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SUBTEST ORDER EFFECT ON THE WIST WITH  
CHRONIC SCHIZOPHRENICS

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by  
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## Chapter 1

### THE PROBLEM INTRODUCTION

Bleuler, a Swiss psychiatrist, over sixty years ago originated the term schizophrenia. This term was used to describe disorders that were a schism or splitting of association from the affect expression that would usually accompany them. From this rather vague and general concept, the idea of schizophrenic thinking was evolved. He postulated that the associations were disturbed and that these disturbances were a primary symptom of schizophrenia. Bleuler explained:

It appears as if those pathways of association and inhibition, established by experience had lost their meaning and significance. Associations seem to take new pathways more easily, and thus no longer follow the old preferred ways. That is, the logical pathways indicated by past experience. . . Especially in acute conditions of schizophrenia, one often finds so complete a fragmentation of thinking process that they cannot result in a complete idea or action.<sup>1</sup>

Many theoretical interpretations of this thinking disorder have been presented by Pavlov<sup>2</sup> in his overstimulation leading to cortical inhibition; Kraepelin<sup>3</sup> and his disconnection of thought theory; Haufmann

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<sup>1</sup>Bleuler, E., "Dementia Praecox or The Group of Schizophrenics," 1950, pp. 349-350, cited by S. A. Mednick, Psychology Bulletin, 1958, Vol. 55.

<sup>2</sup>Pavlov, I. P., Conditioned Reflexes. Oxford: Oxford University Press, 1927.

<sup>3</sup>Kraepelin, E., Clinical Psychiatry. New York: William Wood, 1917.

and Kasanin<sup>4</sup> and their loss of generalizing ability hypothesis; Cameron and Magaret<sup>5</sup> in their desocialization theory; Goldstein<sup>6</sup> in his impairment of abstract reasoning ability and so the list goes on. While there is difference in theory by these clinicians, they would probably agree to the general statements of Bleuler that irrelevant, contradictory, and fragmented responses or associations are the result of this interference of thought.

From this very broad explanation of schism or division of thinking has come predictions from an extension of Hullian theory that would suggest that the thinking of schizophrenics with high drive, studied by Arietti<sup>7</sup> in 1955 and Malmo<sup>8</sup> in 1957, would be disrupted by the intrusion of remote thought units that had been pushed above the threshold of awareness and that complex tasks would increase the strength of the anxiety drive. In applying this construct to a measurable index of schizophrenic thinking many considerations as to validity and reliability had to be considered. In recent years clinicians have concerned themselves with the task of understanding

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<sup>4</sup>Haufmann, E. and Kasanin, J., Conceptual Thinking in Schizophrenia Nervous Mental Disorder. Monogr., No. 67, 1942.

<sup>5</sup>Cameron, N. and Magaret, A., Behavior Pathology. Boston: Houghton Mifflin, 1951.

<sup>6</sup>Goldstein, K., "The Significance of Special Mental Tests for Diagnosis and Prognosis in Schizophrenia," American Journal of Psychiatry, 1939, Vol. 96, pp. 575-588.

<sup>7</sup>Arietti, S., Interpretation of Schizophrenia. New York: Robert Brunner, 1955.

<sup>8</sup>Malmo, R. B., "Anxiety and Behavioral Arousal," Psychology Review, 1957, Vol. 64, pp. 276-287.



anxiety in schizophrenics in relationship to content and other complexity in psychological tests. Mednick reported that:

High drive (anxiety) will tend to arouse relatively more erroneous associates and will give these associates relatively greater response strength. Thus, schizophrenics would be predicted to make more errors and to take longer to learn a high complexity list.<sup>9</sup>

Whitaker presented two forms of a test, The Whitaker Index of Schizophrenic Thinking, Forms A and B, hereafter referred to as the WIST and in both cases, the order of the subtests were identical. Form A was specially designated as the high anxiety form by Whitaker, and consequently, no research to date has been made on the effect of reordering subtests or complexity of tasks and its relationship to anxiety.

Mednick<sup>10</sup> in 1958 offered a theory of anxiety in schizophrenia which was derived from Hullian Drive Theory. Mednick's theory stated that when anxiety increases, an ascending index of errors of disordered or illogical thinking occurs. This happens when there is a constant stimulus value and the complexity of the tasks remains the same on the testing instrument. But the WIST violates that assumption of increased anxiety with a constant stimulus value and raises some serious questions as to whether previous findings of Albott and Gilbert<sup>11</sup> in 1973 which were felt to represent Mednick's theory are not, in fact, artifacts related to physical stimulus properties of the subtest.

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<sup>9</sup>Mednick, Sarnoff A., "A Learning Theory Approach to Research in Schizophrenia," Psychology Bulletin, 1958, Vol. 55, p. 319.

<sup>10</sup>Ibid.

<sup>11</sup>Albott, William and Gilbert, Lloyd, "Comparison of Non-Brain Damaged Schizophrenic and Brain Damaged Non-Schizophrenic Males on the WIST," Psychology Reports, 1973, Vol. 32, pp. 187-194.

### Statement of the Problem

The purpose of this study was to investigate in more detail the effect of subtest order in both frequency and severity of errors on the WIST in testing chronic schizophrenic patients.

### Statement of the Hypothesis

Considering the noted similarities of performance between stimulus generalization by Mednick and increased task complexity by Whitaker, in diagnosed schizophrenic patients, the null hypothesis of no significant difference was made in studying three groups of chronic schizophrenic patients.

### Purpose of the Study

The purpose of this study was to determine whether Mednick's theory of stimulus generalization or response generalization characterizes subtest reordering in the WIST.

### Significance of the Study

The significance of this study was twofold. First, it could contribute to the increased sensitivity of the assessment armamentarium of the clinician so that a decrease in expense and time in identifying abnormal functioning might be employed. Secondly, it may contribute to the understanding of schizophrenia etiology as related to the psychological and physiological causalities of the illness.

### DEFINITION OF TERMS

The following are terms that were used and were felt to be necessary in understanding this study.

Schizophrenia was defined by Whitaker as an:

Unwitting, inconsistent arrangement of symbols in reasoning problem situations which are well within the intellectual capacity to solve. The three concomitantly essential criteria in this definition of schizophrenic thinking is that the behavior is (1) illogical (2) entered into unwittingly and without awareness of its illogical nature (3) concrete relative to the individual's capacity.<sup>12</sup>

The WIST--Form A consists of 25 multiple-choice questions. The 25 questions are arranged in three subtests. Subtest 1 is designated Similarities and is made up of nine items; Subtest 2 is designated Word-Pairs and is made up of nine items; and Subtest 3 is titled New Inventions and is made up of seven items. Each of the items has five particular kinds of answers (i.e. foils). The answers can be categorized as (a) correct, (b) loose, (c) reference (to self), (d) clang, and (e) nonsense. These answers in the sequence just employed constitute then a continuum of increasing incorrectness or illogicality of the answers. The order of the answers types on the test is random in the WIST. Scoring of the WIST followed the instructions presented by Whitaker (1971) and yielded information regarding (a) the presence or absence of thought disorder and (b) if present, information regarding the degree and type as well as specification of the subtest wherein the error was committed.

The definition accepted by this study of thought disorder was given by Mednick. His hypothesis of thought disorder was that the gradient of stimulus generalization increases and that a patient's anxiety goes through three stages in the following way:

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<sup>12</sup>Whitaker, L., "Problems in the Measurement of Schizophrenic Thinking," a paper presented to the Rocky Mountain Psychological Association Convention, Denver, Colorado, May 12-15, 1967.

Incipient stage: Initially the patient's suffering from intense anxiety and anxiety motivation will therefore lead to a rising of the generalization gradient to the threatening stimuli in the patient's environment. Thus, the aversive or avoidant behavior which he has learned will be readily invoked by stimuli which are more or less irrelevant, i.e., dissimilar to the originally threatening stimulus. The effect of this is to render the formerly non-threatening stimuli threatening, thereby increasing anxiety even further. This, in turn, will raise the gradient of generalization and the process will be repeated. As a consequence of this spiraling situation, there will be a gradual shift into the second or transitional stage.

Transitional stage: As the stimuli to which the patient's responses generalize become now more irrelevant, there will be an increasing probability that stimuli will be included which had been previously associated with anxiety reduction. They will serve to reduce the patient's anxiety and thus, will be additionally reinforcing to him. In this way, seemingly irrelevant responses and preoccupations will become habitual in the part of the patient and thus, will become more and more evident in his behavior pattern. They should become particularly evident whenever he is in unusually anxiety-provoking situations. Gradually, this type of preoccupation will dominate the patient's life and he will pass into the third stage.

Chronic stage: With irrelevant responses and thoughts predominating the anxiety level of the patient is reduced to a stable low level, and in the absence of therapeutic or circumstantial intervention, will remain so. Overt anxiety will be minimal, but autistic and bizarre ideation will be relatively permanent.<sup>13</sup>

Stimulus generalization occurs when a response, having been trained to a stimulus, is also elicited by a similar stimuli.

Error frequency were the number of total errors recorded in Form A of the WIST.

Error type were classified on four different levels, all relating to the severity of thought disorder on the WIST. The types in order of severity were (4) irrelevant, (3) self-reference, (2) clang and (1) loose.

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<sup>13</sup>Maher, Brenham A., Principles of Psychopathology, An Experimental Approach. New York: McGraw-Hill Book Co., 1966, pp. 421-422.

## Chapter 2

### SURVEY OF RELATED LITERATURE

The focus of this investigation was on the measurement of an objective paper and pencil test specifically constructed for assessment of schizophrenic thought disorders. The only specific test on the market currently which meets the inherent criteria noted previously is the WIST. Research reported to date, using the WIST have reported results that are consistent with Hullian learning.<sup>1</sup> These investigations, however, have made no mention of the contributions, or lack of, the psychometric properties of the WIST, i.e., stimulus complexity. This investigation, then, was directly programmed to study the stimulus complexity of the WIST. Researching the literature was limited to current research in schizophrenic thinking and attempted to show how these findings justified the present investigation. The present chapter is concerned with two questions. First, what is schizophrenic thinking; and, secondly, how could this disorder be measured?

In review of the first question, it is commonly accepted among clinicians that the schizophrenic thinking is characterized in the following manner, "making the concrete abstract; making the abstract concrete; condensation; establishing relationships where they do not exist; a strongly personal, subjective character of connections and

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<sup>1</sup>Mednick, Sarnoff A., "A Learning Theory Approach to Research in Schizophrenia," Psychology Bulletin, 1958, Vol. 55, No. 5, pp. 317-323.

sequences."<sup>2</sup>

This illogical thinking was representative of how the schizophrenic approached reality, in one word, confused. His thinking had become inappropriate and his behavior, according to Maslow, conveyed his emotional state. The schizophrenic's emotional state then was:

. . . dulling in affects (i.e., absence of sadness while talking over a tragic event), rigidity of affect (i.e., the patient's mood remains the same while talking about topics that usually have different emotional coloring), inappropriateness of affects (i.e., the patient talks with a smile about tragic events), and disunity of affects (i.e., the patient may weep and laugh at the same time.<sup>3</sup>

This inappropriate schizophrenic state continued to puzzle even the best clinicians until the researchers concerned themselves with the inner stress or anxiety experiences by the schizophrenic. Mednick reported that:

The lack of anxiety of the schizophrenic, often considered an aspect of "flat affect" or emotionlessness has received considerable attention in the clinical and experimental literature. This reduction in reactivity has been the focus of many theoretical discussions of the disorder. However, while "flat affect" might be a term descriptive of certain schizophrenic patients (mainly chronic, although even this has been questioned) it has not normally been used in describing the incipient or acute patients. Thus Arietti calls the first stage of schizophrenia "a period of intensive anxiety and panic"--- This hyperactivity has manifested itself in studies of heart rate, the psychogalvanic response, startle reflex, reactions to painful stimulation, etc.<sup>4</sup>

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<sup>2</sup>Maslow, A. H. and Mittelmann, Bela, Principles of Abnormal Psychology: The Dynamics of Psychic Illness. New York: Harper and Row, 1951, p. 523.

<sup>3</sup>Ibid., p. 524.

<sup>4</sup>Mednick, Sarnoff A., "A Learning Theory Approach to Research in Schizophrenia," Psychology Bulletin, 1958, Vol. 55, No. 5, p. 317.

Similar supporting studies in conditioning and learning recognized emotional arousal states as contributing to drive strength, a construct founded by Hull.<sup>5</sup> This construct represented the motivational force of the behavior in the organism. Mednick assumed then that schizophrenics were organisms in a very heightened drive state and that the effect of heightened drive is to increase the response strength of any habit tendencies that may be aroused in a given situation. Hence when a schizophrenic is anxious he is unlikely to change his inappropriate thoughts or behavior because of his newly formed habit tendencies. In reviewing the literature for clinical experimentation in this area, Schilder<sup>6</sup> in 1939 first mentioned the difficulties the schizophrenic patient experiences in differentiation caused by a heightened drive state. As a result researchers such as Cameron<sup>7</sup> suggested that schizophrenics, in high drive states, have broadened their generalization gradient. Simultaneously Garmezy<sup>8</sup> in 1952 studied stimulus differentiation in schizophrenics and found that schizophrenics showed more generalization than normals. Other schizophrenic studies by Hunt and Cofer<sup>9</sup> in 1944, who coined the term "psychological deficit," were done

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<sup>5</sup>Hull, C. L., Principles of Behavior. New York: Appleton-Century-Crofts, 1943.

<sup>6</sup>Schilder, P., "The Psychology of Schizophrenia," Psychoanalytic Review, 1939, Vol. 26, pp. 380-398.

<sup>7</sup>Cameron, N., "Schizophrenic Thinking in a Problem-Solving Situation," Journal of Mental Science, 1939, Vol. 85, pp. 1-24.

<sup>8</sup>Garmezy, N., "Stimulus Differentiation by Schizophrenic and Normal Subjects under Conditions of Reward and Punishment," Journal of Personality, 1952, Vol. 20, pp. 253-276.

<sup>9</sup>Hunt, J. McV. and Cofer, C. N., "Psychological Deficit," Personality and the Behavior Disorders. New York: Ronald, 1944.

to describe the inferior performance state of the schizophrenics. They suggested that the associative interference theory supported the assumption of inferior performance. Storms, Broen and Levin postulated more concretely that "schizophrenics produced more uncommon idiosyncratic associations than normals or other psychiatric patients."<sup>10</sup> One possibility for these usual associations is that schizophrenics' associations are relatively stable, though private, reflecting defensive withdrawal or lack of involvement in meaningful communication. On the other hand, "remote uncommon associations may represent a breakdown in the schizophrenics' associative organization, in which case instability of associations would be expected."<sup>11</sup> Goden concluded from the work of Storms, Broen and Levin that "the associative interference theory maintains that schizophrenic persons are more vulnerable to interference by associations which are irrelevant to task performance."<sup>12</sup> All of these studies utilized the concept of arousal (drive) as an energizer of response hierarchies within the Hullian framework.

One of the most obvious areas to show a considerable degree of schizophrenic thinking has been abstract or conceptual reasoning by the schizophrenic. Classic studies by Hunt<sup>13</sup> as far back as 1936 concluded

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<sup>10</sup>Storms, Lowell H., Broen, William E. and Levin, Irwin P., "Verbal Associative Stability and Commonality as a Function of Stress in Schizophrenics, Neurotics, and Normals," Journal of Consulting Psychology, 1967, Vol. 31, No. 2, p. 181.

<sup>11</sup>Ibid.

<sup>12</sup>Goden, Joy Y., "Associative Interference in Schizophrenia as a Function of Paranoid Status and Premorbid Adjustment," Journal of Consulting and Clinical Psychology, 1970, Vol. 34, No. 2, p. 221.

<sup>13</sup>Hunt, J., "Psychological Experiments with Disordered Persons," Psychology Bulletin, 1936, Vol. 33, pp. 1-58.



that this deficit in thinking became greater as the complexity of tasks increased. From this general hypothesis other additional studies were undertaken such as those by Dunn. Dunn<sup>14</sup> investigated the effects of anxiety and stress on complex intellectual tasks of normals and was able to prove "some uncertainty" in results, such was not the case in testing schizophrenics under the same conditions. In general most clinicians then agreed with Little<sup>15</sup> in suggesting that research into the nature of the schizophrenic disorder has shown consistently that schizophrenics evidence a considerable deficit in performing tasks involving abstract or conceptual ability.

Mednick in an attempt to establish some basics in schizophrenic thinking summarized these characteristics as part of his current research findings. Mednick suggested that:

. . . (a) schizophrenics more easily acquire a conditioned response, (b) schizophrenics show greater stimulus generalization responsiveness, (c) schizophrenics have great difficulty performing well in complex situations being plagued by irrelevant, tangential associative responses competing with the adequate mode of response.<sup>16</sup>

Mednick wanted to explain how drive, anxiety, stimulus generalization and stimulus complexity were related and stated that:

As the spiral of anxiety and generalization mounts, his (schizophrenics) drive level may increase to an almost insupportable degree. As this is taking place, his ability

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<sup>14</sup>Dunn, James A., "Anxiety, Stress and the Performance of Complex Intellectual Tasks: A New Look at an Old Question," Journal of Consulting and Clinical Psychology, 1968, Vol. 32, No. 6, p. 673.

<sup>15</sup>Little, Lee Kaufman, "Effects of the Interpersonal Interaction on Abstract Thinking Performance in Schizophrenia," Journal of Consulting Psychology, 1966, Vol. 30, No. 2, p. 158.

<sup>16</sup>Mednick, S. A., "A Learning Theory Approach to Research in Schizophrenia," Psychology Bulletin, 1958, Vol. 55, No. 5, p. 320.

to discriminate is almost totally eclipsed by his generalization tendencies. Any unit of a thought sequence might call up still another remote associate. Clang associates based on stimulus-response generalization may be frequent.<sup>17</sup>

Mednick suggested in conclusion that high drive, slow recovery rate, and number of fear arousing stimuli were highly correlated factors in schizophrenic thinking. He suggested that "under conditions of high drive generalization will elicit anxiety and this, in turn, will produce more anxiety."<sup>18</sup> Stimulus complexity according to Mednick would, therefore, increase the anxiety level even higher in order that the index of errors would ascend at an increasing rate.

In conclusion then, Mednick developed a theory which took into account factors which characterized schizophrenic thinking. These factors or operations which were said to exist in schizophrenic thinking were high anxiety causing stimulus generalization and stimulus complexity.

The problem of accurately reporting schizophrenic thinking, or in other words, measuring the severity of the deficit was the second area of research and exploration. Having a theory without some measurable means of applying it was undoubtedly a problem. Some of these problems were pointed out by Knoff and Brown who in a recent study stated that "much of the uniqueness of schizophrenic behavior is yet to be isolated experimentally and that the bases for the schizophrenic's 'peculiar' behavior has been greatly oversimplified."<sup>19</sup>

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<sup>17</sup>Ibid.

<sup>18</sup>Ibid, p. 323.

<sup>19</sup>Knoff, Irwin J. and Brown, Robert A., "The Effects of Social and Non-Social Censure in Neurotics and Schizophrenics," Journal of Consulting Psychology, 1966, Vol. 30, No. 4, p. 318.

Similar studies by Anderson and Felling in differentiation of organics from schizophrenics have suggested that tests for schizophrenics might prove to be more effective if psychologists would "turn their efforts toward an assessment of these indexes as tools for the separation of organics from schizophrenic patients."<sup>20</sup> Little recognized similar problems and suggested that because of the importance of thought and language processes in human behavior and interpersonal interaction, "that a thorough understanding of the schizophrenic's functioning in these areas is needed if the nature of the disorder is to be clarified."<sup>21</sup> The need was apparent for more intensive research in the field of diagnostic testing, especially in the area of the diagnosed schizophrenic patient. Unfortunately this need for refinement in testing instruments was shown to be only a general expectation, instead of a realistic goal. This difficulty in attempting to define the type of illness manifested in a patient suggested that some study should be made in understanding the similarity of symptoms in a variety of disorders so that a more accurate diagnosis could be made. Attempts were made by Chapman<sup>22</sup> in 1960, for example, to compare two similar groups, schizophrenics and brain damaged patients on tasks related to metaphorical thinking to

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<sup>20</sup>Anderson, Dennis and Felling, James, "Differentiation of Organics from Schizophrenics at Two Chronicity Levels by Use of the Reitan-Halstead Organic Test Battery," Journal of Consulting and Clinical Psychology, 1968, Vol. 32, No. 6, p. 684.

<sup>21</sup>Little, Lee Kaufman, "Effects of the Interpersonal Interaction on Abstract Thinking Performance in Schizophrenia," Journal of Consulting Psychology, 1966, Vol. 30, No. 2, p. 158.

<sup>22</sup>Chapman, L. J., "Confusion of Figurative and Literal Usages of Words by Schizophrenics and Brain-Damaged Patients," Journal of Abnormal and Social Psychology, 1960, Vol. 60, pp. 412-416.

abstract-concrete dimensions of thinking. In general the results failed to demonstrate differences of sufficient reliability to allow solving the problem of differentially diagnosing or separating schizophrenics from brain damaged patients as studied by Zimet and Fishman<sup>23</sup> in 1970. These results along with others have been indicative of the types of problems that have continued to exist in understanding abnormal thinking as measured by a psychological test. In response to this general discontentment Garfield and Sandland have pointed out the need for assessment of the schizophrenic disorder as a first step.

The problem of prognosis and outcome with patients diagnosed as schizophrenics has been of interest to a variety of clinicians and research investigators for some time---There have been attempts to differentiate, in terms of prognosis, such groups as acute versus chronic schizophrenics, process or reactive schizophrenics, and to delineate various premorbid personality features and developmental aspects which purportedly have something to do with prognosis. More recently, attempts have been made by psychologists to develop scales which can be used in a more systematic fashion for making prognostic judgments and predictions.<sup>24</sup>

The most popular scales such as the Elgin Prognostic Scale developed by Wittman, the Kantar, Wellner and Winder Scale, and the Phillips Scale had been widely used in research investigating a variety of theoretical hypotheses pertaining to schizophrenia. These scales, however, had been viewed by many as being too broad, dealing more with the social relationship deficits, instead of the actual thought processes deficit.

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<sup>23</sup>Zimet, C. N. and Fishman, D. B., "Psychological Deficit in Schizophrenic and Brain Damage," Annual Review of Psychology, 1970, Vol. 21, pp. 113-146.

<sup>24</sup>Garfield, Sol J. and Sandland, Donald M., "Prognostic Scales in Schizophrenia," Journal of Consulting Psychology, 1966, Vol. 30, No. 1, p. 18.

This lack of current and relevant research, the apparent confusion as to symptomatology, and the lack of essential follow through from theoretical assumptions to applied practice of these hypotheses has suggested a need for some testing device that would decrease some of the existing problems in diagnosis and prognosis of schizophrenic thinking. Whitaker recognized some of these problems and worked to develop a test that would quickly identify schizophrenic thinking.

The development of the WIST began in 1960 with the opinion that there was no highly satisfactory device for assessing schizophrenic thinking. It was intended that the WIST, unlike other tests used to assess schizophrenic thinking, be designed specifically for this purpose. It was intended further that, to be practically useful, this new test be brief, objective, easily administered and easily scored. Two major problems had to be dealt with from the beginning. First, there was no satisfactory conceptual definition of schizophrenia. Existing definitions were not only at variance with one another often but, worse perhaps, were either so pervaded by etiologic assumptions as to beg the important scientific questions, or were too vague to be meaningful. Second, the very lack of satisfactory tests of schizophrenic thinking, which prompted development of the WIST, demanded that much attention be given also to the development of satisfactory operational criteria that could be used to validate the WIST.<sup>25</sup>

Whitaker dealt with the first problem by conceptualizing schizophrenic thinking in three ways, and was thus defined as instance of thinking showing all of the following:

Illogical This characteristic is manifest in the syntactical aspect of an individual's language usage, in the relationships existing among the ideas that he expresses, or in the relationship between his ideas and the logical requirements of a given task of problem situation.

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<sup>25</sup>Whitaker, Leighton, "Manual for the Whitaker Index of Schizophrenic Thinking," University of Colorado Medical School, Denver, 1971, p. 1.

Impaired This characteristic refers to the marked discrepancy between an individual's capacity to think and the level of adequacy of his thinking in a given instance.

Unwitting This characteristic is shown by an individual's lack of awareness, deliberate intention, or control in relation to a given instance of thinking.<sup>26</sup>

Whitaker reported the second problem to be in finding or developing operational validity criteris. He stated that:

An initial criterion was 'pathogonomic verbalization' scores on the Rorschach and the Holtzman Inkblot Technique using Holtzman's refinement of Rapaport's system. (1) This criterion proved fairly reliable and useful in preliminary development of the WIST but its validity and particularly questionable with subjects who gave relatively few responses. (2) A second criterion utilized the judgment of psychologists and psychiatrists who ranked all the WIST answers to each item in order of their logical appropriateness, thereby helping to consensually validate the scoring system and showing what items needed revision. The final stage of WIST scores with the operational validity criterion of independent but reliable clinical ratings of schizophrenic behavior by experienced psychiatrists and psychologists.<sup>27</sup>

Whitaker rated samples of schizophrenics, non-schizophrenics, and "normal" subjects. The development of the WIST then encouraged another study which concerned itself with the problem of studying the discriminatory effects of the WIST between schizophrenics and organic patients. The study proved to be very insightful as to the schizophrenic performance and its conformance to the expectations and predictions following Mednick's model of schizophrenic deficit. The fact that both groups had the most marked difficulty on the New Inventions subtest (i.e. number 3) underscored a frequently noted similarity between the two nosological categories, namely in difficulty

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<sup>26</sup>Ibid, p. 2.

<sup>27</sup>Ibid, pp. 2-3.

in successfully dealing with complex tasks. Subtest three was by far the most complex of the three subtests, in terms of stimulus complexity. Where subtests one and two had one and two word stimuli (questions) respectively, subtest three had sentences for stimuli and the average number of words per sentence was 10.8. The fact that such a disparity of stimulus complexity existed between subtest one and two and subtest three suggested that the performance of the brain damaged patients may have reflected a relationship between task demands (i.e. complexity) and disordered thinking stemming from interference growing out of the associational properties (i.e. content) of the stimuli. This then suggested that in fact these results may have reflected for the chronic schizophrenic patients confounding stemming from an interaction between stimulus complexity and associational properties of the items on the three subtests.

It was interesting to speculate that the gradual increase on the frequency of error types two, three and four for the chronic schizophrenic group was reflecting anxiety stemming from task (stimulus-response, question-answer) complexity, and error type one as reflective of the association (i.e. content) aspects or contributions of the items. Whereas the performance of the chronic schizophrenics was highly consistent with the drive theory based model of psychological deficit by Mednick, the performance of the brain-damaged group was not so conveniently understood. Additionally the type of reasoning required on the third subtest was basically cause-effect abstract reasoning. Thus, in the performance, it was found that the most complex task also required the greatest reliance on abstract, cause-effect, anticipatory reasoning. Given then these stimulus characteristics of subtest number

three, a significant increase in the answers of a "clang" nature could be seen, which could be interpreted as an increase in a reliance on more concretistic thinking or on a mode of thinking which was highly dependent upon the sensorially manifest aspects of the items. At any rate, it seemed obvious that there was a marked difference between the two groups in terms of the type of reasoning which was elicited under the rather unclear characteristics (stimulus demands) of the New Invention Subtest.

The results of this investigation then pointed out that there was still need for further investigations to be conducted upon the problem of stimulus generalization and task complexity. The theoretical application of Mednick's theory, along with Whitaker's Index of Schizophrenic Thinking (WIST) therefore seemed to offer, at best, a more realistic answer to the nature of schizophrenic thinking. The present study attempted to search for some of these answers.



## Chapter 3

### METHODS AND PROCEDURES

This study was concerned with the relative effect of increased anxiety producing stimulus generalization in regard to reordering of the subtests of the WIST. The testing results of the three groups of chronic schizophrenics were then compared and analyzed. Before testing, however, patients were screened using the criteria based on those suggested by Shearn and Whitaker<sup>1</sup> in 1969. Potential subjects were eliminated if they did not meet the following requirements:

1. A minimum I.Q. of 80.
2. A minimal educational achievement of 8th grade.
3. Each patient could not have any evidence of CNS impairment and no severe sensory defect, e.g., blind or deaf.
4. Only those patients where signs of chronic illness were most pronounced were selected. Screening devices such as the "Rating Form for Chronic Schizophrenics" and psychological testing were utilized.
5. Subjects who were younger than 18, or older than 65, were excluded from the investigation.

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<sup>1</sup>Shearn, C. R. and Whitaker, L. C., "Selecting Subjects in Studies of Schizophrenia," Journal of Schizophrenia, 1969, Vol. 1, pp. 4-8.

### Method

The chronic schizophrenics were selected from ten psychiatric units at the Topeka State Hospital. These units represented different counties within the State of Kansas thereby yielding a mixed geographical sample for the study. A random sample of three hundred forty-four case studies was drawn from the total population of seven hundred sixty-seven patients. A survey utilizing the established diagnosis as determined by the treatment team and the most recent individual and/or group psychological testing reports was then taken. Additional psychological tests were administered to each individual for the purpose of selecting a schizophrenic patient population. Sixty patients were selected who qualified by meeting all general requirements based on those criteria suggested by Shearn and Whitaker in 1969. These patients were organized into three groups and were given three different recorded forms of the WIST (Form A) at two week intervals and were defined in the following manner:

Group One: Form A, Form A<sup>1</sup>, Form A<sup>2</sup>; Group Two: Form A<sup>1</sup>, Form A<sup>2</sup>, Form A; Group Three: Form A<sup>2</sup>, Form A, Form A<sup>1</sup>. Form A subtest order consisted of Similarities (1), Word Pairs (2), New Inventions (3). Form A<sup>1</sup> subtest order consisted of Word Pairs (2), New Inventions (3) and Similarities (1). Form A<sup>2</sup> subtest consisted of New Inventions (3), Similarities (1) and Word Pairs (2).

After the testing had been completed a "Rating Form for Chronic Schizophrenics" was completed by each unit director (i.e. psychiatrist or psychologist). These forms were then used as a screening device to select the most severe cases for inclusion in this investigation. See

Appendix for this form. The age, sex, dates of administration and times per test were also collected. Because of this selection system, along with elopements, discharges and remission of illness, only fifty patients were used in the final study. There were 17 patients in group one, 17 patients in group two, and 16 patients in group three.

Because of the newness of this test and ongoing research being conducted with it, the purpose of its existence has changed considerably since its development and revision in 1963 and 1965 respectively. Whitaker's original purpose in creating such a test was simply "to provide a brief, objective, easily administered and easily scored index of schizophrenic thinking."<sup>2</sup> Whitaker viewed the WIST as a screening device to be used in community mental health centers and correctional and military settings. Whitaker reported that:

In most cases each Form can be administered and scored within a fifteen or twenty minute period. They can be administered by anyone qualified to administer even relatively simple psychological tests. The scoring is done with the aid of an objective scoring key. These features of the tests, together with standardization and validity data provide a practically useful instrument readily adaptable to a wide variety of settings and specific uses.<sup>3</sup>

The basic purpose of the test has remained the same, that is, to quickly identify and diagnosis schizophrenic thinking. On the other hand, the usefulness of the WIST has become more adaptive in understanding other psychopathologies similar to schizophrenic thinking. In comparative studies the WIST has differentiated schizophrenics from

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<sup>2</sup>Whitaker, Leighton, "Manual for the Whitaker Index of Schizophrenic Thinking," University of Colorado Medical School, Denver, 1971, p. 3.

<sup>3</sup>Ibid.

organic patients, an additional use not previously investigated by Whitaker. This, along with other proposed studies, has suggested the WIST to be potentially untapped as a new diagnostic test in the present market. (See Appendix for WIST Forms A, A<sup>1</sup> and A<sup>2</sup>.)

Whitaker developed two forms of the WIST, A and B, which are identical in structure although different in content. For the purpose of this study, however, only Form A was used. The subtests of the original Form A were reordered to produce two other forms, A<sup>1</sup> and A<sup>2</sup> respectively. This change from the original order of the subtests created not an increasing index of difficulty in content as noted in Form A, but instead a varied index of difficulty. Each Form included 25 multiple-choice items distributed throughout the three subtests. Similarities and Word Pairs subtests each contained nine items respectively and New Inventions had seven. A short explanatory paragraph with a sample question introduced each subtest. Whitaker identified the subtest in the following manner:

Each item on both forms presents a stimulus word, phrase, or sentence with five alternate answers. These answers are arranged randomly in order independent of the scores assigned them. This prevents systematic biasing of response due to any position reference the individual may have. The alternative answers are designated by a, b, c, d, or e, one of which letters is to be written on the space next to the stimulus word, phrase, or sentence. This feature requires a subject to be definite in his choice; it does not give him the latitude to equivocate either by writing part of one or more answers or inventing his own answers. The requirement of definite choice has also served to minimize opportunities for the subject to talk with the examiner about his answers. Thus, if a subject has not committed himself to a particular answer, the examiner can distance himself by pressing for the subject to write "the letter of the correct answer" instead of mentioning the answers themselves. Thus, the subject is encouraged to make a definite independent commitment to one of the answers and is

discouraged from discussing the content of the answers with the examiner.<sup>4</sup>

#### Procedure

Each group was seen three times throughout a six to ten week period at two week intervals for testing. At these times members from each group were assigned a testing time and location for testing producing three heterogeneous groups. These groups then had members from groups one, two and three respectively and were tested together until all forms of the WIST were administered.

The materials necessary for the administration and scoring were a copy of the WIST (A, A<sup>1</sup>, A<sup>2</sup>), a pencil, an eraser, a stop watch, and an Index Record Form to be used after the testing by the examiner to record answer scores. Whitaker further reported that:

The Index Records are used by the examiner during testing for noting the subject's remarks and his behavior. The notes on behavior should include signs of anxiety, poor concentration, uncooperativeness, or any other variables which might effect the patient's performance, as well as any bizarre or unusual behavior. The subject is handed a WIST Form and a pencil and told, 'Please read the directions on the front of the test and go ahead with it when you are ready.' The examiner must make sure the subject completes the example item for the first subtest. . . by writing the letter of the correct answer in the space provided. If the subject fails to give an answer to this example item as if he gives an incorrect answer, the examiner asks him to reread the directions for the subtest. If the subject then will not or cannot answer this example question correctly, testing is discontinued since it is probable that the subject would not provide a valid protocol. Conversation between examiner and subject during testing is to be avoided.<sup>5</sup>

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<sup>4</sup>Ibid.

<sup>5</sup>Ibid, p. 6

The time which the subject took to complete the test was recorded along with any unusual behavior of the subject during testing. All subtests were checked for omissions before the testing session ended. Unlike the original scoring procedure of the WIST which utilized an inquiry phase used as a method of ascertaining whether the subject had the ability to correct his wrong answers, this study focused only on the first response as an indication of his reasoning ability.

Following the testing, the answers from the WIST were recorded on the Index Record Forms which showed the correct answers as well as alternate answers and their weighted values. These scores were then recorded on a master sheet accompanied by the name and age of the subjects. These results were then analyzed.

## Chapter 4

### ANALYSIS OF DATA

To test the hypothesis that different subtest orders on the WIST would not have a significant effect on the performance of chronic schizophrenic patients, the WIST Scores were analyzed by means of a three factor mixed analysis of Variance.<sup>1</sup> Table 1 summarized the analysis of error frequency scores and Table 2 the error severity scores. Inspection of Table 1 indicates that the only effect to reach significance was that of subtests, thus giving support to the hypothesis as stated. Analysis of error severity (summarized in Table 2) paralleled and replicated the findings presented in Table 1 and thus also were felt to support the hypothesis. Figures 1 and 2 presented the means for the subtests for both types of error scores. It could clearly be seen in Figure 1 that the ordinal relationship (for all groups) of the subtests is (in terms of increasing number of errors): Word-Pairs, Similarities, New Inventions. Inspection of Figure 2 reveals a similar ordinal consistency, for the three subtests. This consistency, which was not apparently affected by error type influences, suggested that the three groups did not perform in a manner consistent with a Hullian Drive theory of thought disorder although by combining the performance (test and two retest) some confounding and obscurity of the initial performance might

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<sup>1</sup>Bruning, Jane L. and Kintz, B. L., Computational Handbook of Statistics. Glenview, Illinois: Scott, Foresman and Company, 1968.

Table 1

## Summary of Error Frequency for the WIST

Source	Df	MS	F
Between Subjects	49		
Groups	2	5.216	0.328
Error B	47	15.867	
Within Subjects	400		
Forms	2	9.242	2.662
Subtests	2	30.936	13.532*
Groups X Forms	4	2.738	.788
Groups X Subtests	4	.243	.106
Forms X Subtests	4	.038	.044
Groups X Forms X Subtests	8	1.020	1.175
Error 1	94	3.471	
Error 2	94	2.286	
Error 3	188	0.868	
TOTAL	449		

\*p &lt; .001



Table 2

Summary of Error Severity Scores  
for Three Groups on the WIST

Source	Df	MS	F
Between Subjects	49		
Groups	2	41.240	0.484
Error B	47	85.064	
Within Subjects	400		
Forms	2	52.829	2.920
Subtests	2	186.429	14.576*
Groups X Forms	4	7.540	0.416
Groups X Subtests	4	1.646	0.128
Forms X Subtests	4	6.876	1.380
Groups X Forms X Subtests	8	1.999	0.401
Error 1	94	18.091	
Error 2	94	12.790	
Error 3	188	4.982	
TOTAL	449		

\*p < .001

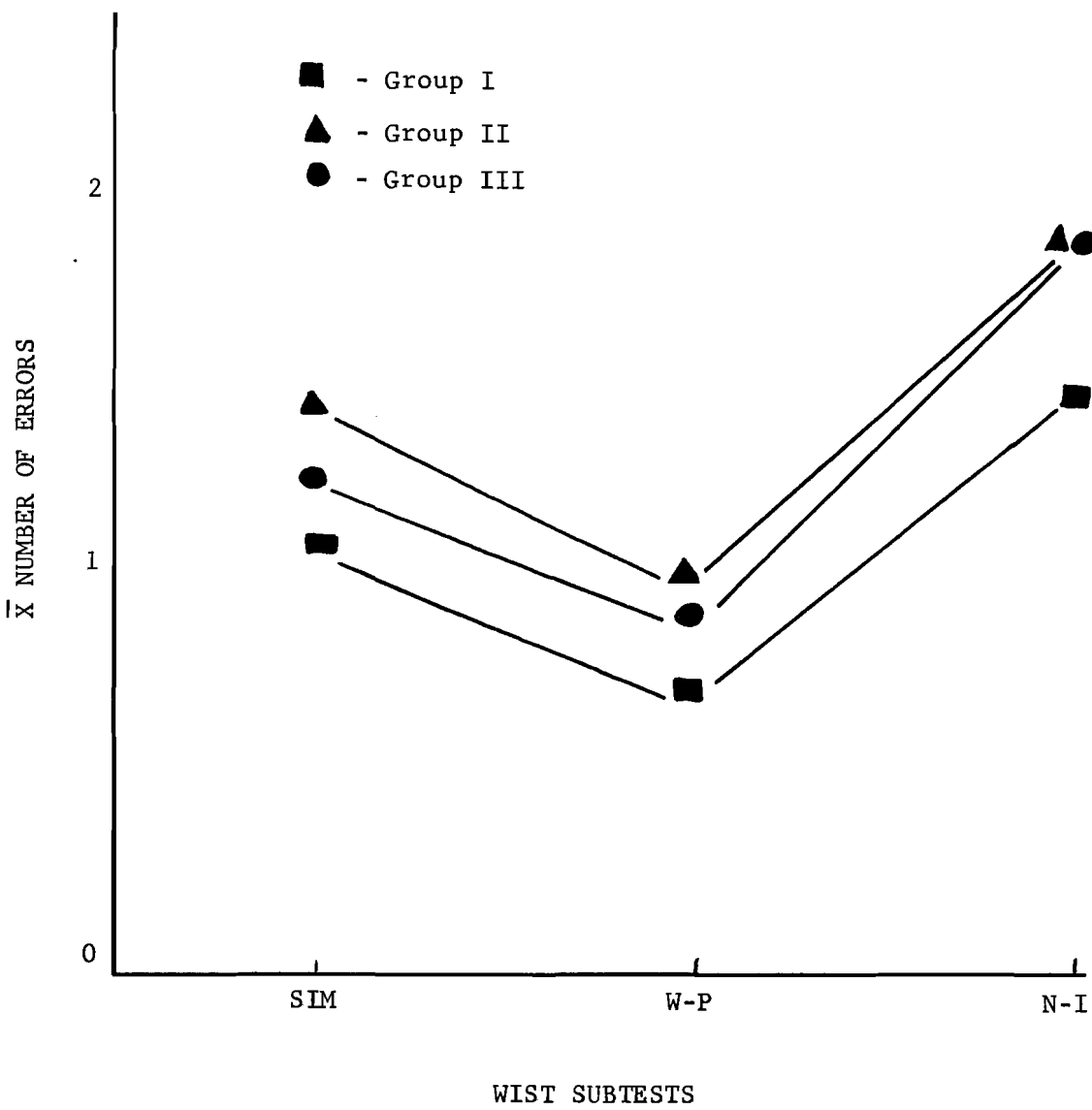


Figure 1

Mean Number of Errors for the Three Groups  
Over All Administrations

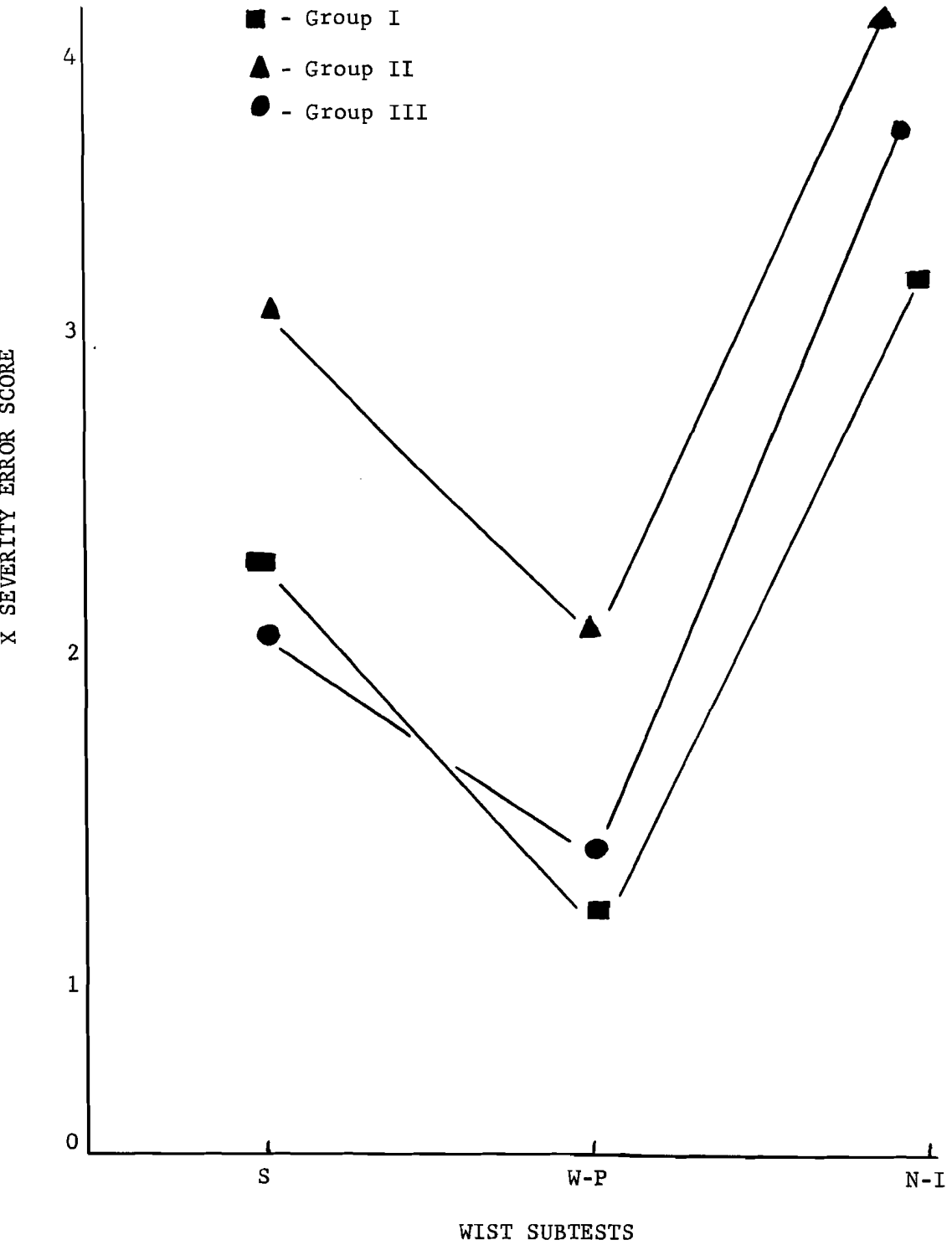


Figure 2

Mean Severity Scores for the WIST Subtests for All Three Groups Averaged Over 3 Test Administrations

have occurred which may have been in keeping with Hullian based predictions (confounding here referred to such variables as practice effects, etc.). Means for number of errors and error severity were presented for the three groups initial testing in Figures 3 and 4. Inspection of these figures revealed that the data in Figures 1 and 2 were the same in shape and thus, here too, there was no evidence to substantiate a Hullian based prediction. If a Hullian derived prediction were accurate it would have been expected that the ordinal relationship between subtests to have reflected order of the presentation and such clearly is not the case, in that the relationship (ordinal) between subtests for all three groups remained constant. It would thus appear that previous research (including that of Whitaker) did not appear to receive corroboration in the data.

The fact that the New Inventions subtest was for each group the most error inducing (or pulling) suggested (following from Albott and Gilbert, 1973)<sup>2</sup> that stimulus complexity was a variable which heretofore had gone unexamined in the development and use of the WIST. The results suggested that a modified Hullian approach could have been employed in interpreting the WIST performance, where stimulus complexity be taken into account. It was tempting to speculate that errors on subtests 1 and 2 reflect associational based, that is, content based anxiety and errors, whereas subtest 3 confounded complexity and association in such a way as to make interpretation most difficult. Figure 5 presented the

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<sup>2</sup>Albott, William and Gilbert, Lloyd, "Comparison of Non-Brain Damaged Schizophrenic and Brain Damaged Non-Schizophrenic Males on the WIST," Psychology Reports, 1973, Vol. 32, pp. 187-194.

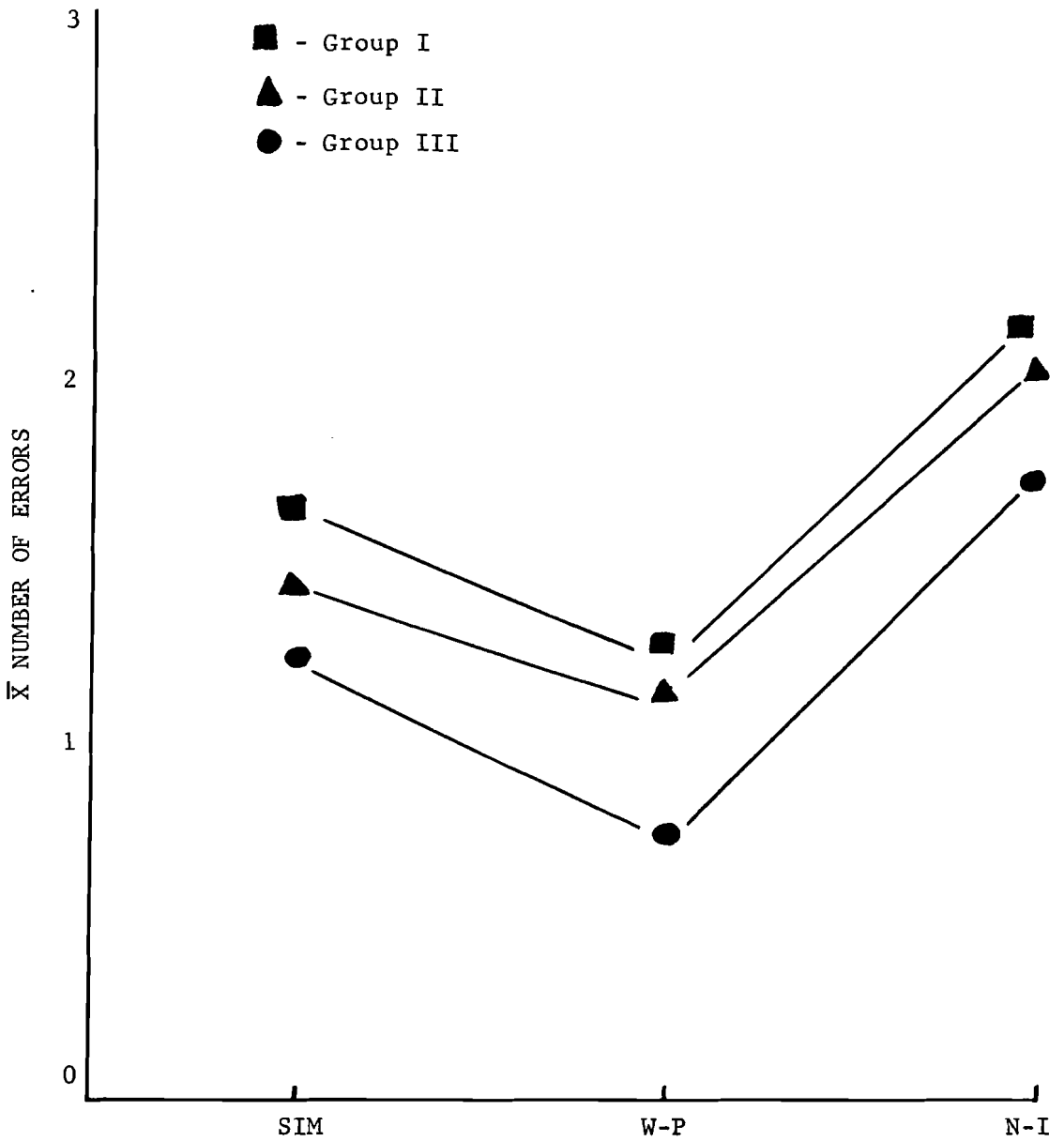


Figure 3

Mean Number of Errors on Initial WIST  
Administration for All Three Groups

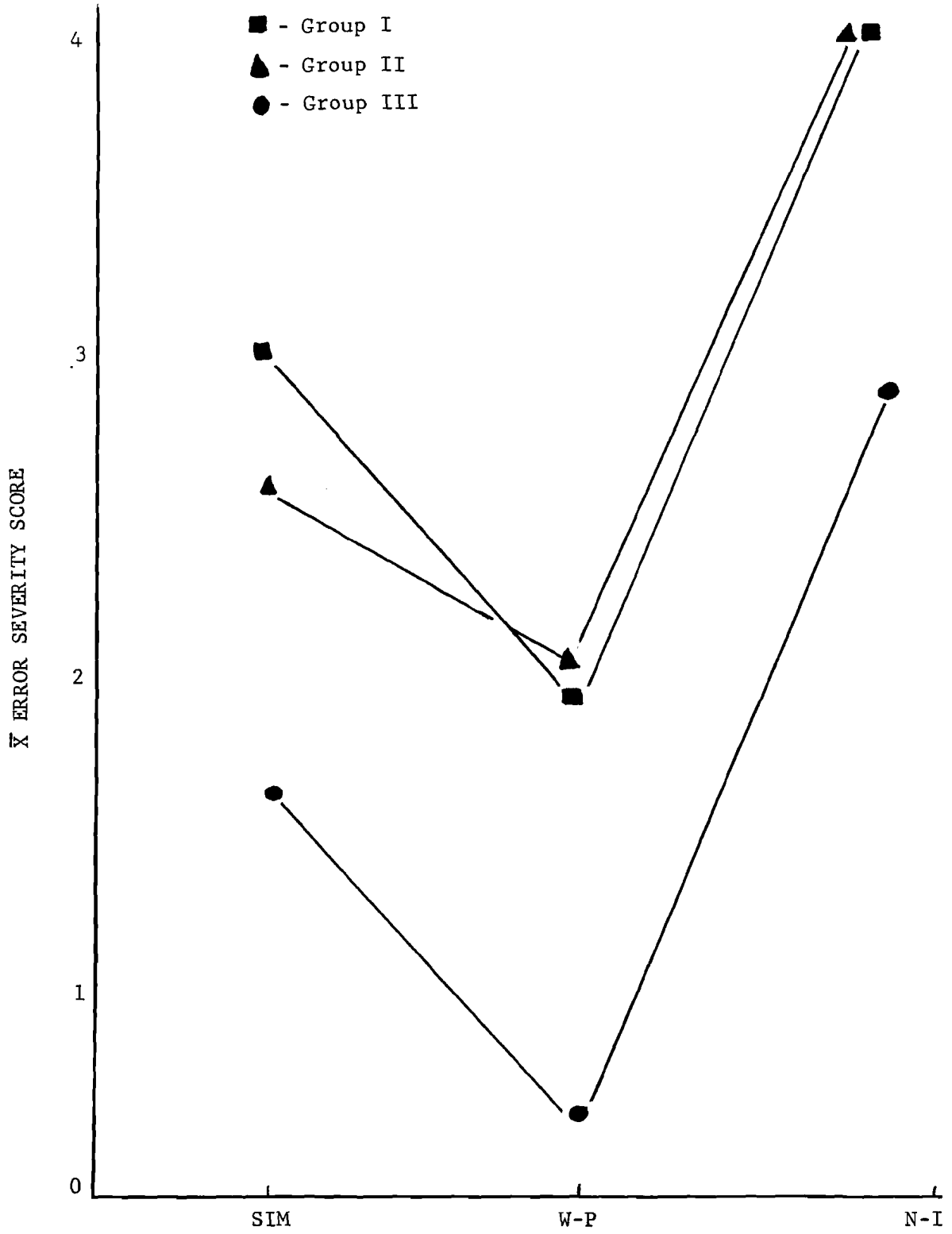


Figure 4

Mean Error Severity Score for Initial WIST Administration for All Three Groups

frequency of errors for all three groups on the initial testing on the seven items making up subtest 3. Clearly items 1, 2, 4 and 7 were those which had the fewest errors in each group.

Table 3

## Number of Words in Each Stem of Subtest III

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#1: 13	#4: 17	#6: 10
#2: 12	#5: 5	#7: 13
#3: 6		

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It would thus appear that the notion of stimulus complexity at the molar level was appropriate but at the level of items, the notion lost some of its tenability, in fact computation of rank order correlation coefficients between the number of words per item stem and both error frequency and error severity scores yielded negative coefficients (i.e.  $-.821$  and  $-.866$  respectively). Thus at the level of subtest comparisons the idea that complexity was related to error rate and degree of illogicality of errors was supported, but within the most complex subtest there appears to be an inverse relationship between stem complexity and errors. An additional possibility dealt with the complexity (i.e. number of words) in the responses.

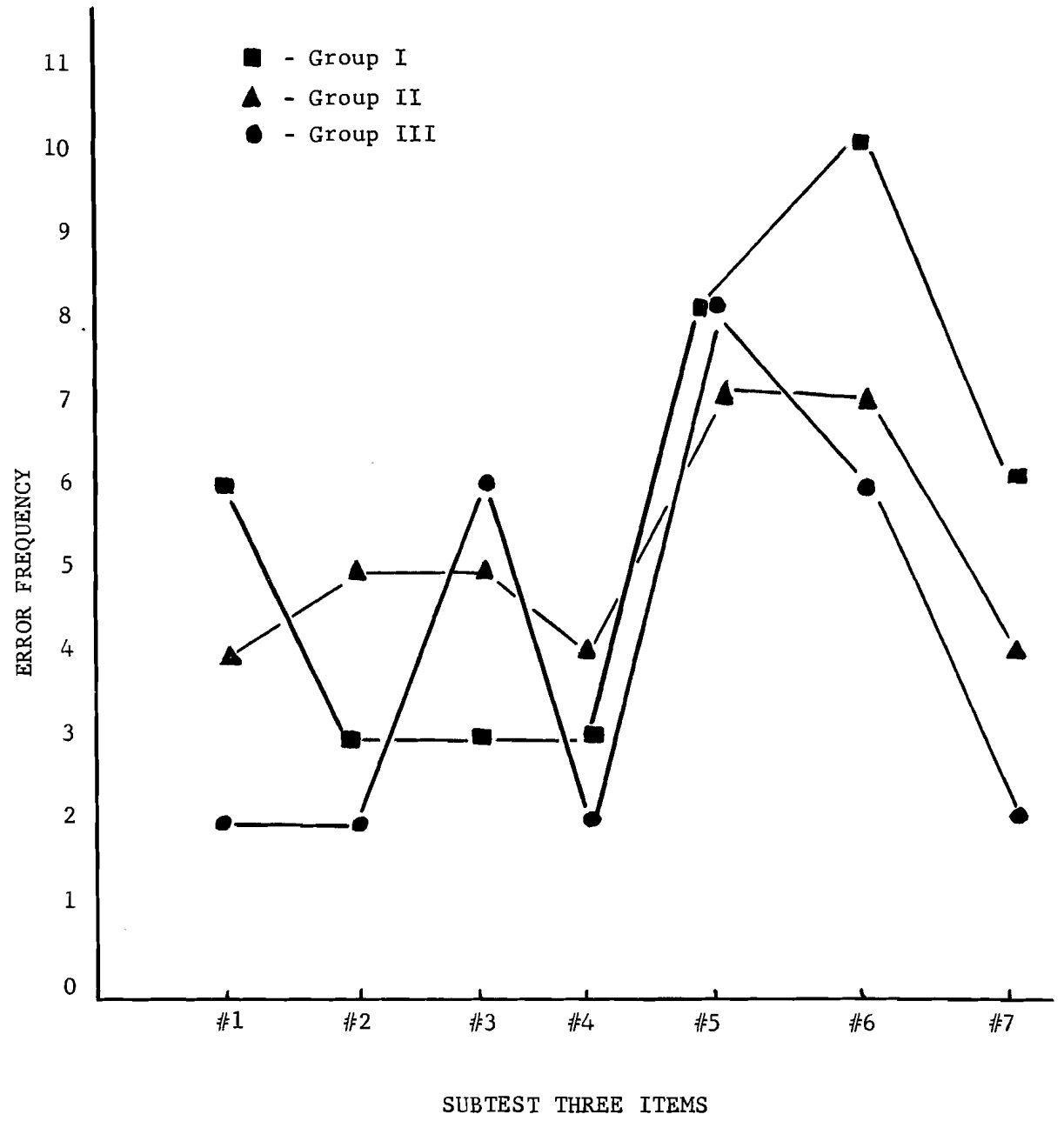


Figure 5

Distribution of Error Frequency on Subtest III Items  
(Initial WIST) for All Three Groups



Table 4

Number of Total Words in Foils Per Item and  
Average Number of Words Per Foil

Item		$\bar{X}$	Range	Rank
#1	27	5.4	3 - 8	4
#2	22	4.4	4 - 5	7
#3	25	5	3 - 8	5.5
#4	30	6	4 - 9	1.5
#5	25	5	3 - 6	5.5
#6	30	6	3 - 11	1.5
#7	28	5.6	4 - 7	3

Computation of rank-order coefficients with foil complexity yielded as before negative values (i.e. -.08 and -.178) but of markedly lower values. Thus it seemed that errors were related to the stems to a significantly stronger degree than to foils--at least in terms of complexity as operationally defined here. Certainly the reversal in the relationship of error to complexity from the inter- to the intra-subtest level raises some serious question as to the appropriateness of a Hullian derived interpretation of WIST Performance by chronic schizophrenics.

Figure 6 presented the combined errors per items on subtest 3 for the three groups. Inspection of this Figure suggested that the research findings of Crider, Maher and Grinspoon; Hamlin, Haywood and

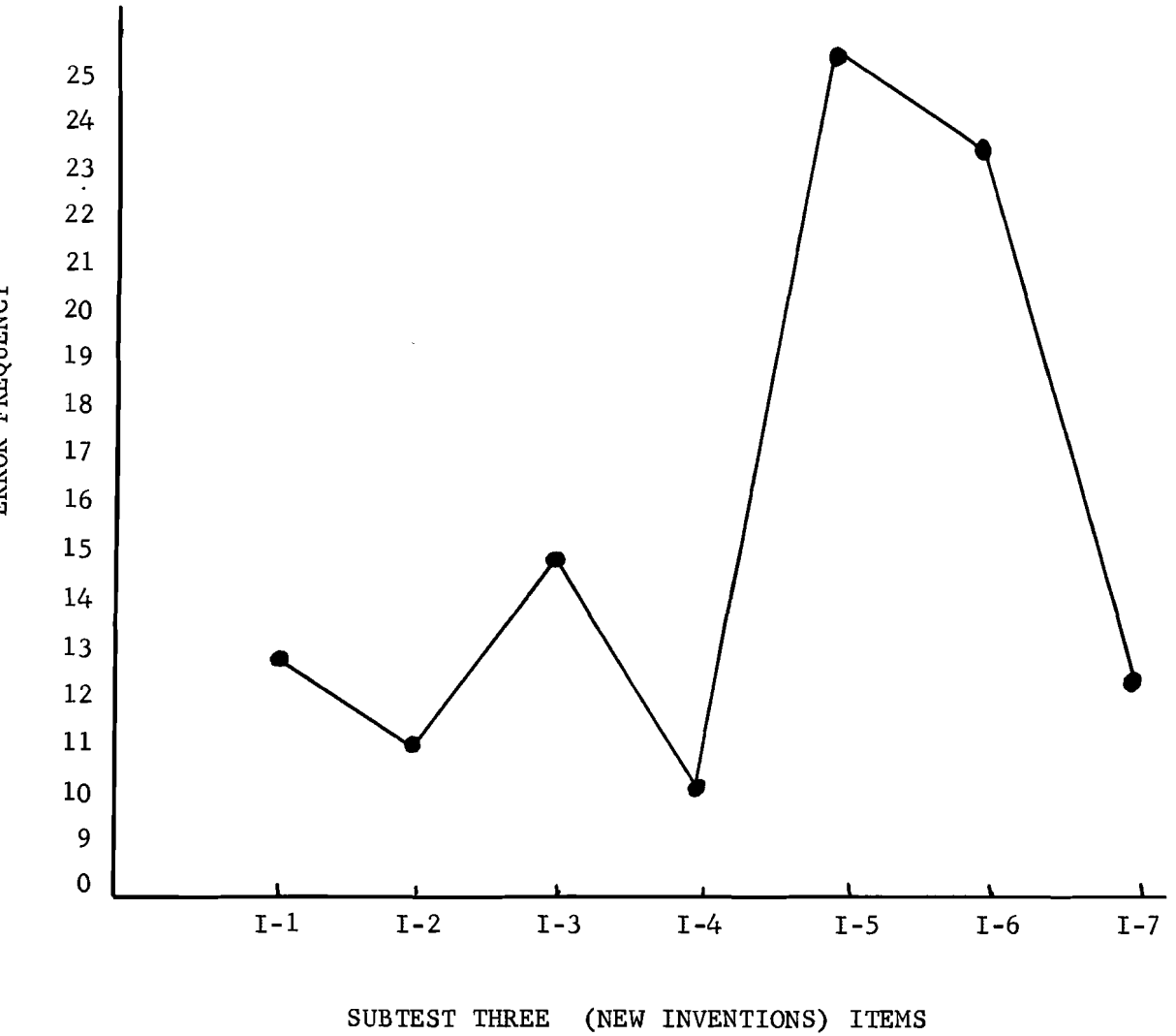


Figure 6

Error Frequency for All Items on Subtest 3 (New Inventions)  
for All Three Groups Combined

Folsom; and Levitt<sup>3</sup> in 1965 may have some relevance to possibly understanding the performance of patients on subtest 3. Their research was directed at the variable of attention in schizophrenics and they found that schizophrenics' performance on a wide variety of tasks was improved when they were "forced" to attend to the task either by increasing the intensity of the stimulus or by shocking them as studied by Cavanaugh in 1958.<sup>4</sup> Keeping this in mind, it might be said that the complexity (i.e. longer stems) tended to "hold" or increase the patient's attention, thus increasing the likelihood of correct answers being chosen, but then when faced with a relatively simple task the patients tended to over relax their attention thus increasing the likelihood of choosing an incorrect answer. It was also possible to employ Mednick's ideas about the gradient of increasing anxiety in conjunction with the above, in light of the fact that there tends to be a trend toward alternation with each subsequent error circumstance increasing until such point where it appeared to be gradually diminishing.

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<sup>3</sup>Crider, A. B, Maher, and Grinspoon, L., "The Effect of Sensory Input on the Reaction Time of Schizophrenic Patients of Good and Poor Premorbid History," Psychonomic Science, 1965, Vol. 2, pp. 47-48; Hamlin, R. M., Haywood, N. C. and Folsom, A. T., "Effect of Enriched Input on Schizophrenic Abstraction," Journal of Abnormal Psychology, 1965, Vol. 70, pp. 390-394; Levitt, H., "Performance Deficit and Auditory Inefficiencies in Schizophrenia," Journal of Nervous and Mental Disease, 1965, Vol. 140, pp. 290-296.

<sup>4</sup>Cavanaugh, D., "Improvement in the Performance of Schizophrenics on Concept Formation Tasks as a Function of Motivational Change," Journal of Abnormal and Social Psychology, 1958, Vol. 57, pp. 8-12.

## Chapter 5

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to determine whether Mednick's theory of stimulus generalization or response generalization characterized subtest reordering on the WIST.

In summary, subjects for this investigation were selected from ten psychiatric units at the Topeka State Hospital. Out of a total of three hundred and forty-four case studies reviewed, using Shearn and Whitaker's criteria for selection,<sup>1</sup> only sixty patients were finally chosen for the study. In addition, these sixty patients were screened using psychological testing, established diagnosis and staff interviewing. This screening process was done to select the most severe cases of schizophrenia available for testing for this study. These patients were then divided into three designated groups, each group consisting of twenty patients each. Because of elopements and discharges, however, patients were lost in each group. As a result only fifty patients were used and were distributed in the following way: group one had seventeen members, group two had seventeen members, and group three had sixteen members.

Each group was given different reordered forms of the WIST (Form A) at two week intervals for a six to ten week period. Members

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Shearn, C. F. and Whitaker, L. C., "Selecting Subjects in Studies of Schizophrenia," Journal of Schizophrenia, 1969, No. 1, pp. 4-8.

of group one were given Form A, Form A<sup>1</sup> and Form A<sup>2</sup>. Group two members were given Form A<sup>2</sup>, Form A and Form A<sup>1</sup>. Group three was given Form A<sup>2</sup>, Form A and Form A<sup>1</sup>.

The responses from all presentations of the WIST were then recorded on the Index Record Forms. From this form, an assessment of severity and frequency of errors was made and recorded on a master sheet. The data were then analyzed by means of a three mixed analysis of variance.

The results of this investigation did not unequivocally support a Hullian interpretation of the patient's performance on the WIST. In fact, the results tended to be, at the global level, most consistent with an interpretation based primarily upon stimulus complexity. That is to say, the patients had the most difficulty with subtest 3 which was significantly more complex than either of the other subtests. The complexity factor or idea, however, failed to account for the errors found within subtest 3, and in fact the reverse was found to be the case. It might be assumed, therefore that the schizophrenics' performance on a wide variety of tasks might have been improved when they were forced to attend to the task by increasing the intensity of the stimulus. The complexity tended to hold or increase the patient's attention, thus increasing the likelihood of correct answers being chosen. When the patients were faced with a relatively simple task, they tended to over relax their attention, thus increasing the likelihood of choosing an incorrect answer. Mednick's theory about the gradient of increasing anxiety also seems relevant as applied to the above assumptions.

Inspection of the data raised another additional problem, one which at this point suggests that the data may be impossible to interpret accurately. The inspection suggested that, in spite of the extremely careful approach to selection of patients, there was a group of patients distributed through all three groups who appeared to be neurologically impaired (based on results presented by Albott and Gilbert, 1973).<sup>2</sup> Such post hoc analysis points up once more support for Shearn and Whitaker's<sup>3</sup> contention that hospital diagnosing is lacking in refinement. It also points out that even more attention must be used in the selection of patients for research into this area.

In conclusion, it may be helpful to see the implementations of this study on the general problems of the relative effect of selecting patients for other studies. The problems of selection seem to be a time consuming process, especially if a complete evaluation is made for placement into experimental groups for study.

It would take approximately one year to accurately test and evaluate these patients. First of all, all patients should be given neuropsychological testing along with brain scans, EEG, and neurological examination. Unfortunately the politics of almost all hospitals is such that justification for such testing would not be realistic. In other words, subjective guessing as indicated by physical symptoms seems to be just as good or reliable in most cases for those who have been diagnosed as chronic schizophrenics. Another problem in obtaining complete

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<sup>2</sup>Albott, William and Gilbert, Lloyd, "Comparison of Non-Brain Damaged Schizophrenic and Brain Damaged Non-Schizophrenic Males on the WIST," Psychology Reports, 1973, Vol. 32, pp. 187-194.

<sup>3</sup>Ibid.

evaluations is the idea of cost. Currently the cost of the average complete psychological work up is at two hundred and fifty dollars. This in itself seems to be an obvious reason to instead rely on other methods of diagnosing schizophrenia at a lower cost. Similarly, the size of each group in this study should have been larger. Even though there were over 345 cases, this did not guarantee an adequate number of subjects to work with.

Perhaps the solution is to have a large enough sample such as all the state hospitals in Kansas to insure a pure sample of schizophrenics.

The experimental instrument for this study was the WIST. The test has not yet been published and further research as to its reliability is still to be studied. This poses a problem in interpreting any results of this test because of the lack of use outside a hospital setting. Further studies should be done with this instrument in a more accurately defined population of chronic schizophrenics. Until this is done, similar results, as indicated by this study, can be expected.

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## APPENDIX

1. Rating Form for Schizophrenics
2. WIST Form A
3. WIST Form A/1
4. WIST Form A/2
5. Index Record Form A

RATING FORM FOR CHRONIC SCHIZOPHRENIA

WARD \_\_\_\_\_ HOSPITAL \_\_\_\_\_ DATE \_\_\_\_\_

PATIENT \_\_\_\_\_ RATER \_\_\_\_\_ POSITION \_\_\_\_\_

1=part-time 2=much of the time Blank=not at all
---

Indicate (1 or 2)  
Degree Within  
Within last 3  
last 3 years  
months

Cognitive Signs

Hallucinations.....	_____	_____
Delusions.....	_____	_____
Talking to oneself.....	_____	_____
Pathognomic verbalizations		
Neologisms .....	_____	_____
Word salad .....	_____	_____
Queer verbalizations .....	_____	_____
Incoherence .....	_____	_____
Autistic logic .....	_____	_____
Self-reference ideas .....	_____	_____

Affective Signs

Inappropriate affect .....	_____	_____
Shallow affect .....	_____	_____

Behavioral Signs

Grimacing .....	_____	_____
Peculiar and/or stereotyped gesticulations, mannerisms or behaviors .....	_____	_____
Rigidity and/or awkwardness of posture and gait .....	_____	_____
Non-focused staring and/or averting of gaze .	_____	_____
Self-mutilation .....	_____	_____

Chronic Schizophrenia  
Active      In Remission

Overall rating		
Nonappreciable	0	0
Mild	1	1
Marked	2	2

W I S T

Form A  
January, 1968 Revision  
Copyright 1963, L. Whitaker, Ph.D.

Name \_\_\_\_\_

Age \_\_\_\_\_

Today's Date \_\_\_\_\_

DIRECTIONS

This booklet contains three tests. You are to write the answers to all the questions in all the tests. There is no time limit and you may read the directions as often as you like. When you have answered all of the questions, the examiner will go over your answers with you.

Now, turn the page and begin.

Directions for the Similarities Test

This is a test with nine questions for you to answer by picking out words which are similar in meaning to one another. Read the first word in the question and then read the words below it. When you have found which of the words below the first word is most similar to the first word, write the letter of that word (a, b, c, d, or e) in the space beside the first word in the question. For example, give the correct answer for the question below:

CAR \_\_\_\_\_

- a. tires
- b. automobile
- c. jar
- d. smickle
- e. my transportation

The word which is most similar to "CAR" is "automobile," so you should have written "b" in the space next to "CAR."

Now answer all the other questions beginning with No. 1.

1. KILL \_\_\_\_\_

- a. bapple
- b. mill
- c. stab
- d. cause to die
- e. bloody me

2. HURT \_\_\_\_\_

- a. brost
- b. injure
- c. attack me
- d. cut
- e. blurt

3. STINK \_\_\_\_\_

- a. feart
- b. make me dirty
- c. skunk
- d. unpleasant odor
- e. pink

4. KOTEX \_\_\_\_\_

- a. convex
- b. bleper
- c. pad
- d. smear me
- e. messy

5. SCREW \_\_\_\_\_

- a. twist
- b. spin
- c. krorp
- d. brew
- e. stick me

6. CRUEL \_\_\_\_\_

- a. push me
- b. sluck
- c. whip
- d. unkind
- e. fuel

7. RAPE \_\_\_\_\_

- a. cape
- b. force to have sex relations
- c. flump
- d. attack
- e. grab me

8. SUCK \_\_\_\_\_

- a. mouth
- b. froopid
- c. lick me
- d. draw in
- e. luck

9. MOTHER \_\_\_\_\_

- a. sklew
- b. smother
- c. dress me
- d. female parent
- e. feed

Now turn to the next page and do the next test.

Directions for the Word Pairs Test

This is a test with nine questions. In each question there are a pair of words that have similarity in meaning. Below the pair of words are five answers. Pick out the answer that shows the greatest similarity in meaning in the pair of words. Then write the letter (a, b, c, d, or e) of your answer in the space beside the pair of words in the question. For example, give the correct answer for the question below:

RED and BLUE\_\_\_\_

- a. I have seen these
- b. bright clothes
- c. bed and glue
- d. colors
- e. lorp

The correct answer is "colors," so you should have written "d" in the space next to "RED and BLUE."

- |  |   |   |
|--|---|---|
| 1. MOTHER and FATHER____   | 2. AX and HAMMER____  | 3. PANTIES and BRA____  |
| <ul style="list-style-type: none"> <li>a. for nice and float</li> <li>b. boss me</li> <li>c. other and gather</li> <li>d. family</li> <li>e. parents</li> </ul>                | <ul style="list-style-type: none"> <li>a. lax and jammer</li> <li>b. sckuck</li> <li>c. build</li> <li>d. tools</li> <li>e. can hurt me</li> </ul>                        | <ul style="list-style-type: none"> <li>a. white coverings</li> <li>b. shanties and spa</li> <li>c. women's underclothes</li> <li>d. make me wicked</li> <li>e. exploding for brood</li> </ul> |
| 4. HOT and COLD____  | 5. BREAST and MOUTH____   | 6. SMASH and KILL____   |
| <ul style="list-style-type: none"> <li>a. temperatures</li> <li>b. thermometer</li> <li>c. dot and fold</li> <li>d. red the drown</li> <li>e. in my bed</li> </ul>             | <ul style="list-style-type: none"> <li>a. my sucking</li> <li>b. best and south</li> <li>c. soft and curved</li> <li>d. side the cut</li> <li>e. parts of body</li> </ul> | <ul style="list-style-type: none"> <li>a. cash and fill</li> <li>b. the fat is lie</li> <li>c. hurt me</li> <li>d. destroy</li> <li>e. hit</li> </ul>   |
| 7. PAIN and FEAR____   | 8. BELLY and THROAT____   | 9. BATH and BED____   |
| <ul style="list-style-type: none"> <li>a. my problems</li> <li>b. away for pretty</li> <li>c. not so good</li> <li>d. unpleasant feelings</li> <li>e. sane and dear</li> </ul> | <ul style="list-style-type: none"> <li>a. to eat</li> <li>b. jelly and boat</li> <li>c. make me sick</li> <li>d. fear the tell</li> <li>e. parts of the body</li> </ul>   | <ul style="list-style-type: none"> <li>a. math and fled</li> <li>b. my place</li> <li>c. things in a house</li> <li>d. fast the up rear</li> <li>e. private</li> </ul>                        |

Now turn to the next page and do the next test.



Directions for the New Inventions Test

This is a test with seven questions. You are to answer them by reading about the new invention and then picking out the result (a, b, c, d, or e) that is most likely to happen according to what you have read. For example, which result is most likely to happen according to what you read about the invention below:

STRONG, ATTRACTIVE HOUSES WILL BE MADE FROM A NEW PLASTIC FOR ONLY HALF THE COST OF REGULAR HOUSES. \_\_\_\_\_

- a. No house will be made of wood.
- b. The plastic will be sarcastic.
- c. More people will own houses.
- d. The pink of will.
- e. They will put plastic in my house.

The correct answer is "more people will own houses," so you should have written "c" for this example question.

Now answer the other questions.

1. A MACHINE CAN QUICKLY AND EASILY TRANSLATE ANY LANGUAGE INTO ANY OTHER LANGUAGE. \_\_\_\_\_

- a. The machine will be marine.
- b. The machine might read my mind.
- c. We will buy more books.
- d. Crawling for inside.
- e. People will better understand people in other countries.

2. A NEW KIND OF PILL CAN CHANGE THE FEELINGS IN PEOPLE'S BODIES. \_\_\_\_\_

- a. The cry is rotten.
- b. It will be pleasant.
- c. My body will change.
- d. The pill will be hill.
- e. The people will feel different.

3. A MACHINE CAN PREDICT THE FUTURE. \_\_\_\_\_

- a. They will be mad at me.
- b. Slimy the sideways.
- c. The future will suture.
- d. People will get angry.
- e. We will have some news ahead of time.

Now turn to the next page.

4. SOME PEOPLE WILL BE ABLE TO TAKE A PILL WHICH WILL ALLOW THEM TO READ YOUR MIND. \_\_\_\_\_
- a. These people will get to know you better.
  - b. These people will show off what they can do.
  - c. The people on a steeple.
  - d. The sinking will dance.
  - e. They will hate me.
5. A NEW MACHINE MAKES MILK. \_\_\_\_\_
- a. It will be a new blew.
  - b. Some people will taste the milk.
  - c. The bloated for.
  - d. My milk will be sour.
  - e. The milk will taste funny.
6. RADIO WAVES WILL BE SENT BY PEOPLE ON OTHER PLANETS. \_\_\_\_\_
- a. They may talk about me.
  - b. It will be a space lace.
  - c. Forward these hide.
  - d. The people on the other planets will have many space ships.
  - e. The government will be interested.
7. A NEW ALCOHOLIC DRINK MAKES ONLY THE LEFT SIDE OF YOUR BRAIN DRUNK. \_\_\_\_\_
- a. People will laugh at my drunkenness.
  - b. The drink will cost more to buy.
  - c. It will make a person partly drunk.
  - d. Bloom always the paint.
  - e. The drink will rink.

The End.

W I S T

Form A/1  
January, 1968 Revision  
Copyright 1963, L. Whitaker, Ph.D.

Name \_\_\_\_\_

Age \_\_\_\_\_

Today's Date \_\_\_\_\_

DIRECTIONS

This booklet contains three tests. You are to write the answers to all the questions in all the tests. There is no time limit and you may read the directions as often as you like. When you have answered all of the questions, the examiner will go over your answers with you.

Now, turn the page and begin.

Directions for the Word Pairs Test

This is a test with nine questions. In each question there are a pair of words that have similarity in meaning. Below the pair of words are five answers. Pick out the answer that shows the greatest similarity in meaning in the pair of words. Then write the letter (a, b, c, d, or e) of your answer in the space beside the pair of words in the question. For example, give the correct answer for the question below:

RED and BLUE\_\_\_

- a. I have seen these
- b. bright clothes
- c. bed and glue
- d. colors
- e. lorp

The correct answer is "colors," so you should have written "d" in the space next to "RED and BLUE."

1. MOTHER and FATHER\_\_\_ 2. AX and HAMMER\_\_\_ 3. PANTIES and BRA\_\_\_

- |                       |                   |                         |
|-----------------------|-------------------|-------------------------|
| a. for nice and float | a. lax and jammer | a. white coverings      |
| b. boss me            | b. skuck          | b. shanties and spa     |
| c. other and gather   | c. build          | c. women's underclothes |
| d. family             | d. tools          | d. make me wicked       |
| e. parents            | e. can hurt me    | e. exploding for brood  |

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- |                  |                    |                   |
|------------------|--------------------|-------------------|
| a. temperatures  | a. my sucking      | a. cash and fill  |
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| e. in my bed     | e. parts of body   | e. hit            |

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- |                        |                      |                      |
|------------------------|----------------------|----------------------|
| a. my problems         | a. to eat            | a. math and fled     |
| b. away for pretty     | b. jelly and boat    | b. my place          |
| c. not so good         | c. make me sick      | c. things in a house |
| d. unpleasant feelings | d. fear the tell     | d. fast the up rear  |
| e. sane and dear       | e. parts of the body | e. private           |

Now turn to the next page and do the next test.

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Now answer all the other questions beginning with No. 1.

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- d. attack
- e. grab me

8. SUCK \_\_\_\_\_

- a. mouth
- b. froopid
- c. lick me
- d. draw in
- e. luck

9. MOTHER \_\_\_\_\_

- a. sklew
- b. smother
- c. dress me
- d. female parent
- e. feed

The End.

W I S T

Form A/2  
January, 1968 Revision  
Copyright 1963, L. Whitaker, Ph.D.

Name \_\_\_\_\_

Age \_\_\_\_\_

Today's Date \_\_\_\_\_

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- a. twist
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- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>a. for nice and float</li> <li>b. boss me</li> <li>c. other and gather</li> <li>d. family</li> <li>e. parents</li> </ul> | <ul style="list-style-type: none"> <li>a. lax and jammer</li> <li>b. sckuck</li> <li>c. build</li> <li>d. tools</li> <li>e. can hurt me</li> </ul> | <ul style="list-style-type: none"> <li>a. white coverings</li> <li>b. shanties and spa</li> <li>c. women's underclothes</li> <li>d. make me wicked</li> <li>e. exploding for brood</li> </ul> |
|---|--|---|

4. HOT and COLD \_\_\_ 5. BREAST and MOUTH \_\_\_ 6. SMASH and KILL \_\_\_

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>a. temperatures</li> <li>b. thermometer</li> <li>c. dot and fold</li> <li>d. red and drown</li> <li>e. in my bed</li> </ul> | <ul style="list-style-type: none"> <li>a. my sucking</li> <li>b. best and south</li> <li>c. soft and curved</li> <li>d. side the cut</li> <li>e. parts of body</li> </ul> | <ul style="list-style-type: none"> <li>a. cash and fill</li> <li>b. the fat is lie</li> <li>c. hurt me</li> <li>d. destroy</li> <li>e. hit</li> </ul> |
|--|---|---|

7. PAIN and FEAR \_\_\_ 8. BELLY and THROAT \_\_\_ 9. BATH and BED \_\_\_

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>a. my problems</li> <li>b. away for pretty</li> <li>c. not so good</li> <li>d. unpleasant feelings</li> <li>e. sane and dear</li> </ul> | <ul style="list-style-type: none"> <li>a. to eat</li> <li>b. jelly and boat</li> <li>c. make me sick</li> <li>d. fear the tell</li> <li>e. parts of the body</li> </ul> | <ul style="list-style-type: none"> <li>a. math and fled</li> <li>b. my place</li> <li>c. things in a house</li> <li>d. fast the up rear</li> <li>e. private</li> </ul> |
|--|---|--|

The End.

WIST Index Record, Form A

Name \_\_\_\_\_ Date \_\_\_\_\_ Dept. \_\_\_\_\_

Age \_\_\_\_\_ Sex \_\_\_\_\_ Birthdate \_\_\_\_\_ Examiner \_\_\_\_\_

Similarities

Word Pairs

New Inventions

	Scores				
	0	1	2	3	4
1.	d	c	e	b	a
2.	b	d	c	e	a
3.	d	c	b	e	a
4.	c	e	d	a	b
5.	a	b	e	d	c
6.	d	c	a	e	b
7.	b	d	e	a	c
8.	d	a	c	e	b
9.	d	e	c	b	a

	Scores				
	0	1	2	3	4
	e	d	b	a	c
	d	c	e	a	b
	c	a	d	b	e
	a	b	e	c	d
	e	c	a	b	d
	d	e	c	a	b
	d	c	a	e	b
	e	a	c	b	d
	c	e	b	a	d

	Scores				
	0	1	2	3	4
	e	c	b	a	d
	e	b	c	d	a
	e	d	a	c	b
	a	b	e	c	d
	b	e	d	a	c
	e	d	a	b	c
	c	b	a	e	d

Test Score

Time Required