried out on the data for the 50/50 condition showed that the TD group is significantly different from both the NTD ($t = 2.02$, df=24, $p < .05$) and the NS groups ($t = 2.43$, df=27, $p < .02$). The NTD and NS groups do not differ significantly ($t = .63$, df=27, n.s.).

The means for blocks of trials until the first matching occurred are presented in Table 7. Separate analyses of variance were carried out for the two different event probabilities. The groups were not significantly different in either the 70/30 ($F = 2.75$, df=2,39, n.s.) or the 50/50 condition ($F = 2.23$, df=2,39, n.s.).

To test for the hypothesized interaction effects, a mixed model, harmonic means analysis of variance (Winer, 1971) was carried out for both number of matches and trials until first match. These analyses are presented in Tables 8 and 9.
<table>
<thead>
<tr>
<th>Group</th>
<th>70/30</th>
<th>50/50</th>
<th>70/30 + 50/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>1.69</td>
<td>3.28</td>
<td>2.48</td>
</tr>
<tr>
<td>NTD</td>
<td>0.64</td>
<td>2.29</td>
<td>1.47</td>
</tr>
<tr>
<td>NS</td>
<td>1.68</td>
<td>2.00</td>
<td>1.84</td>
</tr>
</tbody>
</table>
### TABLE 7

Mean Blocks of Trials Until First Matching

<table>
<thead>
<tr>
<th>Group</th>
<th>70/30</th>
<th>50/50</th>
<th>70/30 + 50/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>5.29</td>
<td>3.56</td>
<td>4.42</td>
</tr>
<tr>
<td>NTD</td>
<td>7.86</td>
<td>5.25</td>
<td>6.51</td>
</tr>
<tr>
<td>NS</td>
<td>5.87</td>
<td>5.43</td>
<td>5.65</td>
</tr>
</tbody>
</table>
Table 8

Summary of Results of 3 x 2 x 2 Analysis

of Data on Number of Matches

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups (G)</td>
<td>14.635</td>
<td>2</td>
<td>7.317</td>
<td>4.18 **</td>
</tr>
<tr>
<td>Order (O)</td>
<td>3.757</td>
<td>1</td>
<td>3.757</td>
<td>2.15</td>
</tr>
<tr>
<td>G X O</td>
<td>4.449</td>
<td>2</td>
<td>2.225</td>
<td>1.27</td>
</tr>
<tr>
<td>Error</td>
<td>62.949</td>
<td>36</td>
<td>1.749</td>
<td></td>
</tr>
<tr>
<td>Within Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event P (EP)</td>
<td>29.209</td>
<td>1</td>
<td>29.209</td>
<td>17.20 ***</td>
</tr>
<tr>
<td>G X EP</td>
<td>7.936</td>
<td>2</td>
<td>3.968</td>
<td>2.37 *</td>
</tr>
<tr>
<td>O X EP</td>
<td>1.010</td>
<td>1</td>
<td>1.010</td>
<td>0.59</td>
</tr>
<tr>
<td>G X O X EP</td>
<td>6.587</td>
<td>2</td>
<td>3.293</td>
<td>1.94</td>
</tr>
<tr>
<td>Error</td>
<td>61.128</td>
<td>36</td>
<td>1.698</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>191.660</td>
<td>83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .12
** p < .025
*** p < .001
TABLE 9

Summary of Results of 3 x 2 x 2 Analysis of Data on Trials to First Match

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups (G)</td>
<td>60.874</td>
<td>2</td>
<td>30.437</td>
<td>3.73</td>
</tr>
<tr>
<td>Order (O)</td>
<td>5.113</td>
<td>1</td>
<td>5.113</td>
<td>0.63</td>
</tr>
<tr>
<td>G X O</td>
<td>49.147</td>
<td>2</td>
<td>24.574</td>
<td>3.01</td>
</tr>
<tr>
<td>Error</td>
<td>293.759</td>
<td>36</td>
<td>8.160</td>
<td></td>
</tr>
<tr>
<td><strong>Within Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event P (EP)</td>
<td>51.086</td>
<td>1</td>
<td>51.086</td>
<td>7.41</td>
</tr>
<tr>
<td>G X EP</td>
<td>15.492</td>
<td>2</td>
<td>7.746</td>
<td>1.12</td>
</tr>
<tr>
<td>O X EP</td>
<td>0.014</td>
<td>1</td>
<td>0.014</td>
<td>0.00</td>
</tr>
<tr>
<td>G X O X EP</td>
<td>10.701</td>
<td>2</td>
<td>5.350</td>
<td>0.78</td>
</tr>
<tr>
<td>Error</td>
<td>248.140</td>
<td>36</td>
<td>6.893</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>734.326</td>
<td>83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .10
** p < .05
*** p < .01
The findings disconfirm the hypothesis that the NTD and NS groups would perform better than the TD group. While the groups did not differ significantly in the 70/30 condition, the significant main effect of groups in the 50/50 condition and the boarderline significant interaction between groups and event probability tend to support the hypothesis that the TD group would have an advantage in the 50/50 situation. It can be seen from an inspection of Figure 1 that, while the performance level of the NS group did not change appreciably as a function of differences in event probability, the change in performance for both schizophrenic groups is striking. A similar trend toward a relatively better performance in the 50/50 situation for the schizophrenic Ss can be seen in the "trials until first match" data shown in Figure 2.

The relatively better overall performance of the TD Ss as compared to the NTD Ss cannot be explained by Personal Construct Theory. While the TD Ss can be viewed as having an advantage in the 50/50 condition by virtue of their hypothesized chance-like set, this advantage should become a distinct disadvantage in the 70/30 situation. The data of this study clearly do not bear this out.

It is possible that construct theory predictions based on notions of construct looseness and inconsistency need to be qualified more in terms of content and/or structural characteristics of the environment. In this connection, an anecdote reported by Callaway (1970) seems relevant:

Some years ago, before phenothiazines, a fire broke out on the back ward of a state hospital. Most of the patients were hallucinated, chronic, process schizophrenics. However, they quickly queued up and marched out as sane as you please. Mannerisms, responses to hallucinations, and other gross signs of disorder vanished until after they reached the safety of the yard; then things returned to normal, or, in this case, to abnormal. With such a clear goal and with such a clear and practiced method of reaching it, the excitement of the fire did not disorganize their behavior (Callaway, 1970, p. 193).
Fig. 1  Mean Number of Matches in 50/50 and 70/30 Event Probability for TD, NTD, and NS Groups
Fig. 2 Mean Trials Until First Match in 50/50 and 70/30 Event Probability for TD, NTD, and NS Groups
Following a similar line of reasoning, it might be speculated that the probability learning task used in the present study was both too simple and too concrete to test for differences in the ability to predict outcomes in the three groups studied. It could be that, while the loose and inconsistent conceptual structure of thought-disordered schizophrenics leads to poor predictions in more complex interpersonal situations, the performance deficits engendered by thought disorder are reduced in situations having a high degree of structure and redundancy such as the probability learning task. This latter consideration might explain why the TD group performed at about the same level as the NS group in the 70/30 situation.

Thought Disorder and the Paranoid Dimension

Bannister (1971) has pointed out that paranoid schizophrenics are expected to have tighter construct systems than non-paranoid schizophrenics. The evidence for this assertion so far is in the right direction but is relatively weak. Foulds, Hope, McPherson, and Mayo (1967b) did not find significant differences in Intensity or Consistency in clinically judged paranoid and non-paranoid schizophrenics. When Foulds' Symptom-Sign Inventory (Foulds, 1965) was used, the paranoid dimension correlated positively and significantly only with the Consistency measure.

The weakness of these results may be related to difficulties in the assessment of the paranoid dimension. A re-examination of Foulds' (1965) schema for classifying psychiatric disorders shows that "paranoid schizophrenia" is not seen as the same as "paranoia," the latter being regarded as an "integrated" paranoid or integrated psychosis" along with mania and melancholia. Though it is impossible to know for certain, it is probably
the "integrated" paranoid or integrated features in a paranoid schizophrenic that are the basis for Bannister's (1971) comments about construct organization in paranoids.

Using clinical diagnosis as a criterion, Foulds (1965) found that of 20 non-paranoid schizophrenics given his Integrated Psychosis vs Non-Integrated Psychosis Scale, 65% scored in the non-integrated range, 5% scored in the integrated range and 30% were intermediate between these two and classified as "uncertain." Further, on the Paranoid vs Schizophrenia Scale, non-paranoid schizophrenics scored .60 (s.d. = 1.39), paranoid schizophrenics 3.00 (s.d. = 1.26 and paranoiacs 3.75 (s.d. = 1.89). Unfortunately, Foulds provides no data about the correlation between these scales. It is clear, however, that, non-paranoid schizophrenics (supposedly "non-integrated" psychotics) can score in the integrated end of the scale or somewhere in between the integrated and non-integrated. Also, from results with the Paranoid vs Schizophrenia Scales, paranoid schizophrenics appear to occupy a point on a continuum of integration rather than being a separate class of psychotics.

In the present study, the relationship between thought disorder and paranoid integration was tested by comparing extreme groups on both the paranoid and the integration dimension. Comparison groups were obtained by combining criteria from the Paranoid vs Schizophrenia scale and the Integrated vs Non-Integrated Psychosis scale (Foulds, 1965). Ss with scores above the median on both the Paranoid and Integration dimension were assigned to a High Integration category and those with scores below the median on both of these dimensions were assigned to a Low Integration category. It was predicted that the High Integration groups would show less thought disorder than the Low Integration group.
Results and Discussion

The frequencies of TD and NTD Ss in the High Integration and Low Integration groups are presented in Table 10. While there are more TD Ss in the Low Integration groups and more NTD Ss in the High Integration groups, the Fisher Exact Probability Test could not rule out the possibility that these frequencies occurred by chance ($p = .182$). Similarly, separate Median Tests indicate that the groups do not differ significantly on Intensity ($p = .38$) or Consistency ($p = .304$) scores. Thus, the hypothesis that tighter construct systems are associated with paranoid integration as measured by Foulds' criteria is not supported by these data.

One possible explanation for these results is that not enough of the "integration" range was sampled in this study. A more adequate test of the hypothesis might be made if clinically diagnosed integrated psychotics such as paranoiacs (Foulds, 1965) and manic-depressives were compared with paranoid schizophrenics and non-paranoid schizophrenics. Another possibility is that the Symptom-Sign Inventory did not effectively discriminate between paranoid and non-paranoid schizophrenics in this study. In support of the latter possibility is the finding that Ss in the present study who were clinically diagnosed as paranoid did not differ significantly on the Foulds Paranoid vs Schizophrenia scale (Mann-Whitney $U = 76$).

Considering that Foulds (1965) used clinical diagnosis to validate the Symptom-Sign Inventory, and the fact that the present findings cast doubt on the validity of the Paranoid vs Schizophrenia scale, an additional test of the hypothesis using clinical diagnosis as a criterion seemed
TABLE 10
Frequencies of TD and NTD Ss in High Integration and Low Integration Groups by Foulds' Criteria

<table>
<thead>
<tr>
<th></th>
<th>TD</th>
<th>NTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Integration</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Low Integration</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>
warranted. The numbers of TD and NTD Ss clinically diagnosed as paranoid and non-paranoid are presented in Table 11. As can be seen, there are relatively more TD Ss in the non-paranoid group and relatively more NTD Ss in the paranoid group. This pattern of frequencies departs significantly from what would be expected by chance ($\chi^2 = 3.84$, df = 1, $p < .05$).

By the Median Test, the paranoid group was found to be significantly higher than the non-paranoid group in Consistency ($\chi^2 = 3.84$, df = 1, $p < .05$), but not in Intensity ($\chi^2 = .152$, n.s.).

Thus, two different criteria of paranoid integration yield different results in relation to Bannister's hypothesis of tighter construct organization in paranoid schizophrenics (Bannister, 1971). The positive findings in relation to the clinical diagnosis of the paranoid dimension are in conflict with one previous study (Foulds, Hope, McPherson, and Mayo, 1967b). The finding of a relationship between the paranoid dimension and Consistency but not Intensity scores is consistent with Foulds (1965).

The reason for the latter finding is not clear and Personal Construct Theory does not provide different hypotheses for the relationship between paranoid integration and the two different criteria of construct Intensity and Consistency. It does not contradict either Personal Construct Theory or common sense, however, to think of paranoids as being as loose as other schizophrenics in terms of the interrelationships among separate constructs and at the same time more consistent in the pattern of looseness that they display. Put another way, paranoid delusions may give rise to, or be the result of distorted construct interrelationships (reflected by low Intensity scores) which are somewhat stable over time (reflected by relatively high Consistency scores). Thus, paranoid schizophrenics, like other schizophrenics, may have distorted constructions of events, but their
<table>
<thead>
<tr>
<th></th>
<th>TD</th>
<th>NTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paranoid</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Non-Paranoid</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>
particular pattern of distortions are more consistent than those of non-paranoid schizophrenics.

**Construct Organization and Chronicity**

Previous validity studies using the Grid Test have given little serious attention to the chronic/acute, process/reactive, or good pre-morbid/poor pre-morbid dimensions. Bannister (1962) found no significant differences in Grid Test scores between chronics ("long persisting symptomatology") and acutes ("sudden onset and relatively short duration of symptoms") when patients were rated on chronicity by their psychiatrists. The same study failed to find a significant correlation between "length of hospitalization" and test scores. A more recent study (Bannister, Fransella, and Agnew, 1971) found significant relationships between test scores and both condition on discharge and number of previous admissions, but no other prognostic criteria were related to test scores. Just what these "other prognostic criteria" were is impossible to say since they are not described explicitly in the report.

Considering the relatively elaborate development of the process-reactive concept and the refinement of scales used to tap this dimension (DeWolfe, 1968; Garmezy, 1970), the manner in which this variable has been assessed in validity studies with the Grid Test can be regarded as cursory at best. Viewing the process-reactive concept as an attempt to assess the wide pattern variations in the developmental sequence of the schizophrenic disorder (Garmezy, 1970) and the Grid Test as a method of gauging the status of a patient's conceptual structure in what is seen as a process of conceptual loosening (Bannister, 1971), it seems appropriate to give these two variables more systematic consideration than they
have received.

Studies which have used cognitive tests as criteria have generally supported the notion that the process-reactive dimension represents a continuum of severity of the schizophrenic syndrome (Garmezy, 1970). Typical research findings show that process schizophrenics are less mature in formal aspects of their responses to Rorschach Inkblots (Becker, 1956) and less able to give adequate responses on tests of conceptual processes (Becker, 1956; Tutko and Spence, 1962) than reactive schizophrenics. Considering the results of studies like these and the general implications of the process-reactive construct, one might predict that process schizophrenics would simply score lower (i.e., would be more "thought disordered") on the Grid Test than the reactives. This relatively uncomplicated prediction, however, would not follow from Bannister's theory (Bannister, 1971). Bannister's theory does predict a relationship between chronicity and thought disorder, but certain qualifications are necessary. Complications arise in connection with paranoid schizophrenics who are seen as having relatively tightly organized constructs (Bannister, 1971) and can also be classified as process schizophrenics (Garmezy, 1970). By virtue of the tight construct organization in this sub-category, the deleterious loosening that "serial invalidation" is said to produce over time is likely to be reduced. Bannister's position on this issue involves the view that paranoid integration is a "bus stop" on the way to formal thought disorder (Bannister, 1971). To explain how it is that some schizophrenics "achieve" paranoid integration while others "suffer" thought disorder, Bannister says:

The answer may lie in the state of the individual's construct system at the point of impact - at the time of his first disintegrating stress. If a person's construct system was never allowed to develop beyond an embryonic state before it was confronted with invalidations, the result may be a full-blown thought disorder. In contrast, if inter-
personal difficulties put pressure on a person with a relatively mature, viable construct system, the outcome may be the pattern-restructuring of paranoia (Bannister, 1971, p. 84).

It would seem that, if what Bannister says is correct, in order to test any hypotheses about chronicity and a person's construct organization, we would need to know what the character of his construct system was at that hypothetical point in time when he "began to become schizophrenic." If his construct system was relatively "well-developed," then we would expect some order of paranoid integration; if, on the other hand, the construct system was not so "well-developed" then we would expect a course of gradual loosening of construct systems eventually ending in the state called thought disorder. In the absence of this kind of data we are forced to infer something about the developmental progression of the patient's disorder from his current condition. If a patient is currently paranoid - in the sense of being an "integrated and tight construer" - then the implication is that he had a relatively well-developed construct system at the time of decompensation. Also, it may be expected that in a patient group of this kind, at least for the time being, there would be no significant correlation between chronicity and level of construct organization.

Directly relevant to the point of this discussion is a study by Hunt, Schwartz, and Walker (1965) in which it was shown that clinicians who try to differentiate process from reactive schizophrenics on the basis of responses to vocabulary test materials are strongly influenced by the bias that process schizophrenics are thought to be more confused in their thinking than are reactives. Independent judges' ratings of confusion, however, failed to differentiate a process from a reactive group. The paranoid dimension was not assessed in this study. It might be speculated that, had paranoids in the process group been analyzed separately, a
significant association between the process-reactive dimension and confusion may have been revealed. The important lesson from this study is that process schizophrenics, as a group, are not necessarily more confused than reactives, even though clinicians think of them as such.

For purposes of the present study, it was assumed that, in some way, the process continuum reflects a dimension which might be meaningfully related to Grid-assessed severity of thought disorder. Specifically, the prediction was made that a significant correlation exists between Grid test scores and scores on the Phillip's Scale, low Grid scores (the thought-disordered end) being associated with high Phillips Scale scores (the process end), but not for integrated paranoids. Accordingly, patients who were judged paranoid were eliminated from this analysis. The reason for the latter procedure follows from the expectation that the existence of paranoid process schizophrenics in the sample might mask any significant associations between construct loosening and the process dimension. Due to the previously discussed lack of relationship found between Foulds' criteria and the clinical diagnosis of paranoid schizophrenia in this study, clinical diagnosis was used to measure the paranoid dimension. To assess chronicity, DeWolfe's (1968) General Information Questionnaire was used.

**Results and Discussion**

The process-reactive scores for the schizophrenics ranged from 5 to 27. By discrete criteria (after DeWolfe, 1968), nine Ss were process (i.e., scores of 17 or above) and five Ss were reactive (i.e., scores of 12 or below). For purposes of correlational analyses, the process reactive dimension was treated as a continuum (Garmezy, 1970) and all schizophrenic Ss were included in the analyses.
As was predicted, Grid scores did not correlate significantly with the process-reactive dimension in the total schizophrenic sample (Intensity: \( r_s = .025 \), n.s.; Consistency: \( r_s = .259 \), n.s.). Also, as was expected, paranoid schizophrenics were distributed over the entire range of process-reactive scores.

When paranoids (13 Ss) were eliminated from the analysis, no significant relationship was found between process-reactive scores and either Intensity (\( r_s = .199 \), n.s.) or Consistency (\( r_s = -.180 \), n.s.). Thus, the hypothesis of a relationship between construct loosening and chronicity was not supported by these data.

Although different criteria were used, these findings are consistent with other studies (Hunt, Schwartz, and Walker, 1965; Rice, 1968) which have not found thought disorder to be more pronounced in process than in reactive schizophrenics. It might be legitimately argued that eliminating the paranoids in this analysis resulted in a sample size too small to provide a fair test of the hypothesis. However, it is noteworthy that of the nine Ss clearly in the process end of the continuum (i.e., scores of 17 or above), only three were thought-disordered by Bannister's criteria. Three of the five Ss clearly in the reactive end of the scale (i.e., scores of 12 or below) were thought disordered. The latter findings, while not answering the objection of small sample size, indicate the absence of even a trend toward the hypothesized relationship. Nevertheless, until the hypothesis of increasing thought disorder with chronicity is tested on a larger sample of non-paranoid schizophrenics, these conclusions must be regarded as only tentative.
Attentional Deficit

Though the Grid Test is presumed to measure the interrelationships among a person's constructs, other interpretations of test scores are certainly possible. It might be that severely disordered attention rather than disordered constructs leads to low Consistency and Intensity scores. It could be argued that the ranking of elements according to constructs on any other than a near random basis requires an ability to maintain an adequate attentional set. It could be that schizophrenics, and especially thought disordered schizophrenics, because of their "segmental" as opposed to "major" set (Shakow, 1962), give rise to low inter-construct correlations because they do not maintain an adequate attentional set while viewing the elements (photographs) to be construed. An opposing theoretical argument is possible. It has been asserted by advocates of Personal Construct Theory that attentional deficit is a result rather than a cause of loose interconstruct organization (McPherson, Blackburn, Draffan, and McFadyen, 1973). Arguing from this point of view, it could be said that the basis for meaningful attention to stimuli lay in a relatively tightly organized construct system which forms the basis for any meaningful, organized interactions with the environment.

No matter what direction of cause and effect one assumes, Personal Construct Theory does imply that a loose, incoherent construct system is associated with attentional deficit. Realizing the theoretical difficulties with the concept of attention and the problem of arbitrariness in choice of measures (Neale and Cromwell, 1970), the Stroop Color-Word Test (described in Chapter II) was selected as a measure of attention for the present study. Successful performance on Card C of the Stroop Test requires the maintenance of an attentional set to name colors despite the
visual presence of conflicting words in which the colors are imbedded. Schizophrenics have been found to perform more slowly than non-schizophrenics (Wapner and Krus, 1960), but conflicting results have been reported (Chapman and McGhie, 1962).

The relevant measures taken from this task included the total time (in log seconds) to complete Card C minus this score on Card B and a count of the number of intrusion errors (i.e., reading the word instead of naming the color) on Card C. It was predicted that the TD group would have significantly higher time and error scores than the NS group.

Results and Discussion

The data on both the time measure and intrusion errors on Card C are presented in Table 12. The analyses of variance performed on these data indicate that the groups differ significantly on both time to complete Card C-B ($F=4.12, df = 2,39, p \leq .024$) and on number of intrusion errors ($F = 3.19, df=2, 39, p \leq .052$). Separate $t$ tests on the time measure indicated that TD and NS differed significantly ($t = 2.71, df=27, p < .01$) as did NTD and NS ($t = 1.88, df=27, p < .05$) but not TD and NTD ($t = 1.02, df=24, n.s.$). Separate $t$ tests on intrusion errors showed that TD and NS differed significantly ($t = 2.65, df=27, p < .01$) but TD and NTD ($t = .72, df=24, n.s.$) and NTD and NS ($t = 1.59, df=27, n.s.$) did not.

The hypothesis of a positive association between thought disorder, as indicated by construct loosening, and attentional deficit as indicated by two criteria taken from the Stroop Test, is clearly supported by these data. These findings are contrary to those of Chapman and McGhie (1962) but consistent with Wapner and Krus (1960).
TABLE 12

Log Time To Complete Card C-B and Intrusion Errors on The Stroop Test

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>1.94258</td>
<td>.18689</td>
</tr>
<tr>
<td>NTD</td>
<td>1.87529</td>
<td>.14906</td>
</tr>
<tr>
<td>NS</td>
<td>1.76892</td>
<td>.15763</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>7.00</td>
<td>4.65</td>
</tr>
<tr>
<td>NTD</td>
<td>5.61</td>
<td>5.61</td>
</tr>
<tr>
<td>NS</td>
<td>3.00</td>
<td>3.16</td>
</tr>
</tbody>
</table>
The present findings indicate that, compared to non-schizophrenics, thought-disordered schizophrenics are less able to maintain an attentional set to name colors in the presence of conflicting perceptual cues. Thought-disordered schizophrenics performed more poorly than non-thought disordered schizophrenics on two performance criteria, but the differences between the latter two groups were found to be statistically nonsignificant. Also, it appears that, while non-thought disordered schizophrenics perform significantly more slowly than non-schizophrenics on this task, the latter two groups are not significantly different in susceptibility to distraction as measured by intrusion errors. This finding fits well with the conception that it is the thought-disorder aspect of schizophrenia that is most relevant to the concept of cognitive interference (Callaway, 1970).

The present findings cannot be used to decide the issue of whether loose interconstruct organization leads to attentional dysfunction or attentional dysfunction leads to loose interconstruct organization. As was pointed out previously, either theoretical position can be assumed in relation to the design of this study. Logically, disordered constructs could be either the effect or cause of attentional dysfunction. However, as McPherson, Blackburn, Draffan, and McFadyen (1973) argue, the view that disordered personal constructs are the result of a more primitive cognitive deficit would not explain why thought-disordered schizophrenics do not obtain abnormal Grid Test scores when they are ranking photographs in terms of physical constructs. It would seem that an attentional dysfunction, if it is the fundamental disorder, ought to produce loose and inconsistent construct intercorrelations no matter what content is being construed.
CHAPTER V

CONCLUSIONS

Concurrent Validity of The Grid Test

There are two different kinds of criteria that may be used to assess the concurrent validity of the Grid Test. The first involves comparisons of test scores schizophrenics with non-schizophrenics. The second, a more stringent criterion, involves comparisons between schizophrenics who are judged thought-disordered and those who are judged non-thought-disordered by some external criterion of thought disturbance. With respect to the first criterion, the findings of the present study indicate that the Grid Test validly discriminates between schizophrenics and non-schizophrenics, the latter achieving higher scores than the former on both Intensity and Consistency. In this regard, the present findings are consistent with others reported (Bannister, 1962, Bannister and Fransella, 1966, Bannister, Fransella, and Agnew, 1971; Williams, 1971). With respect to the second criterion, the present findings fail to show a significant association between Grid Test scores and indices of thought disorder taken from the clinical judgments of S's primary therapist and from psychologists' ratings of thought disorder reflected in responses to a proverb-interpretation task. The lack of a relationship between the clinical judgments and Grid Test scores is at variance with several studies (Bannister, 1962, Bannister and Fransella, 1966, Bannister, Fransella and Agnew, 1971; Costello, 1966, Foulds, Hope, McPherson and Mayo, 1967).
Any comparisons with other studies of this variable must be made with caution because, as has been discussed previously, there are important differences in the manner in which thought disorder was assessed clinically. In studies showing positive results, two dichotomous criteria (thought-disordered vs non-thought disordered by both Grid Test and clinical criteria) were found to be significantly related. In the present study, clinical judgments were organized as continuous criteria, and no relationship was found between the latter and Grid indices. What these results may mean is that when clinicians are forced to dichotomize their judgments, different subjective criteria are used in forming them. Another possibility is that either Grid indices or clinical judgments (or both) are better as measures of extreme states of thought disorder than they are measures of degrees of thought disturbance. Interestingly, when a dichotomous criterion such as "phenothiazines prescribed" vs "phenothiazines not prescribed" is related to Grid criteria, a significantly closer relationship is found between clinical judgment and Grid criteria. Of course, the latter assertion rests on the assumption that clinicians prescribe phenothiazines to combat thought disturbances.

Construct Validity of The Grid Test

To examine the construct validity of the Grid Test, four hypotheses—each relating to a different behavioral domain—were tested. Of the four hypotheses tested, one was confirmed, two received partial confirmation, and one was disconfirmed.

The Grid Test and considerations from its associated model of thought disorder led to the hypothesis that thought-disordered schizophrenics, while generally inferior in predicting outcomes of events, would perform
better than other groups when dealing with chance-like event probabilities. Though the latter hypothesis received support in this study, the findings do not confirm the hypothesis of a relationship between loose and inconsistent construing and the ability to predict the outcomes of events. Of course, it is possible that the task used in the present study was too structured to permit a valid test of the hypothesis. If this is true, it will be necessary for future studies of this variable to sample a broader range of event probabilities. Also, Personal Construct Theory will need to specify more clearly the conditions under which loosened construing is expected to lead to difficulties in prediction.

Paranoids, by clinical diagnosis of this state, were found to have tighter construct systems than non-paranoids. This finding is consistent with expectations from Personal Construct Theory and with Foulds (1965). Negative results have been reported (Foulds, Hope, McPherson, and Mayo, 1967b) and, in the present study, when a different criterion of paranoid integration was used, the hypothesis was disconfirmed. The basis for this hypothesis is found in the general observation of a tighter cognitive organization in paranoid schizophrenics as compared to other schizophrenic sub types (McGhie, 1970). The inconsistent findings in this area could be related to inconsistencies in the diagnosis of the paranoid state. As Rosenwald (1962) has pointed out, there is a great deal of confusion among clinicians as to what constitutes paranoid symptomatology. It is possible that not all clinical diagnoses of paranoid schizophrenia are based on the notion of paranoid integration. It is conceivable that more consistent results could be obtained with better measures of psychotic integration, and perhaps the hypothesis ought to predict tighter construct organization for integrated psychotics rather than paranoid schizophrenics. This would
make restricting the hypothesis to "coherent" paranoids (Venables and Wing, 1962) an unnecessary refinement. Further, it might be pointed out that when the integration dimension has been considered in studies, findings have been generally supportive of the hypothesis (McPherson, 1969; Mellsop, Spelman and Harrison, 1971).

Apparently, there is no significant relationship between construct looseness and chronicity. This finding is contrary to Personal Construct Theory (Bannister, 1971), but consistent with other studies (Hunt, Schwartz, and Walker, 1965; Rice, 1968) which have used different criteria of thought disturbance but similar criteria (process-reactive) for chronicity. These results are also consistent with studies using the Grid Test and clinical criteria of chronicity (Bannister, 1962; Foulds, Hope, McPherson, and Mayo, 1967b; Mellsop, Spelman, and Harrison, 1971). It is difficult to reconcile these data with the general expectation from Construct Theory (Bannister, 1971).

Construct loosening was found to be significantly related to attentional deficit in the present study. Schizophrenics judged thought-disordered by Grid criteria showed significantly more deficit than non-schizophrenics, with non-thought disordered schizophrenics intermediate between these two groups. This finding is consistent with Personal Construct Theory. Individuals whose construct systems have become loose and inconsistent may be viewed as lacking the ability to sustain a consistent set to select and attend to certain features of their environment. As has been pointed out in a previous discussion, whether attentional deficit is a cause or an effect of loosened construing is a moot point at present. However, those who would assert that attentional deficits are prior to construct disorganization usually will find it difficult to account for
the fact that thought-disordered schizophrenics do not manifest disordered constructs in every stimulus domain (Bannister and Salmon, 1966).
CHAPTER VI

SUMMARY

This study investigated the concurrent and construct validity of Bannister's Grid Test of schizophrenic thought disorder. Three groups were studied: 1) Non-schizophrenic hospitalized psychiatric patients (NS), 2) Thought-Disordered Schizophrenics (TD); and 3) Non-Thought-Disordered Schizophrenics (NTD). Schizophrenic Ss were classified as TD if they obtained scores below +.49 on the Grid Test's Consistency measure and below 1,000 on the Grid Test's Intensity measure. Schizophrenics with scores above these cut-off points were classified as NTD.

Schizophrenics (TD and NTD pooled) were found to be significantly different from the NS group on both Intensity and Consistency. The TD and NTD groups were not found to be significantly different on ratings of thought disorder made by each S's primary therapist nor were these groups significantly different on clinical psychologists' ratings of thought disorder reflected in responses to a proverb-interpretation task. Though no significant associations were found between Grid measures and dosage of phenothiazines and phenothiazine derivatives, there was a significantly greater tendency for therapists to prescribe phenothiazines and phenothiazine derivatives for TD Ss than for the other groups.

The TD group performed better than the other groups on a probability learning task when the event probabilities were 50/50 but not when they were 70/30. Clinically diagnosed paranoids were found to be less thought-disordered than non-paranoids. When Foulds Symptom-Sign Inventory was used
to classify paranoids, this group was not found to differ from non-paranoids in thought disorder. In the TD and NTD groups combined, no significant relationships were found between Grid Test scores and the process-reactive dimension. The TD group performed significantly more slowly and showed significantly more intrusion errors on card C of the Stroop Color-Word Test than did the NS group.
References


Becker, W. C. A genetic approach to the interpretation and evaluation of the process-reactive distinction in schizophrenia. *Journal of Abnormal and Social Psychology*, 1956, 53, 229 - 236.


APPENDIX A
APPENDIX A

Grid Test Instructions

1. Place in front of $S$ the array of eight photographs.

2. "Study these photographs. You will be asked questions about the people in them." (60 seconds)

3. "Which of these people is most likely to be kind?" When $S$ has made his selection, $E$ turns the photograph face down and writes the letter, which is printed on the back, on the Record Sheet against "1st for KIND. $E$ then asks $S$ to "select the person most likely to be KIND from the seven remaining photographs." $E$ then turns this photograph face down and notes its letter against "2nd" on the Record Sheet. $E$ continues in this manner until $S$ has ranked all eight photographs.

4. $E$ then turns all photographs face upwards, shuffles them and asks $S$ to select the person most likely to be STUPID. The procedure for the remaining constructs is identical to that for the first.

5. When $S$ has completed ranking the photographs on the six constructs, he is given the following instructions: "Now that you are quite familiar with the procedure and the pictures, I should like you to do it all again. If you feel you want to change your mind you may, because this is not a memory test. There are no right or wrong answers; I just want to know how you feel about these people now that you have thought about them a lot." The test procedure is repeated exactly as before only $S$'s rankings are entered under Grid II on the Record Sheet.

6. If $S$ asks what meaning he is to attach to words like KIND, STUPID and so forth, $E$ instructs him to use the words in his own personal sense, i.e., to use KIND to mean whatever he would mean by it if in conversation he said someone was a kind person.

7. If $S$ complains that the task is difficult, $E$ encourages him to do his best even if this may mean that he has to guess.

8. If $S$ claims, for example, that there are no really STUPID people in the group, $E$ tells him he is to select the one who comes nearest to being STUPID as compared with the others.
APPENDIX B

Probability Learning Task Instructions

"As you can see, I have a set of cards before me. On each of these cards there is printed either a square or a circle. (S is shown the sample cards). I will turn the cards up to you one at a time. Before I turn a card, I want you to try your best to predict which - the square or the circle - will turn up each time." If S asks "should I guess?" E says "That's entirely up to you. However you do it, I want you to tell me which - the square or the circle - you think will turn up." After each prediction, E turns up the next card and, while S is viewing it, enters the prediction in the record sheet next to the number for that trial. E then moves the card aside and asks S to make his next prediction. E continues to signal the next prediction until the process becomes automatic, i.e., S makes the prediction as soon as the card from the previous trial is removed. As long as S hesitates, E continues to signal the next trial."
APPENDIX C
APPENDIX C

Foulds Symptom Sign Inventory

Administration

Opening: I want to ask you a number of questions. Now these are standard questions which I am asking nearly everyone, so many of them may not apply to you; but I want to ask all of them to make sure we don't miss anything and so I can compare one person with another.

Wording: S should be encouraged to answer the questions as they stand. If he says "You mean..." and then gives a different version of the question, E should repeat the question.

Scoring: Inability to answer a question is shown as "?" and not scored except for the following items in the Paranoia Scale: on this version IP 3, 5, and 6. On these items a question mark is scored as positive.

Scales: Paranoid vs Schizophrenia and Nonintegrated Psychosis vs Integrated Psychosis

NIP+S

1. Are you ever so cheerful that you want to wear lots of gay things, like button-holes, flowers, bright ties, jewelry, etc.?

2. When you get bored, do you ever like to stir up some excitement?

3. Do you ever feel so full of energy that you don't want to go to bed?

4. Are you compelled to think over abstract problems again and again until you can't leave them alone?

5. Do distressing thoughts about sex or religion come into your mind against your will?

6. ($+) Do you ever see visions, or people, animals, or things around you that other people don't seem to see?

7. Do you often wonder who you really are?

8. Do you ever have very strange and peculiar experiences?

9. Do you ever hear voices without knowing where they come from?

10. Do you have very strange and peculiar thoughts at times?

11. Is there something unusual about your body - like one side being different from the other and meaning something different?
12. (S) Are you afraid that you might be going insane?

13. (S) Are you afraid of going out alone?

14. (S) Have you ever attempted to do away with yourself?

15. (S) Do you ever seriously think of doing away with yourself because you are no longer able to cope with your difficulties?

IP+P

1. (P+) Are people talking about and criticizing you through no fault of your own?

2. (P+) Have you been in poor physical health during most of the past few years?

3. (P) Are these people who are trying to harm you through no fault of your own?

4. (P) Is someone, other than yourself, deliberately causing most of your trouble?

5. (P) Are people plotting against you through no fault of your own?

6. (P) Can people read your thoughts and make you do things against your will by a sort of hypnotism?
INSTRUCTIONS FOR FILLING OUT THE GENERAL INFORMATION QUESTIONNAIRE:

(Male Form)

THIS QUESTIONNAIRE IS PART OF A RESEARCH PROJECT ABOUT PATIENTS IN THE HOSPITAL. YOUR COOPERATION WILL BE APPRECIATED. IT IS HOPED THAT THE RESULTS WILL BE OF HELP IN DEVELOPING NEW AND BETTER WAYS OF HELPING PATIENTS. OF COURSE, YOUR ANSWERS WILL BE STRICTLY CONFIDENTIAL.

FOR MOST OF THE QUESTIONS, ALL YOU WILL HAVE TO DO IS PUT A CHECK BESIDE THE STATEMENT OR STATEMENTS WHICH APPLY TO YOU. SOMETIMES MORE THAN ONE STATEMENT WILL BE TRUE OF YOU. PLEASE BE SURE TO CHECK ALL THE STATEMENTS THAT APPLY TO YOU AND PLEASE BE VERY CAREFUL TO ANSWER EVERY QUESTION. SOMETIMES YOU WILL NOT BE COMPLETELY SURE OF THE ANSWER TO A QUESTION. WHEN YOU ARE NOT COMPLETELY SURE OF THE ANSWER, GO AHEAD AND ANSWER THE QUESTION AND BE AS ACCURATE AS YOU CAN. IF YOU HAVE ANY QUESTIONS, EITHER NOW OR AT ANY TIME WHILE YOU ARE FILLING OUT THE QUESTIONNAIRE, JUST RAISE YOUR HAND AND SOMEONE WILL COME TO YOUR SEAT TO ANSWER IT.

REMEMBER, PLEASE ANSWER EVERY QUESTION AS ACCURATELY AS YOU CAN AND CHECK ALL THE STATEMENTS THAT APPLY TO YOU ON EACH QUESTION.
1) **WHAT IS YOUR AGE?**

- under 20
- 20-24
- 25-29
- 30-34
- 35-39
- 40-44
- 45-49
- 50-54
- 55-59
- 60-64
- 65-69
- 70 or over

2) **WHAT WAS YOUR LAST JOB?**


3) **ARE THERE OTHER MEMBERS OF THE HOUSEHOLD WHO WORK?**

- No other members work and I have been out of work.
- At present, I am the only member who works.
- 1 or more parents I live with work.
- Wife and/or children work.
- Relatives I live with work.

4) **BEFORE ENTERING THE HOSPITAL, DID YOU:**

- Own your own home
- Rent your own home
- Own an apartment
- Rent an apartment
- Rent a room
- Live with parents or relatives
- Have some other living arrangements

5) **IF YOU ARE SINGLE, BEFORE ENTERING THE HOSPITAL, DID YOU:**

- Live alone
- Live with parents
- Live with relatives
- Live with friends
- I am married

6) **BY WHOM WERE YOU RAISED?**

- Real parents
- Adoptive parents
- Foster parents
- Relatives
- Orphanage
- (List other)

7) **HOW MANY BROTHERS AND SISTERS DID YOU LIVE WITH?**

- None
- One
- Two
- Three or four
- More than four

8) **WHAT IS YOUR NATIONALITY BACKGROUND?**

- English
- Irish
- French
- Scandinavian
- German
- Italian
- Greek
- Spanish or Portuguese
- Mexican or Puerto Rican
- Other, list here

9) **WOULD YOU SAY YOUR CHILDHOOD WAS:**

- Unhappy
- Somewhat unhappy
- Sometimes happy, sometimes unhappy
- Fairly happy
- Very happy

10) **HOW MUCH EDUCATION HAVE YOU HAD? (Number of years completed)**

- College graduate or more
- Some college education
- High school graduate
- Some high school
- Completed grade school
- Some grade school
- No formal education
(11) How many friends did you have between the ages of 6 and 12?
(Real friends, not just people whom you knew by name)

No real friends, then
1
2
3
4 or 5
6 or 7
8 to 10
more than 10

(12) How close were your friends when you were between the ages of 6 and 12?

No friends, then
Mainly casual friendships
Mainly close friends

(13) How many real friends did you have between the ages of 12 and 18?

No real friends
1 or 2
3 to 5
6 to 10
over 10

(14) How close were these friends?

No friends then
A few casual friends, only
A few close friends, only
A number of close and casual friends

(15) How well did you get along in elementary and high school?

Never went to school
Never seemed to have any trouble
Disciplined by teachers a few times
Often disciplined by teachers or the principal
Expelled from school

(16) How many of your real friends (before you were eighteen) were girls?

Not really friendly with any girls
One or two
A few
Quite a few
Mainly girls for friends

(17) How many girls did you date before you were eighteen?

None
1 to 5
6 to 10
11 to 20
over 20

(18) How many girls did you date more than five times before you were eighteen?

None
1 or 2
3 to 5
6 to 10
Over 10

(19) Have you ever dated frequently and regularly? If so, how old were you when you started?

Never did
Over 18
16 to 18
14 to 16
13 or younger

(20) Did you have a "steady girl" before you were eighteen?

No
Yes

(21) What activities did you take part in in elementary and high school? (check as many as apply to you)

Language or Hobby Clubs
Student government
"Major" sports: Football, Basketball, Track, Baseball
Other high school sport teams
Musical or Dramatic groups
Fraternities or Social Clubs
Debate or Academic (Science or literary, etc.) Clubs
Ran around with a group, clique or gang.
Was not interested in group activities

(22) Are your parents living?

Yes, both living
Mother deceased
Father deceased
Both deceased
23) ARE YOUR PARENTS PRESENTLY LIVING TOGETHER?

--- One or both deceased
--- Yes
--- No

24) HOW OLD WAS YOUR FATHER WHEN YOU WERE BORN?

--- Under 20
--- 20-24
--- 25-29
--- 30-40
--- Over 40

25) HOW OLD WAS YOUR MOTHER WHEN YOU WERE BORN?

--- Under 20
--- 20-24
--- 25-29
--- 30-39
--- Over 40

26) HOW OLD WERE YOU WHEN YOUR FATHER DIED?

--- Father still living
--- Under 5
--- 5-9
--- 10-14
--- 15-19
--- 20 or over

27) HOW OLD WERE YOU WHEN MOTHER DIED?

--- Mother still living
--- Under 5
--- 5-9
--- 10-14
--- 15-19
--- 20 or over

28) HOW MUCH EDUCATION DID YOUR MOTHER HAVE?

--- College graduate or more
--- Some college education
--- High School graduate
--- Some high school
--- Completed grade school
--- Some grade school education
--- No formal education

29) HOW MUCH EDUCATION DID YOUR FATHER HAVE?

--- College graduate or higher
--- Some college education
--- High school graduate
--- Some high school education
--- Completed grade school
--- Some grade school education
--- No formal education

30) WHERE IS YOUR PRESENT SOCIAL POSITION IN RELATION TO THAT OF YOUR PARENTS?

--- I am better off socially
--- I am at about the same level
--- I am slightly worse off socially
--- Can't tell

31) WHAT IS YOUR CURRENT MARITAL STATUS?

--- Single
--- First marriage
--- Widowed
--- Divorced
--- Separated
--- Second marriage
--- Third or more marriage

32) HOW WELL DO YOU GET ALONG WITH YOUR WIFE OR GIRL FRIEND?

--- Very well; never quarrel or disagree; almost perfect
--- Fairly well; a few quarrels or disagreements, but enjoy being together most of the time
--- All right; some ups and some downs
--- Not too well; mostly bickering and tension but occasional peace and contentment together
--- Poorly; constantly quarreling with disagreements and tension
--- No wife or girl friend at present
33) IF YOUR ANSWER TO ITEM 32 HAS NOT ALWAYS BEEN TRUE, HOW LONG HAS IT BEEN TRUE?

   _____ Always been this way
   _____ Been this way a long time
   _____ Only a short time
   _____ No wife or girl friend, at present

34) WHAT IS YOUR LENGTH OF MARRIAGE?
(If more than one, length of longest)

   _____ Never married
   _____ Under 1 year
   _____ 1 to 5 years
   _____ 6 to 10 years
   _____ 11 to 20 years
   _____ Over 20 years

35) HOW MANY CHILDREN DO YOU HAVE?

   _____ Never married
   _____ No children
   _____ 1 child
   _____ 2 to 4 children
   _____ over 4 children

36) HOW OLD WERE YOU WHEN YOU WERE FIRST MARRIED?

   _____ Never married
   _____ Under 20
   _____ 20-24
   _____ 25-29
   _____ 30-34
   _____ 35 or over

37) WHAT IS YOUR WIFE'S AGE COMPARISON WITH YOURS?

   _____ Never married
   _____ More than 5 years younger than I
   _____ Less than 5 years younger than I
   _____ Less than 5 years older than I
   _____ More than 5 years older than I
   _____ Same age as I am

38) HOW MANY WOMEN HAVE YOU DATED IN THE PAST YEAR?

   _____ Only my wife
   _____ None
   _____ 1 or two
   _____ 3 to 5
   _____ 6 to 10
   _____ Over 10

39) IF SINGLE, HAVE YOU DATED ANY WOMEN MORE THAN 10 TIMES IN THE PAST YEAR?

   _____ Married
   _____ Yes
   _____ No

40) ARE YOU NOW OR HAVE YOU EVER BEEN ENGAGED TO BE MARRIED?

   _____ Married before
   _____ Married now
   _____ Engaged now
   _____ Engaged before
   _____ Never engaged

41) DO YOU NOW HAVE DEFINITE PLANS TO BE MARRIED WITHIN ONE YEAR?

   _____ Married now
   _____ Yes
   _____ No

42) HOW MANY BOOKS HAVE YOU READ IN THE LAST YEAR?

   _____ None
   _____ 1 or 2
   _____ 3 to 5
   _____ 6 to 10
   _____ Over 10

43) WHAT KIND OF BOOKS DO YOU READ?

   _____ Fiction
   _____ Non-fiction
   _____ Both
   _____ Neither

44) WHAT MAGAZINES DO YOU FREQUENTLY READ?

   __________________________________________
   __________________________________________

45) WHAT ARE YOUR HOBBIES?

   __________________________________________
   __________________________________________

46) WHAT GROUPS OR ORGANIZATIONS DO YOU BELONG TO?

   __________________________________________
47) WHEN YOU ARE IN A GROUP, HOW DO THE OTHERS USUALLY THINK OF YOU?

____ A "go getter"
____ Just one of the group
____ One of the quieter ones
____ Others never notice me
____ I usually try to stay out of groups as much as possible.

48) HOW MANY REAL FRIENDS DO YOU HAVE NOW?

____ None at present
____ A few
____ Some
____ Many

49) DO YOU NOW HAVE ANY CLOSE FRIENDS THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH?

____ No
____ Yes

50) DO YOU NOW KNOW ANY WOMEN THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH? (Include your wife, if married)

____ No
____ Yes

51) DO YOU HAVE ANY FRIENDS YOU HAVE KNOWN FOR OVER FIVE YEARS WITH WHOM YOU ARE STILL FRIENDS?

____ No
____ Yes

52) HAVE YOU BEEN FEELING TENSE AND UNDER STRAIN IN THE RECENT PAST?

____ Very much so
____ Somewhat so
____ I have been feeling fairly calm
____ I have been feeling very very calm

53) IS YOUR APPETITE PRESENTLY GOOD?

____ Very good
____ Fairly good
____ Fairly poor
____ Very poor

54) AT PRESENT DO YOU SLEEP WELL?

____ Very well
____ Fairly well
____ Fairly poor
____ Toss and turn all night

55) OVER THE PAST FEW MONTHS BEFORE ENTERING THE HOSPITAL WAS YOUR SEX LIFE REASONABLY SATISFACTORY?

____ No sex life
____ Unsatisfactory
____ Satisfactory

56) IS YOUR MEMORY AS GOOD NOW AS IT ALWAYS HAS BEEN?

____ Yes
____ No

57) HAVE YOU EVER RECEIVED PSYCHIATRIC TREATMENT BEFORE, AND IF SO, HOW LONG AGO WAS THE LAST TIME?

____ Never received psychiatric treatment before
____ Within the last 6 months
____ Between 6 months and 1 year ago
____ Between 1 year and 5 years ago

58) WHAT ARE YOUR PRESENT PHYSICAL AILMENTS?

________________________________________
________________________________________
________________________________________
________________________________________
INSTRUCTIONS FOR FILLING OUT THE GENERAL INFORMATION QUESTIONNAIRE:

(Female Form)

THIS QUESTIONNAIRE IS PART OF A RESEARCH PROJECT ABOUT PATIENTS IN THE HOSPITAL. YOUR COOPERATION WILL BE APPRECIATED. IT IS HOPED THAT THE RESULTS WILL BE OF HELP IN DEVELOPING NEW AND BETTER WAYS OF HELPING PATIENTS. OF COURSE, YOUR ANSWERS WILL BE STRICTLY CONFIDENTIAL.

FOR MOST OF THE QUESTIONS, ALL YOU WILL HAVE TO DO IS PUT A CHECK BESIDE A STATEMENT OR STATEMENTS WHICH APPLY TO YOU. SOMETIMES MORE THAN ONE STATEMENT WILL BE TRUE OF YOU. PLEASE BE SURE TO CHECK ALL THE STATEMENTS THAT APPLY TO YOU AND PLEASE BE VERY CAREFUL TO ANSWER EVERY QUESTION. SOMETIMES YOU WILL NOT BE COMPLETELY SURE OF THE ANSWER TO A QUESTION. WHEN YOU ARE NOT COMPLETELY SURE OF THE ANSWER, GO AHEAD AND ANSWER THE QUESTION AND BE AS ACCURATE AS YOU CAN. IF YOU HAVE ANY QUESTIONS, EITHER NOW OR AT ANY TIME WHILE YOU ARE FILLING OUT THE QUESTIONNAIRE, JUST RAISE YOUR HAND AND SOMEONE WILL COME TO YOUR SEAT TO ANSWER IT.

REMEMBER, PLEASE ANSWER EVERY QUESTION AS ACCURATELY AS YOU CAN AND CHECK ALL THE STATEMENTS THAT APPLY TO YOU ON EACH QUESTION.
GENERAL INFORMATION QUESTIONNAIRE

1) WHAT IS YOUR AGE?
   - Under 20
   - 20-24
   - 25-29
   - 30-34
   - 35-39
   - 40-44
   - 45-49
   - 50-54
   - 55-59
   - 60-64
   - 65-69
   - 70 or over

2) WHAT WAS YOUR LAST JOB?
   ___________________________________________

3) ARE THERE OTHER MEMBERS OF THE HOUSEHOLD WHO WORK?
   - No other members work and I have been out of work.
   - At present, I am the only member who works.
   - I or more parents I live with work.
   - Husband and/or children work.
   - Relatives I live with work.

4) BEFORE ENTERING THE HOSPITAL, DID YOU:
   - Own your own home
   - Rent your own home
   - Own an apartment
   - Rent an apartment
   - Rent a room
   - Live with parents or relatives
   - Have some other living arrangements.

5) IF YOU ARE SINGLE, BEFORE ENTERING THE HOSPITAL, DID YOU:
   - Live alone
   - Live with parents
   - Live with relatives
   - Live with friends
   - I am married

6) BY WHOM WERE YOU RAISED?
   - Real parents
   - Adoptive parents
   - Foster parents
   - Relatives
   - Orphanage
   - (List other)

7) HOW MANY BROTHERS AND SISTERS DID YOU LIVE WITH?
   - None
   - One
   - Two
   - Three or four
   - More than four

8) WHAT IS YOUR NATIONALITY BACKGROUND?
   - English
   - Irish
   - French
   - Scandinavian
   - German
   - Italian
   - Greek
   - Spanish or Portugese
   - Mexican or Puerto Rican
   - Other European
   - Other

9) WOULD YOU SAY YOUR CHILDHOOD WAS:
   - Unhappy
   - Somewhat unhappy
   - Sometimes happy, sometimes unhappy
   - Fairly happy
   - Very happy

10) HOW MUCH EDUCATION HAVE YOU HAD?
    - College graduate or more
    - Some college education
    - High school graduate
    - Some high school
    - Completed grade school
    - Some grade school
    - No formal education
11) HOW MANY FRIENDS DID YOU HAVE BETWEEN THE AGES OF 6 AND 12? (REAL FRIENDS, NOT JUST PEOPLE WHOM YOU KNEW BY NAME)

No real friends, then
1
2 or 3
4 or 5
6 or 7
8 to 10
More than 10

12) HOW CLOSE WERE YOUR FRIENDS WHEN YOU WERE BETWEEN THE AGES OF 6 AND 12?

No friends, then
Mainly casual friendships
Mainly close friends

13) HOW MANY REAL FRIENDS DID YOU HAVE BETWEEN THE AGES OF 12 AND 18?

No real friends
1 or 2
3 to 5
6 to 10
Over 10

14) HOW CLOSE WERE THESE FRIENDS?

No friends then
A few casual friends, only
A few close friends, only
A number of close and casual friends

15) HOW WELL DID YOU GET ALONG IN ELEMENTARY AND HIGH SCHOOL?

Never went to school
Never seemed to have any trouble
Disciplined by teachers a few times
Often disciplined by teachers or by principal
Expelled from school

16) HOW MANY OF YOUR REAL FRIENDS (BEFORE YOU WERE EIGHTEEN) WERE BOYS?

Not really friendly with any boys
One or two
A few
Quite a few
Mainly boys for friends

17) HOW MANY BOYS DID YOU DATE BEFORE YOU WERE EIGHTEEN?

None
1 to 5
6 to 10
11 to 20
Over 20

18) HOW MANY BOYS DID YOU DATE MORE THAN FIVE TIMES BEFORE YOU WERE EIGHTEEN?

None
1 or 2
3 to 5
6 to 10
Over 10

19) HAVE YOU EVER DATED FREQUENTLY AND REGULARLY? IF SO, HOW OLD WERE YOU WHEN YOU STARTED?

Never did
Over 18
16 to 18
14 to 16
13 or younger

20) DID YOU HAVE A "STEADY" BEFORE YOU WERE EIGHTEEN?

No
Yes

21) WHAT ACTIVITIES DID YOU TAKE PART IN IN ELEMENTARY AND HIGH SCHOOL? (Check as many as apply to you)

Language or Hobby Clubs
Student government
"Major sports: Basketball, Track, Baseball
Other high school sport teams
Musical or Dramatic Groups
Sororities or Social Clubs
Debate or Academic (Science or literary etc.) Clubs
Ran around with a group, clique or gang
Was not interested in group activities

22) ARE YOUR PARENTS LIVING?

Yes, both living
Mother deceased
Father deceased
Both deceased
23) Are your parents presently living together?

___ One or both deceased
___ Yes
___ No

24) How old was your father when you were born?

___ Under 20
___ 20-24
___ 25-29
___ 30-39
___ Over 40
___ Deceased

25) How old was your mother when you were born?

___ Under 20
___ 20-24
___ 25-29
___ 30-39
___ Over 40

26) How old were you when father died?

___ Father still living
___ Under 5
___ 5-9
___ 10-14
___ 15-19
___ 20 or over

27) How old were you when mother died?

___ Mother still living
___ Under 5
___ 5-9
___ 10-14
___ 15-19
___ 20 or over

28) How much education did your mother have?

___ College graduate or more
___ Some college education
___ High School graduate
___ Some high school
___ Completed grade school
___ Some grade school education
___ No formal education

29) How much education did your father have?

___ College graduate or higher
___ Some college education
___ High school graduate
___ Some high school education
___ Completed grade school
___ Some grade school education
___ No formal education

30) Where is your present social position in relation to that of your parents?

___ I am better off socially
___ I am at about the same level
___ I am slightly worse off socially
___ Can't tell

31) What is your current marital status?

___ Single
___ First marriage
___ Widowed
___ Divorced
___ Separated
___ Second marriage
___ Third or more marriage

32) How well do you get along with your husband or boy friend?

___ Very well; never quarrel or disagree; almost perfect
___ Fairly well; a few quarrels or disagreements, but enjoy being together most of the time
___ All right; some ups and some downs
___ Not too well; mostly bickering and tension but occasional peace and contentment together
___ Poorly; constantly quarreling with disagreements and tension
___ No husband or boy friend at present
33) IF YOUR ANSWER TO ITEM 32 HAS NOT ALWAYS BEEN TRUE, HOW LONG HAS IT BEEN TRUE?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Always been this way</td>
</tr>
<tr>
<td>___ Been this way a long time</td>
</tr>
<tr>
<td>___ Only a short time</td>
</tr>
<tr>
<td>___ No husband or boyfriend, at present</td>
</tr>
</tbody>
</table>

34) WHAT IS YOUR LENGTH OF MARRIAGE?
(If more than one, length of longest)

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Never married</td>
</tr>
<tr>
<td>___ Under 1 year</td>
</tr>
<tr>
<td>___ 1 to 5 years</td>
</tr>
<tr>
<td>___ 6 to 10 years</td>
</tr>
<tr>
<td>___ 11 to 20 years</td>
</tr>
<tr>
<td>___ over 20 years</td>
</tr>
</tbody>
</table>

35) HOW MANY CHILDREN DO YOU HAVE?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Never Married</td>
</tr>
<tr>
<td>___ No children</td>
</tr>
<tr>
<td>___ 1 child</td>
</tr>
<tr>
<td>___ 2 to 4 children</td>
</tr>
<tr>
<td>___ over 4 children</td>
</tr>
</tbody>
</table>

36) HOW OLD WERE YOU WHEN YOU WERE FIRST MARRIED?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Never married</td>
</tr>
<tr>
<td>___ Under 20</td>
</tr>
<tr>
<td>___ 20-24</td>
</tr>
<tr>
<td>___ 25-29</td>
</tr>
<tr>
<td>___ 30-34</td>
</tr>
<tr>
<td>___ 35 or over</td>
</tr>
</tbody>
</table>

37) WHAT IS YOUR HUSBAND'S AGE IN COMPARISON WITH YOURS?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Never married</td>
</tr>
<tr>
<td>___ More than 5 years younger than I</td>
</tr>
<tr>
<td>___ Less than 5 years younger than I</td>
</tr>
<tr>
<td>___ Less than 5 years older than I</td>
</tr>
<tr>
<td>___ More than 5 years older than I</td>
</tr>
<tr>
<td>___ Same age as I am</td>
</tr>
</tbody>
</table>

38) HOW MANY MEN HAVE YOU DATED IN THE PAST YEAR?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Only my husband</td>
</tr>
<tr>
<td>___ None</td>
</tr>
<tr>
<td>___ 1 or 2</td>
</tr>
<tr>
<td>___ 3 to 5</td>
</tr>
<tr>
<td>___ 6 to 10</td>
</tr>
<tr>
<td>___ Over 10</td>
</tr>
</tbody>
</table>

39) IF SINGLE, HAVE YOU DATED ANY MAN MORE THAN 10 TIMES IN THE PAST YEAR?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Married</td>
</tr>
<tr>
<td>___ Yes</td>
</tr>
<tr>
<td>___ No</td>
</tr>
</tbody>
</table>

40) ARE YOU NOW OR HAVE YOU EVER BEEN ENGAGED TO BE MARRIED?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Married before</td>
</tr>
<tr>
<td>___ Married now</td>
</tr>
<tr>
<td>___ Engaged now</td>
</tr>
<tr>
<td>___ Engaged before</td>
</tr>
<tr>
<td>___ Never engaged</td>
</tr>
</tbody>
</table>

41) DO YOU NOW HAVE DEFINITE PLANS TO BE MARRIED WITHIN ONE YEAR?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Married now</td>
</tr>
<tr>
<td>___ Yes</td>
</tr>
<tr>
<td>___ No</td>
</tr>
</tbody>
</table>

42) HOW MANY BOOKS HAVE YOU READ IN THE LAST YEAR?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ None</td>
</tr>
<tr>
<td>___ 1 or 2</td>
</tr>
<tr>
<td>___ 3 to 5</td>
</tr>
<tr>
<td>___ 6 to 10</td>
</tr>
<tr>
<td>___ over 10</td>
</tr>
</tbody>
</table>

43) WHAT KINDS OF BOOKS DO YOU READ?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ Fiction</td>
</tr>
<tr>
<td>___ Non-fiction</td>
</tr>
<tr>
<td>___ Both</td>
</tr>
<tr>
<td>___ Neither</td>
</tr>
</tbody>
</table>

44) WHAT MAGAZINES DO YOU FREQUENTLY READ?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
</table>

45) WHAT ARE YOUR HOBBIES?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
</table>

46) WHAT GROUPS OR ORGANIZATIONS DO YOU BELONG TO?

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
</table>
47) WHEN YOU ARE IN A GROUP, HOW DO THE OTHERS USUALLY THINK OF YOU?

_____ A "go getter"
_____ Just one of the group
_____ One of the quieter ones
_____ Others never notice me
_____ I usually try to stay out of groups as much as possible.

48) HOW MANY REAL FRIENDS DO YOU HAVE NOW?

_____ None at present
_____ A few
_____ Some
_____ Many

49) DO YOU NOW HAVE ANY CLOSE FRIENDS THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH?

_____ No
_____ Yes

50) DO YOU NOW KNOW ANY MEN THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH? (Include your husband, if married)

_____ No
_____ Yes

51) DO YOU HAVE ANY FRIENDS YOU HAVE KNOWN FOR OVER FIVE YEARS WITH WHOM YOU ARE STILL FRIENDS?

_____ No
_____ Yes

52) HAVE YOU BEEN FEELING TENSE AND UNDER STRAIN IN THE RECENT PAST?

_____ Very much so
_____ Somewhat so
_____ I have been feeling fairly calm
_____ I have been feeling very calm

53) IS YOUR APPETITE PRESENTLY GOOD?

_____ Very good
_____ Fairly good
_____ Fairly poor
_____ Very poor

54) AT PRESENT DO YOU SLEEP WELL?

_____ Very well
_____ Fairly well
_____ Fairly poor
_____ Toss and turn all night

55) OVER THE PAST FEW MONTHS BEFORE ENTERING THE HOSPITAL WAS YOUR SEX LIFE REASONABLY SATISFACTORY?

_____ No sex life
_____ Unsatisfactory
_____ Satisfactory

56) IS YOUR MEMORY AS GOOD NOW AS IT ALWAYS HAS BEEN?

_____ Yes
_____ No

57) HAVE YOU EVER RECEIVED PSYCHIATRIC TREATMENT BEFORE, AND IF SO HOW LONG AGO WAS THE LAST TIME?

_____ Never received psychiatric treatment before
_____ Within the last 6 months
_____ Between 6 months and 1 year ago
_____ Between 1 year and 5 years ago
_____ More than 5 years ago

58) WHAT ARE YOUR PRESENT PHYSICAL AILMENTS?
APPENDIX E

Rosenwald's Proverbs

Instructions

S is presented each proverb orally and asked: "What does this proverb mean?"

1. Birds of a feather flock together
2. Do not cut down the tree that gives you shade
3. The fairer the paper the fouler the blot
4. He that speaks truth must have one foot in the stirrup
5. The ripest fruit falls first
6. A man is not a horse because he was born in a stable
7. Fat sorrow is better than lean sorrow
8. The gentle ewe is sucked by every lamb
9. Who hath a fair wife needs more than two eyes
10. Gratitude soon grows old
11. To choose a wife, two heads are not enough
12. If you have no honey in your pot, have some in your mouth
13. He that died half a year ago is as dead as Adam
14. The calmest husbands make the stormiest wives
15. He who sows thorns will never reap grapes
16. However high a bird may soar, it seeks its food on earth
17. Blood does not wash blood away
18. To the boiling pot the flies come not
19. No one is born with an axe in his hand
20. Honey in the mouth saves the purse
APPENDIX F

Stroop Color-Word Test Instructions

E shows card B of the test to S face downward and says "On this card there are a series of colored rectangles. Some are red, some are blue, some are green." E then shows S the sample strip and says "I want you to name the color of each rectangle going from left to right as fast as you can. Try it. If S indicates that he does not understand the instructions, repeat them and ask him to try again. When S shows that he does understand the instructions, say "Now let's do the same with these." Turn up the card, place it before S and say "Go as fast as you can. Ready . . . go." E begins timing here. When he names the last patch of color, E records the time and removes the card.

The instructions for card C are as follows: "On this card there are a series of color-words printed in the colors red, blue, and green." E shows S the sample strip. Now I want you to tell me the color of the ink of each of the following words. Try these." When E is assured that the task is understood he places the test card in front of S, says "Again go as quickly as possible," and begins timing.

Both trials are recorded on tape to facilitate analysis of errors.
APPENDIX G
APPENDIX G

Thought Disorder Rating Scale

The above named patient has been selected for a research project being carried out at this hospital. Would you please rate your patients according to the criteria presented below. Answer "yes" if the patient has ever manifested the characteristic and "no" if the patient has never manifested the characteristic. Notice that there are two places to enter your rating for each characteristic marked "presently" and "previously." The "previously" category relates to your experience with this patient during this hospitalization. "Presently" means within the past two weeks. You are to check both places for each characteristic. Thus, if a patient has shown indications of thought blocking in the past but no longer manifests this characteristic, the rating should be as follows:

Previously: Yes _____ No _____
Presently: Yes _____ No _____

If the patient has shown indications of blocking in the past and continues to block then "yes" would be checked under both categories. Please do not leave any category blank.

1. Inconsequential following of side issues.

Presently: Yes _____ No _____
Previously: Yes _____ No _____

2. Tendencies for the thought to be directed by alliterations, analogies, clang associations, associations with accidents of the speaker's environment, symbolic meanings, and the condensation of several (perhaps mutually contradictory) ideas in one.

Presently: Yes _____ No _____
Previously: Yes _____ No _____

3. Words used out of context, e.g., concrete meanings taken where abstract meanings would be appropriate.

Presently: Yes _____ No _____
Previously: Yes _____ No _____

4. Clinging to unimportant detail.

Presently: Yes _____ No _____
Previously: Yes _____ No _____

5. The use of laconic answers, e.g., I don't know, maybe, perhaps - indicative of emptiness and vagueness of ideas.

Presently: Yes _____ No _____
Previously: Yes _____ No _____
6. Thought is generally marked by gaps, poverty, indefiniteness and vagueness.

Presently: Yes ___ No ___
Previously: Yes ___ No ___

7. Indications of thought-blocking.

Presently: Yes ___ No ___
Previously: Yes ___ No ___

8. Indications of pressure of thoughts

Presently: Yes ___ No ___
Previously: Yes ___ No ___
APPENDIX H

Motivation Scale

Instructions: S is asked to indicate by a check mark which of these phrases best describes how he felt during all of the tests.

PLEASE PLACE A CHECK OVER THE PHRASE WHICH BEST DESCRIBES YOUR FEELINGS DURING THE TEST SESSIONS:

HIGHLY INVOLVED/VERY INVOLVED/MODERATELY INVOLVED/SLIGHTLY INVOLVED/NOT AT ALL INVOLVED
The dissertation submitted by Kenneth R. Gamble has been read and approved by the following Committee:

- Dr. William A. Hunt, Director
  Professor, Psychology, Loyola

- Dr. Ronald E. Walker
  Dean, College of Arts and Sciences, Loyola

- Dr. Thomas P. Petzel
  Associate Professor, Psychology, Loyola

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

5/1/74
Date

[Signature]
Director's Signature