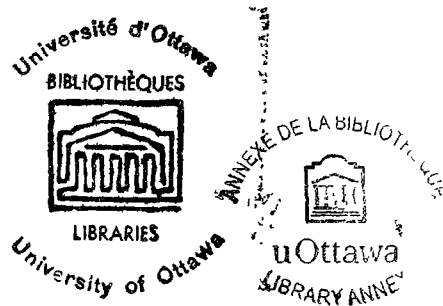


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A COMPARISON OF CONCEPTUAL ABILITY
IN REACTIVE AND PROCESS
SCHIZOPHRENICS

by Donald W. Proud

Thesis presented to the School of
Psychology and Education of the
University of Ottawa as partial
fulfillment of the requirements
for the degree of Doctor of
Philosophy



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CURRICULUM STUDIORUM

Donald William Proud was born June 21, 1937, in Toronto, Ontario. He received the Bachelor of Arts degree in Science and Arts from Michigan State University, East Lansing, Michigan, in 1959. He received the Master of Arts degree in Clinical Psychology from Bowling Green State University, Bowling Green, Ohio, in 1962. The title of his thesis was The Effects of Examiner Encouragement on WISC Performance.

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INTRODUCTION

The present study belongs, in one sense, within the area of research in conceptual processes. However, it goes without saying that this is a many faceted area. Hence, the study is directed toward the investigation of one particular aspect of the conceptual process, that of abstract ability. Even here there are a multitude of approaches thus, as a consequence, this thesis endeavours to study specifically abstract ability as it is manifest in schizophrenia.

Schizophrenia, as a disease entity, has been defined and described in a variety of ways, from the enumeration of associated symptoms to the level of causality and dynamics. However, when considered globally for research, it becomes increasingly obvious that there exists within this population of individuals, so diagnosed, numerous individual differences such as can be observed in any broadly defined population. It follows that when these differences may have an influence upon what is being investigated, here abstract ability, then the differences must be controlled for in some systematic fashion. The failure to meet this requirement can only lead to confusion and controversy.

In that abstract ability can be defined quantitatively through the employment of a particular measure and has, at the same time, dynamic implications, the approach

taken in this study has a similar orientation. With more than an allusion to causality, through the introduction of the reactive-process dimension of schizophrenia, the effort is made to control the subject variables with reliance upon what appears to be the more essential differences.

Following from these considerations, the contributions of the present study are contained by the extent to which the reactive-process dimension, emphasizing to a degree causality, is a feasible means for distinguishing among schizophrenics for research. Secondly, from the contention that schizophrenics can be divided into these two groups, the reactive and process, the differences are, again, reflected in their comparative ability to abstract.

The first chapter is a review of the literature. It considers one rather comprehensive theory of schizophrenia that, when limited, provides the general framework for the present study. Included, also, in this first chapter, is a review of some of the major experimental studies which deals with the concept of abstraction in schizophrenia, illustrates the importance of the subject variable and leads to the statement of the general hypotheses for this investigation.

The experimental design is detailed in the second chapter. The discussion includes the formulation of the null hypotheses to be tested, a description of the test used to measure abstract ability, the sampling and testing

procedures, and a brief outline of the applied statistical techniques.

The experimental results are presented and discussed in the final chapter. This chapter is then followed by a summary of the study and the conclusions.

CHAPTER I

REVIEW OF THE LITERATURE

This chapter will first be devoted to the limiting of the theoretical aspects of schizophrenia with which this investigation is concerned. Also included will be the experimental evidence which suggests the plausibility of the theoretical approach. Following in separate sections, will be the presentation of the literature which, in conjunction with the theory, leads to a conclusion and the formulation of the general hypotheses.

1. Theoretical Considerations.

There are, without question, numerous theories, interpretations, and descriptions of schizophrenia. Also, through the years, there has been an increasing amount of specification with respect to this disease entity. Historically, the applied term itself has undergone change with efforts directed toward greater definitiveness. Kraepelin,¹ using the term dementia praecox, defined schizophrenia as a distinct syndrome and felt there was a common denominator or common cause for all the various types. However, he was not particularly concerned with the psychological meaning of

¹ Emil Kraepelin, Dementia Praecox and Paraphrenia, translated by Mary Barclay, Edinburgh, Livingston, 1919.

the symptoms and consequently devoted his efforts to the formulation of clinical descriptions.

A few years later, Bleuler^{2,3} formulated the concept of schizophrenia in revision of Kraepelin's concept of dementia praecox. Bleuler realized that some patients originally diagnosed schizophrenic, according to Kraepelin's criteria, were recovering rather than dementing. As a consequence of his observations and the inappropriateness in the use of the term dementia praecox, he suggested that further differentiation than that afforded by Kraepelin's criteria was necessary for maximum predictability. It appeared that Bleuler was concerned with prognosis as well as diagnosis, thus suggesting greater emphasis on causality rather than assuming a "common denominator" as did Kraepelin.

From a theoretical position emphasizing causality rather than simply clinical descriptions of schizophrenia, Bellak⁴ has proposed what has been referred to as a "multiple-factor psychosomatic theory of schizophrenia". He suggested that schizophrenia or dementia praecox be thought of as a

2 Eugen Bleuler, "The Physiogenic and Psychogenic in Schizophrenia", in the American Journal of Psychiatry, Vol. 10, No. 2, September 1930, p. 203-211.

3 Eugen Bleuler, Dementia Praecox or the Group of Schizophrenias, translated by Joseph Zinkin, New York, International Universities Press, 1950, p. 8.

4 Leopold Bellak, (ed.), "The Schizophrenic Syndrome", in Schizophrenia: A Review of the Syndrome, New York, Logos, 1958, p. 4.

psychiatric syndrome rather than a single disease entity. Continuing, he indicated that the variety of symptoms generally associated with schizophrenia as a diagnostic label must be understood as the final common path or end result of a number of conditions which may lead to and become manifest in a severe ego disturbance. Thus it can be noted that, for Bellak, schizophrenia is the end result of a number of causes and is typified by a severe disturbance of the ego. This is in contrast to earlier theories which considered schizophrenia as having a common cause rather than multiple causes.

The conditions which Bellak proposed as leading to, causing or resulting in schizophrenia were classified into four broad categories. Specifically, these categories were referred to as factors. The factors enumerated were: chemogenic, histogenic, genogenic, and psychogenic. Bellak theorized that any one or any combination of these factors may lead to schizophrenia.

As an illustration of the multiple-factor theory, reference can be made to the "model" psychosis, i.e., studies dealing with induced psychotic states. For example, Saraga and Chalden⁵ induced schizophrenic-like states with lysergic

5 G. Saraga and L. Chalden, "Schizophrenia and the Model Psychoses", in the Journal of Clinical and Experimental Psychopathology, Vol. 17, No. 3, August 1958, p. 405-413.

acid diethylamide (LSD-25). Whether administered orally or intravenously, when comparing the "model" to naturally occurring psychosis the following similarities were noted: anxiety, perceptual disturbances, elation and depression, hyperactivity, delusions, ego disturbance and thought disturbances. The concluding hypotheses were that: 1) LSD is related to a chemical factor involved in the genesis of naturally occurring schizophrenia, 2) schizophrenia may be a psychological change which is accompanied by metabolic or chemical disturbances which are similar to LSD, and 3) the induced states of schizophrenia, though similar in symptoms, in no way reflect the similarities in cause. To emphasize this latter point, within the chemogenic factor, mescaline will also induce a similar psychosis. The conclusions of this study conform in many respects to the multiple-factor theory even though its primary concern is with the chemogenic factor.

In contrast to chemically induced schizophrenic-like states, reference can be made to those studies using sensory deprivation as another means of eliciting symptoms similarly found in schizophrenia. Bexton, Heron and Scott⁶ investigated the hypothesis that the maintenance of normal,

⁶ W.H. Bexton, W. Heron, and T.H. Scott, "Effects of Decreased Variation in the Sensory Environment", in the Canadian Journal of Psychology, Vol. 8, No. 2, June 1954, p. 70-76.

intelligent, adaptive behavior required continually varied sensory input. Of interest here are some of the qualitative aspects which were similar to the findings in the chemical study. Noted were: emotional lability, elation and depression, irritability and significant differences between the control group and the experimental subjects with the latter group exhibiting an inferior performance on tasks involving cognitive processes.

In a second study, Heron, Doane and Scott⁷ were interested in systematically investigating the visual effects of isolation. The effects of isolation reported were similar to those previously mentioned. Also of interest, the authors commented that the effects were similar to those observed with the use of mescal, LSD and in certain types of brain damage. The electro-encephalographic records showed marked delta activity and slow frequencies in the alpha band.

A consideration of the implications of the studies just discussed illustrates rather conclusively the possibility of multiple causality in schizophrenia. In Bellak's terms, the drug studies could be subsumed under the factor of chemogenesis and the sensory deprivation experiments under the psychogenic factor. Hence, it can readily be observed

⁷ Woodburn Heron, B.K. Doane and T.H. Scott, "Visual Disturbance After Prolonged Perceptual Isolation", in the Canadian Journal of Psychology, Vol. 10, No. 1, March 1956, p. 13-18.

that with obvious differences in cause, two different drugs and perceptual isolation, there were numerous similarities in manifest behavior. In other words, though the causes were different they manifest themselves in similar ego disturbances or end result. As Bellak would put it, "the final common path of psychotic experiences can be produced by psychological experiences as well as toxic substances".⁸

Frequent reference has been made to ego disturbance, however, in and of itself it may have various interpretations. Bellak⁹ was specific in his definition of ego disturbance. The disturbance could be noted in relation to what he referred to as ego-function. Thus there could be a disturbance in any of the seven ego-functions which were listed as: 1) relation to reality, 2) regulation and control of drives, 3) object relations, 4) thought processes, 5) defensive functions, 6) autonomous functions, and 7) synthetic functions. In terms of the theory, disturbance of these ego-functions will be manifest in schizophrenia whether the cause be all or any of the factors previously enumerated.

From this brief exposure to Bellak's multiple-factor psychomatic theory, it becomes readily apparent that it is quite encompassing and comprehensive. It is because of these

⁸ Bellak, Op. Cit., p. 30.

⁹ Ibid., p. 8.

numerous attributes that it becomes essential to first limit the theory in order to systematically investigate certain aspects of it. To study the multiple factor theory in its totality would be not only cumbersome, but pure folly.

Hence this thesis will restrict itself to a consideration of the psychogenic factor, representing the cause, and thought processes, representing the ego disturbance.

As previously mentioned, the overall division of schizophrenia into two groups or two types of schizophrenia was first suggested by Bleuler¹⁰ in his criticism of Kraepelin's categories, when he indicated differences in prognosis. In agreement with Bleuler, according to Becker¹¹ prognostic studies of schizophrenia have led to the conclusion that remitting schizophrenics have a better personality adjustment before and during illness. It was his contention that if controlled research in the area of schizophrenia is to be undertaken, then some meaningful way of organizing the gross individual differences among schizophrenics is necessary.

¹⁰ Bleuler, Dementia Praecox or the Group of Schizophrenias, Op. Cit., p. 4-7.

¹¹ Wesley C. Becker, "A Genetic Approach to the Interpretation and Evaluation of the Process-Reactive Distinction in Schizophrenia", in The Journal of Abnormal and Social Psychology, Vol. 53, No. 2, September 1956, p. 229-236.

The personality adjustment referred to by Becker is of prime importance in restricting this study to the psychogenic factor. As was mentioned, within the chemogenic factor, there is evidence to suggest multiple causality within this factor in that two different drugs resulted in the same end state. The literature would indicate the plausibility of a similar distinction within the psychogenic factor. However, this division is made in terms of case histories or explicitly, pre-psychotic adjustment. Here the concern is with the observable, i.e., personality adjustment, however, this is not to deny the possibility of other influencing factors. Though the other factors may play a role in determining the premorbid adjustment, it is the actual adjustment that is observable. It would not be accurate to infer, for example, the influence of the histogenic factor if it manifested itself only after the onset of schizophrenia. Jackson¹² has indicated that it is questionable whether the physical abnormalities seen in chronic schizophrenics are causes or effects. The findings of Heron, Doane and Scott¹³ in regards to the resultant electro-encephalographic patterns after perceptual isolation, suggest that the disturbance

¹² Don D. Jackson, (ed.), The Etiology of Schizophrenia, New York, Basic, 1960, p. 14.

¹³ Heron, Doane, and Scott, Op. Cit., p. 13-18.

noted in the patterning was an effect rather than a cause. The disrupted pattern was not present previous to isolation, thus unobservable.

To continue now, keeping premorbid adjustment in the fore, in the more recent literature a seemingly more meaningful method of organizing the gross individual differences among schizophrenics has become apparent. One group of schizophrenics has been designated as process, chronic, malignant, true or typical, and the other as reactive, acute, benign or atypical. It appears that the former group refers to dementia praecox as Kraepelin defined it, and the latter to those schizophrenics more likely to remit. Recently, Winder¹⁴ indicated that the research suggests that there are primarily two groups, the reactive and the process, and they can be differentiated in terms of the adequacy of premorbid adjustment.

Kantor, Wallner and Winder¹⁵ appear to be some of the first to systematically study the reactive-process dimension. They established a criteria for judging case histories as reactive or process. Their concern was whether or not

14 C.L. Winder, "Some Psychological Studies of Schizophrenia", in The Etiology of Schizophrenia, Don D. Jackson, (ed.), New York, Basic, 1960, p. 239.

15 Robert E. Kantor, Julius M. Wallner and C.L. Winder, "Process and Reactive Schizophrenia", in the Journal of Consulting Psychology, Vol. 17, No. 3, June 1953, p. 157-162.

schizophrenics could be classified as reactive and process and, secondly, did diagnoses based on the Rorschach alone label as non-psychotic a portion of the population of mental patients diagnosed schizophrenic. Thirdly, they were concerned with the question of whether or not those classified as non-psychotic from the Rorschach were classified as reactive from the case histories and those classified as psychotic, via Rorschach, were classified as process from the case history. The results were in support of the hypotheses. The authors concluded that cases classified as reactive from case history data tended to be classified as non-psychotic from the Rorschach, and those viewed as process from the case history were classified as psychotic from the Rorschach. Furthermore, schizophrenics could be reliably differentiated into the reactive and process categories. It was the author's contention that this study supported the view that schizophrenia could be elaborated to include the reactive-process dimension. The evidence indicated that the two schizophrenic groups differed in their thinking characteristics.

Other authors, again using case history data, have reached similar conclusions. Brackbill and Fine¹⁶ found

¹⁶ Glen A. Brackbill and Harold J. Fine, "Schizophrenia and Central Nervous System Pathology", in The Journal of Abnormal and Social Psychology, Vol. 52, No. 3, May 1956, p. 310-313.

significant differences between reactive and process schizophrenics, and the reactive group and organics. Using the Pietrowski signs on the Rorschach, five signs indicative of organicity, the authors concluded, in support of their hypothesis, that process schizophrenics react to a perceptual task in a manner similar to organics.

Fine and Zimet,¹⁷ too, divided schizophrenics into process and reactive groups on the basis of case history material. As defined by Rorschach developmental scores, they hypothesized that process schizophrenics show more indices of perceptual immaturity than reactive schizophrenics, with the latter group reflecting more perceptual maturity. With the results supporting the hypotheses, they concluded that seemingly one of the critical differences between reactive and process schizophrenics was in terms of a kind of thinking disorder.

From this brief consideration of the reactive-process dimension in terms of at least being able to distinguish the two groups, the literature appears to be in support of the contention. Also, the manner in which the distinction has been made, i.e., case history data, would seem to indicate the necessity of relegating it to Bellak's psychogenic

17 Harold J. Fine and Carl W. Zimet, "Process-Reactive Schizophrenia and Genetic Levels of Perception", in The Journal of Abnormal and Social Psychology, Vol. 59, No. 1, July 1959, p. 83-85.

factor. The nature of the case history material upon which the judgments were based was such as to restrict judges to only that which was observable, i.e., the premorbid adjustment. Thus accepting Becker's¹⁵ contention that some schizophrenics remit and have a better personality adjustment before and during illness and not ignoring the possible influence of other factors than psychogenic, and considering the research mentioned, it appears that the reactive-process division may be justified. Again, at the risk of being repetitious, judging from the case history criteria which have emphasized the observable premorbid adjustment and the psychological influences, it would seem most plausible to consider the reactive-process dimension within the psychogenic framework of Bellak's theory. In essence, it is these criteria which predominantly influence or determine whether the individual will be considered as a reactive or process schizophrenic.

Having restricted Bellak's theory to the psychogenic factor representing the cause and suggesting that this is a feasible method for differentiating schizophrenic groups, i.e., the reactive-process dimension defined within this factor, it is essential to introduce the second restriction, namely the thought process which represents the ego function or, as in the case of schizophrenia, the ego disturbance.

¹⁵ Becker, Op. Cit., p. 229-236.

As previously stated, it was Bellak's¹⁹ contention that one of the disturbances of ego function that could be noted in schizophrenia became apparent in the manifest thought processes. Again, he was explicit in discerning the ego function within this somewhat broad category. In his effort to be definitive, he specified abstracting ability as one of the ego functions within the category of thought processes. In contrast, concretism was considered as indicative of the ego disturbance. It was not implied that all schizophrenic thinking was typified by concretism, nor was it denied. The implications are that there may be differences among schizophrenics in their abstract ability. The remaining sections of this chapter will be chiefly concerned with abstraction and concretism in schizophrenia. Through this consideration the reactive-process dimension should become more apparent.

2. Support for Abstract Ability.

The meaning of abstract ability, in itself, necessitates some elaboration. Within the literature, various meanings have been ascribed to this function and, for the most part, they are within the confines of Goldstein's conception of the abstract attitude. The abstract attitude

19 Bellak, Op. Cit., p. 8.

has been defined by Goldstein and Sheerer²⁰ as when the individual goes beyond specific boundaries or sense impressions and responds to an individual thing in a manner which may be representative of a category or class. The individual becomes detached from the given impression and is oriented in his action by a conceptual viewpoint, a category, class, or a general meaning under which the particular object may fall. The abstract attitude implies a conscious activity such as reasoning rather than a passive receptivity.

At a later date, in defining the abstract attitude, Goldstein²¹ explained that there was a transgression of the immediately given specific aspect or sense impression and abstraction occurs from particular properties. Hence, the abstract attitude could be called categorical and the abstract behavior active. Goldstein pointed out that when the individual is dependent upon the immediate claims of the stimulus, distraction may result. This latter point has generated research which suggests that the schizophrenic can abstract and the shortcomings in his performance are a result of the distraction phenomena.

²⁰ Kurt Goldstein and M. Sheerer, "Abstract and Concrete Behavior: An Experimental Study with Special Tests", in the Psychological Monographs, Vol. 53, No. 2, 1941, p. 3.

²¹ Kurt Goldstein, "Methodological Approach to the Study of Schizophrenic Thought Disorder", in Language and Thought in Schizophrenia, J.S. Kasanin, (ed.), Berkeley, University of California Press, 1944, p. 17-40.

Chapman, at the present time, seems to be one of the more prominent figures in this area. In one study, Chapman²² hypothesized that the inferior performance on conceptual tasks by schizophrenics was, at least in part, due to their handling of the test materials in other ways than those required by the instructions, rather than due only to an inability to form concepts. The "chronic" schizophrenic group, it was found, used the incorrect distractor commonalities as a basis for sorting whereas the normal group sorted more in accordance with the correct stimulus. The results were interpreted as supporting the hypothesis in that sortings based upon incorrect commonalities required a conceptual ability.

The importance of such intrusion responses was not new in the literature at the time of Chapman. More than a decade before, the importance of intrusion responses or distractor commonalities was advanced in the proposals of such writers as Cameron²³ and, more recently, Shakow.²⁴

22 Loren J. Chapman, "Distractibility in the Conceptual Performance of Schizophrenics", in The Journal of Abnormal and Social Psychology, Vol. 53, No. 3, November 1956, p. 286-291.

23 Norman Cameron, "Reasoning, Regression and Communication in Schizophrenia", in the Psychological Monographs, Vol. 50, No. 1, 1938, p. 1-34.

24 D. Shakow, "The Nature of Deterioration in Schizophrenic Conditions", in Nervous and Mental Disease Monographs, Vol. 70, No. 2, 1946, p. 1-88.

Again, concerned with intrusion responses in a similar framework, Chapman²⁵ oriented a study contrary to Goldstein and Sheerer's²⁶ view that the schizophrenic has lost the abstract attitude and as a consequence must rely on the concrete attitude. The author reasoned that concrete and other incorrect sortings of schizophrenics could be viewed not as a consequence of an inability to form a concept, but as a distraction phenomenon, an intrusion, into otherwise correct sorting, of an inappropriate response to distracting stimuli. Comparing the "pull" of two kinds of distractors, namely, opportunities to sort by incorrect identical whole figures, and opportunities to sort by incorrect conceptual commonalities, Chapman hypothesized that schizophrenics were more distracted by opportunities to respond inappropriately to whole objects than by opportunities to respond inappropriately to incorrect concepts than were normals. Elaborating the hypothesis, on a conceptual sorting task in which the distracting commonalities were other concepts, schizophrenics would be distracted, as in the previous study, by the incorrect conceptual commonalities. However, if the distracting commonalities were identities,

²⁵ Loran J. Chapman, "The Role of Type of Distractor in the 'Concrete' Conceptual Performance of Schizophrenics", in the Journal of Personality, Vol. 25, No. 2, December 1956, p. 130-141.

²⁶ Goldstein and Sheerer, Op. Cit., p. 9.

then the schizophrenics would more often abandon the instructions to sort by incorrect commonalities. The results confirmed the prediction that the schizophrenic group as a whole would be more distracted by opportunities for incorrectly sorting by identities than by conceptual commonalities. Support was given for the author's contention that the concrete behavior of schizophrenics was, at least in part, a distraction phenomenon rather than solely the result of an inability to form concepts. A schizophrenic must be able to form a concept in order to be distracted by it.

It may be worthwhile to consider the results of the preceding study in greater detail. Although the prediction for the groups as a whole were confirmed, it should be noted that some schizophrenic subjects differed markedly on their error tendencies. Some made few errors while others were distracted more by concepts than by identities. In addition, the sampling could be questioned in that there was a significant difference between the mean I.Q.'s of the two groups. The author felt that the lower I.Q. of the schizophrenic group could be accounted for in that it would be expected as a result of a functional disease. Also, the author was justifiably guarded in his statement that the results, only in part, account for the inappropriate dealing with conceptual tasks noted in schizophrenics. Comments made by the subjects indicated that some of the errors arose from sources

other than the one being isolated by the manipulation of the experimental variable.

Before considering another area of research, it might be well to consider two additional studies in which Chapman was involved. Chapman and Taylor²⁷ attempted to isolate stimulus conditions that result in certain types of errors made by schizophrenics on conceptual sorting tasks. It was expected that schizophrenics would select, of the incorrect items, those that were more similar. This was significantly confirmed and the authors interpreted these findings as additional support to their contention that schizophrenic inferiority on conceptual tasks was due to over responsiveness to inappropriate stimuli rather than loss of conceptual ability per se.

Again, more recently, Chapman²⁸ concluded that as the difficulty of concepts increases the inferiority of schizophrenics when compared to normals becomes more magnified. However, the inferiority was intensified when the test material contained opportunity for incorrect sorting

27 Loran J. Chapman and Janet A. Taylor, "Breadth of Deviate Concepts Used by Schizophrenics", in The Journal of Abnormal and Social Psychology, Vol. 54, No. 1, January 1957, p. 118-123.

28 Loran J. Chapman, "Intrusion of Associative Responses into Schizophrenic Conceptual Performance", in The Journal of Abnormal and Social Psychology, Vol. 56, No. 3, May 1958, p. 374-379.

by associative distractors. The results also indicated that regardless of the difficulty of the correct task, susceptibility to associative distraction was a common source of error in the schizophrenic group.

It could be concluded from Chapman's studies that he feels the schizophrenic can abstract and form concepts. Together the studies might be interpreted as attempting to delimit the variables which result in the schizophrenic's inability to maintain a set or, in other words, follow the prescribed instructions. As early as 1940, Rodnick and Shakow,²⁹ studying reaction times of normals and schizophrenics, indicated that schizophrenics have difficulty in maintaining set. Hence this area of study has been given considerable consideration. Adopting a somewhat different approach, there are other advocates of abstract ability in schizophrenia.

Hunt³⁰ felt that there was no loss or serious impairment of abstract ability in schizophrenia, but rather the apparent loss was a result of inadequate motivation. He claimed that when adequate rapport had been established that

²⁹ E.H. Rodnick and D. Shakow, "Set in the Schizophrenic as Measured by Composite Reaction Time", in the American Journal of Psychiatry, Vol. 97, No. 1, July 1940, p. 214-225.

³⁰ J. McV. Hunt, "Psychological Loss in Paretics and Schizophrenics", in the American Journal of Psychology, Vol. 47, No. 3, July 1935, p. 458-465.

even the very disorganized schizophrenics could be led to generalize quite freely and shift their mode of attack from one category to another.

Cavanaugh,³¹ too, investigated the role of motivation in the performance of schizophrenics on concept formation tasks. He questioned whether or not escape from aversive stimuli, in this case noise, would decrease impairment in conceptual ability in schizophrenics and, also, whether there were any differences in the formation of social as opposed to formal concepts under the condition of increased motivation. He found that, with increased motivation, schizophrenics attained the level of normals on both social and formal test material. The performance of the unmotivated group was markedly inferior. Suggesting that schizophrenics suffered from decreased motivation rather than impairment of abstract ability per se, the author interpreted the results in terms of a temporary relinquishing of the schizophrenic defenses enabling them to perform at a level more representative of potential ability than that elicited in the usual testing situation. A criticism, though not to discredit the study, could be that the aversive stimuli created an unusual circumstance much as a drug might and,

³¹ David K. Cavanaugh, "Improvement in the Performance of Schizophrenics on Concept Formation Tasks as a Function of Motivational Change", in The Journal of Abnormal and Social Psychology, Vol. 57, No. 1, July 1958, p. 8-12.

as was apparent in the control group, the schizophrenics may be dominated by more concrete behavior under usual conditions. It is within the latter situation they more generally function.

Before concluding this section, brief reference can be made to two additional studies adopting, yet, another point of view. McGaughran and Moran³² examined the issue of whether schizophrenic thought could be considered abstract or concrete, or whether it could best be characterized as a disorder in social communication. Their results indicated that schizophrenics suffer a loss of social communication rather than a loss of abstract ability. Similarly, Hunt and Jones³³ concluded that schizophrenic groups demonstrate more a loss of social communication without evidence of impairment of abstract ability.

The studies reviewed in this section would tend to suggest that the schizophrenic can abstract and form concepts. However, it could be noted in some cases that the schizophrenic subjects failed to demonstrate the abstract ability as defined by the authors. In addition, when a

32 Laurence S. McGaughran and Louis J. Moran, "Conceptual Level v.s. Conceptual Area Analysis of Object Sorting Behavior of Schizophrenics and Non-Psychotic Groups", in The Journal of Abnormal and Social Psychology, Vol. 52, No. 1, January 1958, p. 43-50.

33 William A. Hunt and Nelson F. Jones, "Clinical Judgments of Some Aspects of Schizophrenic Thinking", in The Journal of Clinical Psychology, Vol. 14, No. 3, July 1958, p. 235-239.

schizophrenic failed to abstract the inability was accounted for by various interpretations rather than that they simply functioned at a concrete level. The following section will emphasize primarily those studies in which the authors view schizophrenic thinking as typified by concretism.

3. Support for Concretism.

Providing a frame of reference, Goldstein³⁴ has defined the concrete attitude, in contrast to the abstract, as being more realistic in that the person is given over and bound to the immediate experience of a given thing or situation in its particular uniqueness. Thinking and acting are passive, being directed by the immediate claims made by one particular aspect of the object or situation in the environment. Accordingly, Goldstein and Sheerer³⁵ felt that the concrete attitude did not imply conscious activity in the sense of reasoning, awareness or self account of what one was doing. Also, the authors indicated that this latter behavior typified the schizophrenic in that schizophrenics manifested considerable difficulty in abstracting or sorting objects into classes. They concluded that one of the more prominent features of the schizophrenic thought process

34 Goldstein, Op. Cit., p. 17-40.

35 Goldstein and Sheerer, Op. Cit., p. 2.

was that of concretism. Numerous other authors have concluded similarly.

For example, Bolles and Goldstein,³⁶ using a modification of an object sorting test, observed that schizophrenics seemed to be impressed by the particular uses of objects and would not act in terms of broader categories. Even when the objects were grouped differently, the patients were often unable to verbalize the concepts. They concluded that a characteristic defect of schizophrenia was an impairment of abstract behavior. In agreement with Bolles and Goldstein, Cohen, Senf and Huston,³⁷ noted that the schizophrenic patient often responds to concept formation tasks, as well as other tasks, with content relevant to his personal preoccupations although irrelevant to the task as it was presented by the experimenter.

Cameron³⁸ referred to this preoccupation as an interpretation of personal themes into the task and that this may reflect the problems which agitate the patient.

³⁶ Marjorie Bolles and Kurt Goldstein, "A Study of the Impairment of Abstract Behavior in Schizophrenic Patients", in the Psychiatric Quarterly, Vol. 12, No. 1, January 1938, p. 42-65.

³⁷ B.D. Cohen, R. Senf and F. Huston, "Effects of Amytal and Affect on Conceptual Thinking in Schizophrenia, Depression and Neurosis", in the Archives of Neurology and Psychiatry, Vol. 71, No. 1, January 1954, p. 171-180.

³⁸ Cameron, Op. Cit., p. 1-34.

Hanfmann,³⁹ too, observed, using a picture completion test, that schizophrenics were unable to keep apart personal wishes or fears, objective reality, and the system of symbolic representation by picture or word. Bleuler⁴⁰ summarized similar phenomena with his concept of autism. He felt that there was a detachment from reality in the schizophrenic and this, being accompanied by a predominance of the "inner life", led to the introduction of personal themes into the task confronting the schizophrenic. The observations of these authors would suggest that the marked distortions in schizophrenic thinking occur most frequently when stimuli are present which arouse personal conflict. Other investigators, adhering to the view that schizophrenic thought is concrete, have reached similar conclusions regarding symbolism and personal conflict.

According to Cohen, et al.,⁴¹ Wegrochi noted that in spite of a very superior score achieved on three tests by a group of schizophrenics with a low error score, these patients tended to lapse into a bizarre phraseology when not attending directly to the test problems. Another

39 Eugenia Hanfmann, "Thought Disturbances in Schizophrenia as Revealed by Performance in a Picture Completion Test", in The Journal of Abnormal and Social Psychology, Vol. 34, No. 2, April 1939, p. 249-264.

40 Bleuler, Dementia Praecox or the Group of Schizophrenias, Op. Cit., p. 63.

41 Cohen, Senf and Huston, Op. Cit., p. 171-180.

abnormality in behavior observed in this group, and not duplicated by either normal adults or children, was the tendency to demonstrate, through their responses to the test items, the problems which agitated them. The remaining schizophrenics, particularly the high error score groups, showed a more extensive number of behavior disorders. In part, these included: domination by a particular set, an inability to organize the stream of associations, and a lack of ability to focus on the problem situation.

Similarly, Gorham,⁴² using a proverbs test, found that on free answers the schizophrenics' abstracting ability breaks down and tends toward concreteness. The author indicated that the schizophrenic frequently "escapes" by a further regression characterized by originality in his performance. The evidence suggesting this type of behavior was bizarreness, irrelevance, perseveration and delusional preoccupation as the prominent features of the schizophrenic responses. The apparent irrelevance referred to in this study may be, in view of research previously mentioned, an intrusion into the responses of personal themes, or the stimulus may have a symbolic quality which evokes the seemingly irrelevant response.

⁴² Donald R. Gorham, "Use of Proverbs Test for Differentiating Schizophrenics from Normals", in the Journal of Consulting Psychology, Vol. 20, No. 6, December 1956, p. 435-440.

Raush⁴³ studied the effects of stimuli with a symbolic value and neutral value. He hypothesized that the former would have a greater influence on the perceptual judgments of schizophrenics. The prediction was that schizophrenics would judge symbolic objects as larger in relation to their judgment of neutral objects. With the results supporting the hypothesis, the author concluded that the schizophrenic was stimulus bound and the object distortions were related to the specific content of the stimulus material.

The results of these studies dealing with the symbolic quality of the stimulus and the introduction of personal themes into the responses might suggest that the schizophrenic has difficulty in maintaining set. In other words, the subject is dominated by his own needs to such an extent that he cannot divorce himself from them and respond to the task in accordance with the given instructions. This interpretation appears to be congruous with Cameron's⁴⁴ thinking. He felt that the schizophrenic could not manage the essential first step in problem solving, that of

⁴³ Harold L. Raush, "Object Constancy in Schizophrenia: the Enhancement of Symbolic Objects and Conceptual Stability", in The Journal of Abnormal and Social Psychology, Vol. 52, No. 2, March 1956, p. 231-234.

⁴⁴ Norman Cameron, "Schizophrenic Thinking in a Problem Solving Situation", in the Journal of Mental Science, Vol. 85, No. 4, October 1939, p. 1012-1035.

narrowing down one's operations to something restricted and unified enough to call out organized attitudes and specific responses. Cameron⁴⁵ noted, also, that one of the most striking characteristics of schizophrenics was their inability to maintain adequate boundaries with a tendency toward overinclusion.

In support of Cameron's view, Epstein⁴⁶ found that overinclusion occurred with significantly greater frequency in a schizophrenic group than it did in a normal group. Underinclusion was noted in both groups though they did not differ significantly in this regard. The author hypothesized that underinclusion when found in schizophrenics, was a reaction to a more basic tendency to be overinclusive. Concluding the author stated that schizophrenics tend to overinclude stimuli which are concretely related to the task at hand.

Zaslav,⁴⁷ too, noted that in schizophrenia conceptual boundaries seemed to be unstable and that this became

45 Norman Cameron, "Deterioration and Regression in Schizophrenic Thinking", in The Journal of Abnormal and Social Psychology, Vol. 34, No. 2, April 1939, p. 265-270.

46 Seymour Epstein, "Overinclusive Thinking in a Schizophrenic and a Control Group", in the Journal of Consulting Psychology, Vol. 17, No. 5, October 1953, p. 384-388.

47 Robert W. Zaslav, "A New Approach to the Problem of Conceptual Thinking in Schizophrenia", in the Journal of Consulting Psychology, Vol. 14, No. 5, October 1950, p. 335-339.

magnified when the task involved subtle gradations along a continuum. The author stated that the range of similarity that the schizophrenic treats as functionally equivalent tends to be either constricted to an abnormal degree, here referring to underinclusion, or diffusely expended due to overinclusion of essentially dissimilar objects. The underinclusion or constricted conceptual grouping was considered as a sign of concreteness with the overinclusion being a result of the perseverating tendencies of schizophrenics.

The concluding remarks in a study by Fey⁴⁵ would tend to summarize the observations in the research discussed thus far. Comparing schizophrenics to normals on a sorting test, she observed greater trial and error in the schizophrenic group as well as a higher frequency of perseverative responses. As a final note, she added that the schizophrenics experienced greater difficulty in solving a problem generally assumed to involve the effective utilization of generalizations or concepts. The several aspects of schizophrenic performance mentioned such as perseveration, difficulty in maintaining set, and the difficulty in responding to patterns as wholes, could be subsumed under the explanatory concept as a loss of the abstract attitude.

⁴⁵ Elizabeth T. Fey, "The Performance of Young Schizophrenics on the Wisconsin Card Sorting Test", in the Journal of Consulting Psychology, Vol. 15, No. 4, August 1951, p. 311-319.

Reaching essentially the same conclusion that schizophrenics manifest a deficit in abstract ability, Whiteman⁴⁹ investigated this phenomenon using a test of social concepts as well as one involving formal concepts. He hypothesized that schizophrenics would exhibit a greater decrement, relative to normals, on a test of social concepts than on tests of formal concepts. In general, more schizophrenics than normals demonstrated a deficit in abstract ability. Specifically, the normals performed significantly superior on both types of tests, however, the schizophrenic decrement on the social concept test proved significantly greater than the decrement on the test of formal concepts. The author, interpreting the results, stressed the importance of the social withdrawal noted in schizophrenia as a determinant of the deficit in cognitive functioning. Furthermore, the concept of impairment of abstract attitude alone, the author felt, was insufficient to account for the schizophrenic deficit of the social concept test.

More recently Whiteman⁵⁰ presented certain qualitative features of schizophrenic thought as manifested on a

49 Martin Whiteman, "The Performance of Schizophrenics on Social Concepts", in The Journal of Abnormal and Social Psychology, Vol. 49, No. 2, April 1954, p. 226-271.

50 -----, "Qualitative Features of Schizophrenic Thought in the Formulation of Social Concepts", in the Journal of Nervous and Mental Diseases, Vol. 124, 1956, p. 199-204.

social concept test. Investigating uniqueness and appropriateness of responses, type of verbalizations and the frequency of rejections, he found that schizophrenics gave significantly more unique responses and were less explicit in their verbalizations. In addition, they more frequently rejected the task and, also, although they would give the correct verbal response, the schizophrenics would misapply the appropriate response and give an incorrect sorting.

Flavell⁵¹ studied explicitly the relationship between verbal impairment, as a measure of abstract thinking, and impairment of social relationships. The results revealed that normals exceeded schizophrenics in the ability to select, as most similar in meaning to a given word, that word which was related in an essential abstract way. Secondly, within the schizophrenic group, the above ability was significantly correlated with the adequacy of everyday social interaction, the latter being measured by ward nurses' rankings. Though there were significant group differences suggesting schizophrenic thinking is concrete, there was considerable overlap between the groups. Thirty-three per cent of the schizophrenics achieved abstract scores above the normal group mean and twenty-five per cent of the normals scored below the mean of

41 John H. Flavell, "Abstract Thinking and Social Behavior in Schizophrenia", in The Journal of Abnormal and Social Psychology, Vol. 52, No. 2, March 1956, p. 208-211.

the schizophrenic group. The sample in this study might well explain the results in that the schizophrenics were described as chronic, being hospitalized from one to twelve years, variation in the degree of "ego intactness", some barely testable and others with little cognitive impairment. The variety of scores are in keeping with the variety of subjects in the sample.

This section has demonstrated the variety of approaches used to measure abstract ability as well as the numerous interpretations adopted to explain the findings. Primarily the authors discussed have advocated concretism or impairment of abstract ability as that which typifies the schizophrenic thought within this dimension. Contrasted to the previous section, it was not uncommon to find a similar result explained in a different light. For example, one author might conclude that schizophrenics can abstract except that they ascribe a personal meaning to the stimulus material whereas an advocate of concretism might say that the schizophrenic cannot abstract because he ascribes a personal meaning to the stimuli. Another characteristic of the studies was the poorly described samples. In many instances there was an overlap in the performance of the schizophrenics and the control subjects. As the study by Flavell⁵² would suggest, the overlap might be

52 Flavell, Op. Cit., p. 208-211.

accounted for by the heterogeneity within the schizophrenic sample. The heterogeneity within the broad classification of schizophrenia may be responsible for this apparent dilemma in the abstract-concrete dimension.

In the following section, the studies presented attempt to deal more specifically with the heterogeneity as it is related to thought processes in schizophrenia.

4. Subject Variable.

That there are differences in the ability to abstract and form concepts among schizophrenics, regardless of the interpretation given for the various results, is apparent from the consideration of the foregoing sections. Furthermore, a review of studies discloses, though not detailed herein, that there has been, for the most part, less emphasis on the sampling than there has been on the type of behavior being measured. Other authors, in their research, have indicated that a distinction should possibly be made between schizophrenics rather than consider them as a homogeneous group.

Concerned with thinking disturbances in schizophrenia as revealed by the Horschach and a concept formation test, Benjamin⁵³ found, according to diagnostic category, that the

⁵³ J.D. Benjamin, "A Method for Distinguishing and Evaluating Formal Thinking Disorders in Schizophrenia", in Language and Thought in Schizophrenia, J.S. Kasasin, (ed.), Berkeley, University of California Press, 1944, p. 66-71.

most marked disturbances in conceptual thinking appeared in hebephrenics, paranoids and chronic insidious schizophrenics. The least disturbance was noted in the acute catatonics. He pointed out that some patients diagnosed as schizophrenic, on the basis of psychiatric examination, did not display signs of a thinking disorder in the slightest degree. Also, he noted that the signs of thinking disorders were relatively independent of the stage of illness and the momentary clinical condition of the patient. The signs were to be found in almost all so-called deteriorated cases and sometimes in the less pronounced cases as well. The implication of these findings is that there may be more than one type or kind of schizophrenic. Of additional importance, is the role of the case history in the general diagnosis of schizophrenia.

Emphasizing the latter point, Bellak,⁵⁴ in his earlier writings, suggested that schizophrenia should be divided into two subgroups, dementia praecox and schizophrenia. The cases of dementia praecox were described as having a maximum somatic, constitutional predisposition and a minimum of sociopsychological predisposition or precipitating causes. The other subgroup, the schizophrenics, would have the reverse of the dementia praecox group. Although Bellak, in more recent

⁵⁴ Leopold Bellak, Dementia Praecox, New York, Grune and Stratton, 1948, p. 445.

writings, has become more explicit in his theory and reformulated some of his ideas, the differences in the development of schizophrenia remains as one of the more important aspects.

The thinking, of both Benjamin and Bellak, appears to coincide with the reactive-process dimension of schizophrenia as outlined in the first section of this paper in that the premorbid personality rather than the final diagnosis is of increasing importance.

Again, demonstrating subject differences, Langfeldt⁵⁵ did a follow-up study of two hundred schizophrenic patients. One half of the patients, paranoics and hebephrenics were viewed as process because they showed an insidious development resulting in a gradual change of personality and a "typical" initial symptomatology. Prognosis for this group was poor whereas for the remaining patients, considered as atypical or reactive, there was greater prognosis thus suggesting the differentiation of the two groups. Other

⁵⁵ Gabriel Langfeldt, "The Diagnosis of Schizophrenia", in The American Journal of Psychiatry, Vol. 106, No. 2, August 1951, p. 123-125.

prognostic studies^{56,57,58,59} have reached essentially the same conclusion in that remitting schizophrenics demonstrated a better personality adjustment before and during illness.

Acknowledging the individual differences among schizophrenics, Becker⁶⁰ was interested in how they would reveal themselves in thought processes. Evaluating social history data in terms of the reactive-process dimension, he hypothesized that those patients more nearly approximating the process syndrome would show more regressive and immature thinking than reactives. Using the Rorschach and proverbs to evaluate thinking processes, the prediction was, in part, confirmed. The results indicated confirmation when the focus was on perceptual organization, meaning Rorschach

56 Robert C. Hunt and Kenneth E. Appel, "Prognosis in Psychoses Lying Midway Between Schizophrenia and Manic-Depressive Psychoses", in The American Journal of Psychiatry, Vol. 93, No. 2, September 1936, p. 313-339.

57 Otto Kant, "Differential Diagnosis in Schizophrenia in the Light of Concepts of Personality Stratification", in The American Journal of Psychiatry, Vol. 97, No. 2, September 1940, p. 342-357.

58 Bernard A. Stotsky, "A Comparison of Remitting and Nonremitting Schizophrenics on Psychological Tests", in The Journal of Abnormal and Social Psychology, Vol. 47, No. 2, April, 1952, p. 489-496.

59 Wesley C. Becker and Robert L. McFarland, "A Lobotomy Prognosis Scale", in the Journal of Consulting Psychology, Vol. 19, No. 3, June 1955, p. 157-162.

60 Becker, Op. Cit., p. 229-236.

performance, but not so when the emphasis was on conceptual organization as measured by the proverbs.

Kantor, Wallner and Winder,⁶¹ too, found differences between reactive and process schizophrenics in Rorschach performance. Their findings tend to corroborate Benjamin's⁶² results in that some patients diagnosed schizophrenic on the basis of case history material did not show signs of a thinking disorder in terms of the Rorschach. The conclusion was that process cases, as diagnosed by the authors, show evidences of a thinking disorder while the reactive cases do not. It was indicated, also, that there seemed to be a higher rate of discharge among the reactive schizophrenics. In that the general criterion for classifying a patient as a reactive schizophrenic is the evidence of a better personality adjustment before and during illness, the apparent increased discharge rate of the patients in this study would appear to be in keeping with the general arrived at conclusions of the prognostic studies.

More recently, Fine and Zimet⁶³ classified schizophrenic patients as reactive or process on the basis of the case history data. Again, employing the Rorschach, they

61 Kantor, Wallner and Winder, Op. Cit., p. 157-162.

62 Benjamin, Op. Cit., p. 66-71.

63 Fine and Zimet, Op. Cit., p. 83-85.

hypothesized that the process schizophrenics would show more indices of perceptual immaturity, as defined by Rorschach criteria, than reactives. Secondly, the reactive schizophrenics, it was predicted, would reflect more perceptual maturity as defined by Rorschach developmental scores. The results were in support of both hypotheses in that the reactive group demonstrated more adequate and integrated perceptual functioning. When all of the scores of the process and reactive schizophrenics were dichotomized into mature and immature combinations, they found that fifty-seven per cent of the process group were in the immature category as compared to twenty per cent of the reactives. Analyzing their results from a qualitative point of view, the authors noted that the process schizophrenics tended to be more concrete and stimulus bound while the reactives seemed to be more capable of abstraction. They concluded that one of the seemingly critical differences between the two groups was in terms of a kind of thinking disorder. These findings are essentially the same as those in the study by Becker⁶⁴ in that similar Rorschach performances were given by the process schizophrenics in each study as well as the reactives.

The brief consideration of the results of the foregoing studies serves to demonstrate that differences do

65 Becker, Op. Cit., p. 229-236.

exist among schizophrenics in particular areas of functioning. Although the differences in the interpretation of the results of studies discussed in the two previous sections may account for opposing points of view regarding abstract ability in schizophrenia, it would seem plausible, from the studies of the reactive-process dimension of schizophrenia, that the previous failure to adequately control the subject variable may also constitute a cause for the apparent dilemma.

There is also another difference which stands out in a comparison of these studies to those previously reported. The research herein has used the Rorschach, for the most part, to demonstrate perceptual differences among schizophrenics and has concluded in general terms that there seems to be a difference in the kind of thinking disorder. In contrast, the studies in the two preceding sections employed various tests assumed to measure abstract ability in that many were a type of sorting technique. The conclusions were, more specifically, that schizophrenics have the ability to abstract or, on the other hand, that schizophrenics function on a concrete level and cannot form concepts. However, in that the reactive and process schizophrenics differed in their premorbid adjustment and perceptual abilities as measured by the Rorschach, it may follow that they would again

differ in conceptual ability or abstract ability as measured by a sorting technique.

Too, this section not only indicates the importance of the subject variable, but re-emphasizes, in conjunction with the first section, that the reactive-process dimension of schizophrenia is a plausible means for controlling this variable. The following section deals with the relationship between schizophrenics and organics in regards to thought processes lending further insight into the reactive-process dimension.

5. Implications of Brain Damage.

Having demonstrated, to a certain extent, the importance of controlling for the variability among schizophrenics in terms of the reactive-process dimension, the consideration of those studies comparing schizophrenics to those suffering from organic brain damage, again, stresses the importance of this distinction. Furthermore, many, although not all, of the studies in this area deal more explicitly with conceptual sorting tasks which is more in keeping with the present investigation.

As an introductory note, Vigotsky⁶⁶ believed that the change he found in schizophrenics on sorting tasks was similar to the impairment of the attitude toward the abstract which was found in organic cases. He stated that in schizophrenia the most important deterioration in thought was a disturbance in the function of concept formation. He pointed out that in schizophrenia there was a disintegration of concepts and a regression to the concrete, factual forms of thought. Bolles and Goldstein⁶⁷ interpreted the impaired performance of schizophrenics on tests of abstract ability as indirect evidence of cerebral pathology in schizophrenia. They felt that the difference between normals and schizophrenics was in their capacity for abstract behavior or the ability to form concepts, the latter group performing concretely as did the organics.

Similarly, Altrocchi and Rosenberg,⁶⁸ describing the schizophrenics in their study as presumably the process type, found that there was no significant difference in the performance of schizophrenics and organics on a conceptual sorting

66 I.S. Vigotsky, "Thought in Schizophrenia", in the Archives of Neurology and Psychiatry, Vol. 31, No. 5, May 1934, p. 1063-1077.

67 Bolles and Goldstein, Op. Cit., p. 4E-65.

68 John Altrocchi and Benjamin G. Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", in the Journal of Clinical Psychology, Vol. 14, No. 1, January 1958, p. 36-40.

task. They, too, felt that their results indicated the presence of cerebral pathology in at least one group of schizophrenics.

In a review of brain function and schizophrenia, Brackbill⁶⁹ concluded from electro-encephalographic studies that there was considerable variability in tracings, thus demonstrating brain dysfunction in an appreciable number of schizophrenics. From the histopathological studies it seemed to be established that the brain of, again, some schizophrenics showed structural damage. The biochemical and physiological studies, in general, would also suggest that in some schizophrenics there are organic changes. There was no attempt to discern whether the noticeable changes in some schizophrenics were the cause of the illness or the effect.

The research comparing the schizophrenic to the organic in which the conclusion reached was that some schizophrenics suffer organic brain damage would suggest that in some cases the diagnosis of schizophrenia would be incorrect. However, another approach to the interpretation, and seemingly a logical one, is that a functional disease could well determine a quantitative score similar to that resulting from an organic disturbance.

⁶⁹ Glen A. Brackbill, "Studies of Brain Dysfunction in Schizophrenia", in the Psychological Bulletin, Vol. 53, No. 3, May 1956, p. 210-226.

A study by Coons⁷⁰ could serve to illustrate this latter point. He found that some schizophrenics performed significantly superior to organics on a cube test while others gave an inferior performance. It was inferred that those who did less well than the organics were poorly motivated. Of interest in terms of the qualitative aspects of the performance by the schizophrenics, the author indicated that the schizophrenic shows no characteristic pattern. On the other hand, the organics, aside from demonstrating impaired abstract ability, were more consistently over concerned with doing well and were highly emotional. Thus in some cases of schizophrenia there was impaired performance as in the organic group, but a qualitative difference in manifest behavior. Another difference may be the symbolic quality ascribed to the task by the schizophrenics.

Cameron⁷¹ has discussed, rather extensively, the influence of symbolism as it manifests itself in schizophrenic thought processes. He maintained that schizophrenic thought was disorganized and it was this lack of organization that accounted for the apparent concreteness. As a result of the

70 W.H. Coons, "Abstract Ability in Schizophrenia and Organic Psychosis", in the Canadian Journal of Psychology, Vol. 10, No. 1, March 1956, p. 43-50.

71 Norman Cameron, "Experimental Analysis of Schizophrenic Thinking", in Language and Thought in Schizophrenia, J.S. Kasanin, (ed.), Berkeley, University of California Press, 1944, p. 50-64.

disorganization, the schizophrenic develops a product that is new and unique in his life history. He did not feel that the thought was regressive in the sense of being child-like, nor deteriorated as that of organics.

Again, from the quantitative point of view, there is conflicting evidence regarding abstract ability when schizophrenics are compared to organics. Dragow and Feldman⁷² adopted the theory that schizophrenics have difficulty in abstracting from a group of objects to form a concept and in shifting from one concept to another within the same set of stimuli. They found that overlap was almost nonexistent between normals and chronic schizophrenics, but considerable between the schizophrenics and organics. It is interesting to note, in light of previous discussion, that the errors unique to the schizophrenics could be classified as responses which were idiosyncratic, perseverative and with arbitrary change in directions.

Somewhat in contrast, McCaughran and Moran⁷³ hypothesized that a brain damaged group would show a significantly

⁷² James Dragow and Marvin Feldman, "Conceptual Processes in Schizophrenia Revealed by the Visual-Verbal Test", in Perceptual Motor Skills, Vol. 7, No. 4, December 1957, p. 251-264.

⁷³ Laurence S. McCaughran and Louis J. Moran, "Differences Between Schizophrenic and Brain Damaged Groups in Conceptual Aspects of Object Sorting", in The Journal of Abnormal and Social Psychology, Vol. 54, No. 1, January 1957, p. 44-49.

lower order of conceptual classification than a schizophrenic group in object sorting behavior. Concluding that both groups manifest a conceptual disorder, the authors indicated that their results suggested that the differences between the groups was in terms of a type of disorder. However, they, too, were interested in qualitative differences rather than simply restricting their study to the abstract-concrete dimension.

The sampling of studies presented in this section tend to emphasize, again, several points which have been discussed thus far. For one, and most generally, it is apparent that there are differences among schizophrenics in their ability to abstract. In contrast to the previous sections which in many instances compared schizophrenics to normals to illustrate abstract ability or concretism in schizophrenia, this section illustrated essentially the same differences but with a different approach to the interpretation as a result of comparing the schizophrenics to organics.

Caution should be exercised in the interpretation of the studies in that the uniformity of the conclusions is the result of similar interpretations by the authors and not necessarily the result of similar procedures or tasks. In short, different approaches yielded similar conclusions. Illustrative of this point, consideration can be given to the sampling procedures. Besides the diagnostic label, such

criteria as the length of stay in the hospital, the probability of being discharged, and scores on tests, among others, were adopted for selecting subjects for study. It appears that these may have been attempts to control for the heterogeneity so frequently noted in schizophrenia. As a control, the adequacy of these procedures might be questioned. This issue, in addition to others is reconsidered in the subsequent section.

6. Conclusions and Hypotheses.

The purpose of this review has been twofold, the presentation of a theory of schizophrenia which provides the framework for the present study and the delineation of the research which is related to the thought processes in schizophrenia.

The theory proposed that schizophrenia was the result of any one or a combination of factors enumerated as the chemogenic, histogenic, genogenic, and psychogenic. The disturbance manifested itself, according to the theory, in the disruption of seven ego functions. This investigation is restricted to the psychogenic factor and thought processes, the latter being an ego function.

The research indicated not only the plausibility of considering schizophrenia as the end result of a number of causes defined within the factors, but also that the factors

themselves could be subdivided. With regard to the psychogenic factor, the subdivision was made in terms of the reactive-process dimension of schizophrenia. Here the distinction is based upon the observable adequacy of premorbid adjustment. Not discounting the possible influence of the other factors, the observable aspect of this division necessitates relegating it to the psychogenic factor. The implications were that the reactive-process dimension was a meaningful criterion for distinguishing between schizophrenics.

Concerning the thought processes and specifically the abstract-concrete dimension, the theory proposed that abstract ability was the ego function with concreteness in thought being indicative of an ego disturbance. That all schizophrenics function at the concrete level was not implied nor denied suggesting that there may be differences among schizophrenics with regard to this function.

Considerable attention has been given to the abstract-concrete dimension. The research discussed demonstrated that there are differences among schizophrenics in their ability to abstract. Comparing them to normals, organics and other schizophrenics, the general conclusion can be drawn that some, but not all, schizophrenics have the ability to abstract. However, individually the authors were, for the most part, either for abstraction or concretism as typifying schizophrenia.

The divergent conclusions of the studies could possibly be accounted for by the variety of tests used to measure abstract ability. Secondly, the author's bias in the interpretation of the results was often the influencing factor rather than the subject's performance as such. A third possible explanation of the apparent conflicting results is with regard to the sampling. A number of studies indicated that there is considerable heterogeneity in the broad classification of schizophrenia and that for research purposes, this should be controlled. The failure to adequately control for the heterogeneity may account for many of the noted differences as well as the overlap in performance of the different samples in many of the individual studies.

From these considerations in conjunction with the findings in the literature, it appears that the reactive-process dimension may more adequately differentiate and hence control for the individual differences among schizophrenics thus allowing for a more refined investigation of abstract and concrete behavior as it is manifest in this disease entity. In view of this contention, at least three research hypotheses can be formulated. In that abstract ability differs among schizophrenics, it could possibly be expected that there is a difference between reactive and process schizophrenics in this respect. Furthermore, if there is less impairment in the reactive group than the reactive

schizophrenics should differ less from normal subjects than do the process schizophrenics.

The design for the testing of these hypotheses will be presented in the following chapter.

CHAPTER II

THE EXPERIMENTAL DESIGN

The first section of this chapter will reconsider the research hypotheses with a restatement of them in the null form. The second section describes the Yacorzynski Block Technique hereafter referred to as the YBT, which was used as the measuring instrument for the study. Following upon this, there is a discussion of the subject selection and a description of the samples. The next section deals briefly with the testing procedure, and the chapter is concluded with an outline of the statistical techniques employed for the analysis of the data.

1. Null Hypotheses.

The preceding chapter, through a review of the literature, developed a problem regarding the thought processes in schizophrenia. Specifically, it was reasoned that the reactive-process dimension of schizophrenia could be considered as having a psychogenic basis and that the differences among schizophrenics, within this dimension, could possibly be reflected in their thought processes. Definitiveness was required to the extent that the category of thought processes, being rather broad, necessarily had to be limited to the discussion of abstract and concrete thinking.

The research hypotheses that evolved pertained to abstract ability as it was manifest in schizophrenia with particular reference to the individual differences which existed among schizophrenics. The reactive-process dimension of this disease entity was introduced in an effort to control for the individual differences. The hypotheses, briefly, restated, were that it could possibly be expected that there is a difference between reactive and process schizophrenics in terms of abstract ability and, moreover, if there is less impairment in the reactive group then the reactive schizophrenics should differ less from the normal subjects than do the process schizophrenics.

The hypotheses, in the research form, coincided with the direction the results were expected to take as indicated by the review of the literature. However, for the purposes of the statistical procedures, it was essential to state them in the null form which is as follows:

1. There is no significant difference between the scores of reactive and process schizophrenics on the YBT;
2. There is no significant difference between the scores of normals and reactive schizophrenics on the YBT;
3. There is no significant difference between the scores of normals and process schizophrenics on the YBT.

As a note of clarification, the research hypotheses referred to abstract ability whereas the null hypotheses

referred to test scores. Accordingly, abstract ability, for the purpose of this study, was operationally defined as the scores obtained on the YBT. This is elaborated further in the next section.

Another point which necessitates explanation is the inclusion of the normal group. Although the experiment was essentially concerned with abstract ability in schizophrenia, the normal group was included because of the theoretical implications following from Becker's¹ view regarding remission in some schizophrenics. This inclusion becomes more meaningful in the discussion section of the final chapter.

2. Research Tool.

The tool selected for the testing of the null hypotheses was the Yacorzynski Block Technique. There were several reasons for this selection which become more apparent from the description of the test itself. This technique, as developed by Yacorzynski,² is essentially a sorting technique. There are sixteen blocks which the subject is asked to sort

1 Wesley C. Becker, "A Genetic Approach to the Interpretation and Evaluation of the Process-Reactive Distinction in Schizophrenia", in The Journal of Abnormal and Social Psychology, Vol. 53, No. 2, September 1956, p. 229-236.

2 G.K. Yacorzynski, "Concept Formation as a Function of Personality Structure", in the American Psychologist, Vol. 5, No. 7, June 1950, p. 322.

into four groups with four blocks in each group. In all, the blocks can be sorted in eight different ways: 1) shape of the block, 2) shape of the figure inscribed on the top of the block, 3) color of the block, 4) color of the figure, 5) height, 6) size or volume of the block, 7) area of the top of the block, and 8) area of the figure.

Since Goldstein³ has provided the definition of abstract behavior and concretism which has served as a basis for the operational definition used herein, it is important to point out the implicit relationship between his definitions and the various sorting tests which he, at least in part, has devised. In his investigations, the sorting techniques have been of central importance in the evaluation of abstract ability with his earlier work, in many ways, setting a precedent for more recent research. To the extent that the YBT is essentially a sorting technique, it conformed, at least structurally, to the tests of Goldstein. Also, in this respect, the YBT could be considered as a measure of abstract ability to the extent that, for Goldstein, the ability was defined in terms of performance on sorting techniques.

³ Kurt Goldstein, "Methodological Approach to the Study of Schizophrenic Thought Disorder", in Language and Thought in Schizophrenia, J.S. Kasanin, (ed.), Berkeley, University of California Press, 1944, p. 17-40.

An additional feature of this test which is not present in many of the tests of a similar nature, is the number of possible sortings and the increasing difficulty level of each. This allows for greater discrimination at the various levels of abstract ability or, in other words, a wider range of performance. Too, the efficiency should be mentioned in that the test requires a short time to administer and is relatively non-threatening to the subjects.

Investigating the YBT experimentally, Altrocchi and Rosenberg⁴ designed a study to investigate the possibility of the test differentiating schizophrenics from organics. Their samples consisted of nineteen male patients suffering from syphilis, tertiary and meningo-encephalitis, and nineteen schizophrenics, presumably of the process type as selected by the ward physician, matched with the organic group for age, length of illness and severity of malfunctioning. Only the length of illness was significantly different, but the difference was between the means of twenty and twenty-seven years. The YBT was administered without the examiner having prior knowledge as to which group the subject belonged. The results indicated that the schizophrenic group did slightly

⁴ John Altrocchi and Benjamin G. Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", in the Journal of Clinical Psychology, Vol. 14, No. 1, January 1958, p. 36-40.

better than the organic group but not significantly so, and most of the subjects of both groups fell within the suggested organic range, that is, achieved less than four sortings.

A further development within the same study was the comparison of twenty-eight organics and twelve non-organics matched for age and intelligence estimate. The authors did not know the proportion of organic versus non-organic patients until the completion of the study. Here, using four different scoring procedures, the agreement of the YBT with the criterion diagnosis was significant in each case. Also, the intelligence estimate was found to correlate significantly with the YBT. Overall, the technique did not discriminate between the "process" schizophrenics and nineteen deteriorated paretics. However, it did discriminate significantly the twenty-eight organics from the twelve non-organic patients.

In another similar study, Rosenberg and Altrocchi⁵ found, upon testing fifty patients suspected of organicity, with the criterion diagnosis yielding twenty-eight organics and twenty-two non-organics, that their conclusions based upon the subject's YBT performance correlated significantly

4 B.G. Rosenberg and John Altrocchi, "The Yacorzynski Block Technique: A Cross-Validation Study", in the Journal of Consulting Psychology, Vol. 22, No. 2, April 1958, p. 122.

with the criterion. They indicated that the results of this study lend support to their previous findings.

Furthermore, Yacorzynski, according to Altrocchi,⁶ indicated that normals and children over ten or eleven years of age could achieve four sortings and that the research data appeared to be in support of the claim. Those who achieved less than four correct sortings were usually organic or quite schizophrenic.

Thus, through a consideration of these findings in conjunction with the previous statements, it would appear that the YBT could serve as a measure of abstract ability as herein defined. The research discussed, though concerned primarily with diagnostics, was in accord with many of the findings of Goldstein and Sheerer⁷ in that the organic and, in some cases, the schizophrenic patient demonstrated an inability to abstract and form concepts. Hence, considering the YBT as essentially a sorting technique which measures abstract ability, plus its additional features as enumerated, it appeared to be a feasible instrument for the purposes of this study.

⁶ John Altrocchi, Directions for the Yacorzynski Block Technique, Mimeographed, Care of Author, Department of Psychiatry, Duke University, North Carolina.

⁷ Kurt Goldstein and M. Sheerer, "Abstract and Concrete Behavior: An Experimental Study with Special Tests", in the Psychological Monographs, Vol. 53, No. 2, 1941, vi-151 p.

3. The Subjects of the Study.

With the focal point of the study being the investigation of abstract ability in reactive and process schizophrenics, it was essential to devise a method for the selection of these particular samples. The subjects were categorized into the two groups on the basis of case history judgments. However, before elaborating this procedure, some preliminary considerations should be noted.

For one, it was necessary to restrict the age range from between nineteen and forty-eight years of age. The lower limit was based upon developmental findings that abstract ability has developed by about twelve years of age. This appears to be in keeping with Altrocchi's⁸ comments regarding the YBT performance of young children in that, providing there was no disability, they could perform within the normal expected range. The age of nineteen years appeared to be sufficiently high to permit the assumption that impaired performance on the YBT was not simply a function of the lack of development, but rather that something else was operating which may be the cause for the deficiency. The upper age limit was selected as a safeguard, again, on the basis of Altrocchi's remarks that YBT performance may be, though not

⁸ Altrocchi, Op. Cit.

necessarily, affected by old age. By adopting forty-eight years of age as the upper limit, the organic complications sometimes encountered in the aged could be avoided in the samples.

A second essential control was for education. For a subject to qualify for the sample, it was required that he have at least a grade ten education. This requirement served two purposes. To have succeeded to this level of education abstract ability would seemingly have had to develop sufficiently for the subject to achieve passing marks. Again, this allowed for the assumption that impaired performance on the YBT was the result of something other than the failure in the development of this specific ability. Secondly, the educational control served, though indirectly, as a control for intelligence to the extent that at least average intelligence, it was assumed, would be necessary for school success at this level. More important, it did not appear plausible to use an intelligence test for this purpose in that Altrocchi and Rosenberg⁹ found significant correlations between the Information, Comprehension and Picture Completion subtests of the Wechsler-Bellevue and the YBT. In view of this findings, particularly in that these subtests are not necessarily conceptual tests, any effort to control for

⁹ Altrocchi and Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", Op. Cit., p. 36-40.

intelligence by means of a test would be a control for the differences that could possibly be expected. To summarize the point, it appeared that conceptual ability was a part of what may be involved in a more general intelligence estimate and if the subjects were tested at the time of their illness and controlled in this manner, the control would have the effect of decreasing the probability of the expected differences. Hence, by using the educational level as an indirect measure of intelligence, it would seem that this permitted a more accurate estimate of premorbid intellectual functioning.

An additional control, aside from those which will be mentioned in the final sample description, was that of sex. To provide uniformity and avoid the possible influence of sex differences between the subject and examiner, only male subjects were used.

The first necessary step in obtaining the schizophrenic samples was that of going through the file cards of all the male patients at Toledo State and Receiving Hospital, Toledo, Ohio. Initially a subject was retained if his educational level was above grade ten, his age was within the stated range, and he bore a schizophrenic diagnosis free of physical complications with the latter being determined through complete neurological and medical examinations. This procedure yielded a total of 163 possible subjects

from which the final sample could be selected. However, it was apparent that eleven subjects undergoing electro-shock treatment and six more on drug therapy should be excluded. With the elimination of these patients, 146 remained to be rediagnosed in terms of the reactive-process dimension of schizophrenia.

Having obtained a somewhat homogeneous group with respect to the criteria mentioned, the next step was that of determining whether a given subject could be considered the reactive or process type. This procedure involved case history judgments based upon criteria revealed in the literature and categorized by Kantor, Wallner and Winder.¹⁰ These criteria are presented in Table I.

Kantor, et al., as one aspect of their study, investigated the problem of whether or not the case histories of clinically diagnosed schizophrenics could be differentiated into the reactive and process categories. Significant agreement was reached between two judges and, when compared to Rorschach performance as an external criterion, it was noted that those subjects judged as reactives from the case history data, were considered as non-psychotic on the basis of their Rorschach performance. On the other hand, those subjects

¹⁰ Robert E. Kantor, Julius M. Wallner and C.L. Winder, "Process and Reactive Schizophrenia", in the Journal of Consulting Psychology, Vol. 17, No. 3, June 1953, p. 157-162.

Table I.-

Items Defining Frame of Reference for Judging Schizophrenic Case Histories as Reactive or Process.

Reactive Schizophrenic	Process Schizophrenic
0 - 5 Years	
a- Good psychological history	a- Early psychological trauma
b- Good physical health	b- Physical illness; severe or long
c- Normal member of family	c- Odd member of family
5 - Adolescence	
a- Well adjusted at school	a- Difficulties at school
b- Domestic troubles unaccompanied by behavior disruptions	b- Family trouble parallel with sudden changes in behavior
c- Extroverted behavior trends and interests	c- Introverted behavior trends and interests
d- History of adequate social, physical, and mental functioning	d- History of breakdown of social, physical and mental functioning
e- Normal siblings	e- Pathological siblings
f- Normally protective, accepting mother	f- Overprotective and rejecting mother
g- Accepting father	g- Rejecting father
Adolescence - Adulthood	
a- Heterosexual behavior	a- Lack of heterosexuality
b- Sudden onset of psychosis, stress present and pertinent, later onset	b- Insidious gradual onset of psychosis without pertinent stress
c- Verbal aggression	c- Physical aggression
d- Good response to treatment	d- Poor response to treatment
e- Short course in hospital	e- Lengthy stay in hospital
Adulthood	
a- Minor paranoid trends	a- Massive paranoia
b- Much capacity for alcohol	b- Little capacity for alcohol
c- Presence of manic-depressive component	c- No manic-depressive component
d- Success despite adversity	d- Failure under adversity

Table I.--(Cont'd.)

Items Defining Frame of Reference for Judging Schizophrenic Case Histories as Reactive or Process.

Reactive Schizophrenic	Process Schizophrenic
Adulthood	
e- Harmony between ability and achievement	e- Discrepancy between ability and achievement
f- No sensation of change in self	f- Awareness of change in self
g- Absence of somatic delusions	g- Somatic delusions
h- Harmony between culture and environment	h- Clash between culture and environment
i- Retention of decency	i- Loss of decency

Robert E. Kantor, Julius M. Wallner and C.L. Winder, "Process and Reactive Schizophrenia", in Journal of Consulting Psychology, Vol. 17, No. 3, June 1953, p. 157-162.

designated as process from the case histories, gave what was considered a psychotic test performance. One conclusion of the study was that schizophrenics could be reliably differentiated into the reactive and process types on the basis of case history judgments.

Additional studies have successfully adopted a similar approach.^{11,12} The primary interest of Fine and Zimet, for example, was to investigate the hypotheses that process schizophrenics show more indices of perceptual immaturity whereas reactives reflect perceptual maturity as defined by Rorschach developmental scores. Though their hypotheses were supported, of particular interest here was the success they experienced while using the diagnostic criteria that Kantor, et al., have provided. These studies, in part, suggested the plausibility of adopting the same approach for the selection of subjects for this study. Also, support can be derived from the fact that the criteria, as categorized, were based upon what numerous other writers have had to say with respect to the premorbid adjustment of reactive and process schizophrenics.

11 Harold J. Fine and Carl N. Zimet, "Process-Reactive Schizophrenia and Genetic Levels of Perception", in The Journal of Abnormal and Social Psychology, Vol. 59, No. 1, July 1959, p. 83-85.

12 Carl N. Zimet and Harold J. Fine, "Perceptual Differentiation and Two Dimensions of Schizophrenia", in the Journal of Nervous and Mental Diseases, Vol. 129, No. 4, November 1959, p. 435-441.

To return to the judging procedure, two judges were used, both of whom had some familiarity with the diagnostic criteria, a copy of which was provided for immediate reference. In that both judges were staff psychologists, their expertness was relied upon. Their task was that of reviewing the 146 case folders which contained all the available data on a given patient, and from this, decide independently into which category, reactive or process, the patient could be classified. In the event that difficulty might arise in classifying a case as one type or another, a category designated "unclassified" was provided.

Of the 146 cases classified, the judges agreed upon a total of 128 which could be broken down into thirty-four reactives, seventy-nine process and fifteen unclassified; eighteen cases remained disputable. At this point, each sample was reduced to include thirty subjects with the efforts directed toward making the samples as comparable as possible with respect to education, age and medication. There appeared to be no contamination with respect to the latter as all the subjects were on what was considered "routine" or standard medication.

It was noted, as might be expected, that the level of education of the reactive group was, by and large, higher than that of the process subjects. Hence, with this being one of the more important control variables, i.e., premorbid

intelligence, four reactive subjects were excluded whose grades completed exceeded sixteen. On the other hand, the older subjects at the lower level of education in the process group were excluded. Essentially this procedure reduced the range of both groups and reduced the mean differences. The consequence was increased homogeneity with respect to these variables.

Having obtained the schizophrenic samples, thirty subjects of each type, the next step was to secure an equal number of normal subjects comparable to the schizophrenics with respect to control variables. A normal was defined herein as a nonpsychotic, nonhospitalized individual who was carrying on his daily activities with no overt signs of distress. For the present study, these subjects were selected from a number of volunteers from the City of Ottawa Fire Department.

For the purposes of comparison, the means for education in grades completed, and age in years, were computed for the reactive, process and normal groups. Respectively they were: for education, 12.500, 12.067, and 11.667; and for age, 31.933, 35.200, and 30.467. The mean differences were analyzed statistically using the critical ratio technique. As it were, both the reactive and the process schizophrenics had significantly more education than the normal subjects ($p < .05$) while, on the other hand, the normals were

significantly younger than the process group ($p < .05$). In general, having pre-established the criteria for selection, it would appear that even though significant differences arose, their influence should be minimal. Moreover, considering the educational level as the more important control variable, to the extent that the normal subjects were the younger group, if there was an influence it would be in favor of the design making it more difficult to demonstrate the suggested differences in abstract ability.

Thus, these ninety subjects, thirty in each of the three groups, were given the YBT according to the procedure outlined in the next section.

4. Experimental Procedure.

a) Testing.- In an effort to dispel initial anxiety, particularly with the patient groups, the subjects were told that the test they were about to undertake had nothing to do with their present status in the hospital and that the interest of the project was to observe how different people performed. The normal subjects were given a similar explanation with the subjects in each group given the opportunity to ask any questions they might have. As a precautionary measure for color blindness, the subject was asked, when the blocks had been displayed, to discriminate the different colors while the examiner pointed to them. To avoid an

examiner bias, the schizophrenic subjects were given code numbers so that the examiner had no knowledge as to which group a given subject belonged until after the testing was completed.

Following upon the introductory comments, the specific instructions, as suggested by Altrocchi,¹³ were given in the manner as follows:

There are sixteen blocks here and your task is to sort them into four groups of 4 blocks each on the basis of something about the blocks, some quality, characteristic, or common feature. The same principle or reason must differentiate all four groups, that is, if you can switch a block from one group to another, it is not a correct sorting. Also, it is against the rules to turn the blocks on their sides or upside down.

Each subject was retested with twenty-four hours intervening between tests so as to establish a measure of retest reliability. The optimum interval may not have been chosen but, due to trial visits, discharge staff meetings, and other ministrations of the hospital, it was necessary, in order to retain all the subjects for retesting, to restrict the time interval. The same was true for the normal subjects in that their work schedule was such that they too, for this reason and for the sake of consistency, were retested at twenty-four hour intervals.

¹³ Altrocchi, Op. Cit.

The instructions for the second testing were essentially the same as for the first although it could be noted that most subjects recalled the original instructions. A question commonly asked was concerned with the necessity of a second test. The subjects were informed simply that the interest was to determine whether or not a time interval created a difference in their performance on the test.

The test itself was concluded when the subject either gave up, repeated a category five times, or ten minutes had elapsed without any scorable progress.

b) Scoring.- The procedure for scoring the YBT involved two systems. The second, which could be employed simultaneously, was merely a refinement of the first. The two systems, both strictly quantitative, were referred to by Altrocchi and Rosenberg¹⁴ as the cut-off four and the cut-off four-minus with the latter being the more conservative estimate.

The cut-off four method required that a subject be given a score of one for each correct sorting with no partial credits. Thus, recalling from the description of the YBT that there was the possibility of eight correct sortings, a subject could attain a minimum score of zero or the maximum score of eight.

¹⁴ Altrocchi and Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", Op. Cit., p. 36-40.

The cut-off four-minus method allowed for partial credit in that scores could range from zero to eight in one-third-unit steps with the partial credits being additive. For example, a subject would be credited with one-third if he stated a scoring principle but failed to carry out the sorting, put four blocks together correctly but never carried out the sorting or, finally completed a sorting after having received "strong hints". On the other hand, the subject would be credited with two-thirds of a point if his sorting was not quite accurate, that is, a square and rectangle mixed, he achieved a correct sorting but could not explain the principle he used, or, having been given a "minimum hint", he contributed to the concept and sorted the blocks.

With respect to "hints", Altrocchi¹⁵ provided examples with increasing strength. A minimum hint would be, "can you find any four blocks that are alike in any way?" If the subject succeeded in sorting from this hint he would be credited with two-thirds of a point. At the other extreme, the examiner would say, "I have sorted the blocks into four groups of four. I have sorted them according to what?" A correct answer would give the subject one-third of a point credit. For consistency, the hints enumerated by Altrocchi were divided midway and adhered to strictly.

15 Altrocchi, Op. Cit.

To summarize, the testing and scoring procedure yielded four scores per subject, a test and retest score for each of the two scoring systems employed. An outline for the analysis of these data is presented in the following section.

5. Statistical Techniques.

The first analysis of the data is concerned with the derivation of product moment coefficients of correlation for the two scoring systems so as to determine the retest reliability. Each group was treated individually so that there were thirty paired observations involved in the computation of six of the coefficients. Two additional coefficients resulted from the combining of groups so that the paired observations for each scoring system equalled ninety. The remaining techniques, which included Bartlett's test of homogeneity, analyses of variance and t tests, were concerned with the data of the first test only. The analyses of variance were applied as a test of the general hypothesis that there are differences between the three groups. The t tests were applied to test the specific hypotheses so that the directional differences could be noted. These procedures are detailed in the subsequent chapter along with a discussion of the results.

CHAPTER III

THE EXPERIMENTAL RESULTS

This chapter considers the statistical findings of the experiment. Specifically, attention is given to the test-retest reliability, the analyses of variance for the two scoring systems, the t tests for mean differences, and is concluded with a discussion of the results.

1. Test-Retest Reliability.

The reliability for this study was established by the test-retest method. As noted previously, each subject was given the test twice with twenty-four hours intervening. This procedure, in that two scoring systems were incorporated in a single testing session, produced four scores for each subject; a test and retest score for each of the two scoring systems. However, for the purposes of analysis, the two systems were treated independently.

In all, eight coefficients of correlation could be derived. Within each scoring system an overall coefficient was obtained as well as a coefficient for each of the three individual groups. The product moment coefficients of

correlation as presented in Table II were established using the raw score formula suggested by Gilford.¹

Each of the individual groups, the reactive, process and normal with correlation coefficients ranging from $r = .73$ to $r = .95$ for the two systems, exceeded the accepted level of confidence of $r(p = .01) = .46$. The coefficients for the total subjects in each of the two scoring systems were $r = .94$ and $r = .96$, both of which reached the accepted level of confidence, $r(p = .01) = .27$.

The reliability coefficients might well be spurious as a result of the nature of the test itself or the influence of a memory factor. There were only minimal increases in scores on the second test, for example, the reactive group mean for the first test ($M = 4.13$) differed from the mean of the second test ($m = 4.43$) by 0.30 on the cut-off four scoring system. Similar comparisons with the other groups for both scoring systems yielded only one difference which exceeded the value in the example given. In that all the coefficients were significant, the retest data were not treated in the remaining analyses.

¹ J.P. Gilford, Fundamental Statistics in Psychology and Education, New York, McGraw-Hill, 1956, p. 140.

Table II.-

Product Moment Coefficients of Correlation for Test-Retest
Reliability for Two Scoring Systems Applied to
Individual Groups and Total Subjects.

Group	Scoring System	
	Cut-off Four	Cut-off Four-minus
Reactive	.85	.95
Process	.89	.91
Normal	.73	.87
Total	.94	.96

8. Analyses of the Group Differences.

This section will deal with the differences in the performance of the three groups, the reactive and process schizophrenics and the normals. The raw data for the analyses are given in the form of frequencies, i.e., the frequency with which each score was obtained by a number of subjects in a given group, in Tables VI and VII in Appendix 1. From the observation of these tables, overlap between the group scores is evident, but more important are the distinct differences between the process schizophrenics and the reactive and normal groups.

The Bartlett test of homogeneity of variance, as outlined by Edwards,² was applied to the data of the two scoring systems. The values obtained, cut-off four system $X^2 = 9.96$ ($p < .02$) and cut-off four-minus system $X^2 = 15.75$ ($p < .01$), were both significant at an acceptable level of confidence. However that there was heterogeneity of variance did not appear overly surprising in light of the manner in which the samples were selected, here referring to the influence of the organismic variable.

² Allen L. Edwards, Experimental Design in Psychological Research, New York, Rinehart, 1960, p. 126.

Despite heterogeneity of variance, Box, according to Edwards,³ has emphasized that the F test is very insensitive to nonnormality and, with equal numbers of subjects, it is also insensitive to variance inequalities. In addition, Edwards provided an example which demonstrated that transformed data, wherein the transformation tended to make the variances more homogeneous, resulted in a somewhat smaller probability associated with the F analysis. Similarly, Hays,⁴ discussing the assumptions for the t test, indicated that as long as sample size was even moderate for each group, severe departures from normality make but little practical difference in the conclusions reached. Again, with respect to heterogeneity of variance, he claimed that for samples with an equal number of observations, relatively large differences in population variance have minimal consequences. In effect, if the observations for each group are equal, violation of the assumptions has a negligible influence. Following from this, the assumption could be made that the effect of the heterogeneous variances would be to reduce the accuracy of the probability statements.

Proceeding with the analyses of variance, the summaries of which are given in Tables III and IV, the F values

³ Edwards, Op. Cit., p. 132.

⁴ William L. Hays, Statistics for Psychologists, New York, Holt, Rinehart and Winston, 1963, p. 322.

Table III.-

Summary of the Analysis of Variance Comparing the Means of
the Reactive, Process and Normal Groups
Using the Cut-Off Four Scoring System.

Source of Variation	Sum of Squares	df	Estimate of Variance	F	F .01
Between groups	190.29	2	95.14	84.94	4.85
Within groups	97.54	87	1.12		
Total	287.83	89			

Table IV.-

Summary of the Analysis of Variance Comparing the Means of the Reactive, Process and Normal Groups Using the Cut-off Four-minus scoring System.

Source of Variation	Sum of Squares	df	Estimate of Variance	F	F .01
Between groups	202.76	2	101.38	72.41	4.65
Within groups	122.37	87	1.40		
Total	325.13	89			

for the cut-off four and cut-off four-minus scoring systems were respectively, 84.94 and 72.41. These values are appreciably above the value at the accepted level of confidence, $F(p = .01) = 4.25$. The findings indicate that there were significant differences between the performance of the three groups irregardless of the scoring system. However, to the extent that the hypotheses made specific reference to the comparison of each group with the others, it was essential for these purposes to apply the t test, as outlined by Dayhaw,⁵ to the compared means.

The results of the t tests are summarized in Table V. It can be observed that regardless of the scoring system employed, there was no significant difference between the mean performances of the reactive schizophrenic and normal groups, whereas, the process schizophrenics achieved mean scores significantly lower than either the reactive or normal groups. With respect to the null hypotheses, the results necessitate the rejection of the hypotheses that there is no significant difference between the scores of reactive and process schizophrenics on the YBT; and, that there is no significant difference between the scores of normals and process schizophrenics on the YBT. The similar

⁵ Lawrence T. Dayhaw, Manuel de Statistique, Editions de l'Universite d'Ottawa, Ottawa, 1958, p. 416.

Table V.-

Evaluation of the Differences Between the Means of the Reactive, Process and Normal Groups on Both Scoring Systems.

Group Comparisons	Means	Differences Between Means
Cut-off four		
$M_R - M_P^a$	4.13 - 1.10	<u>3.03^b</u>
$M_N - M_R$	4.23 - 4.13	.10
$M_N - M_P$	4.23 - 1.10	<u>3.13</u>
Cut-off four-minus		
$M_R - M_P$	4.54 - 1.40	<u>3.14</u>
$M_N - M_R$	4.62 - 4.54	.08
$M_N - M_P$	4.62 - 1.40	<u>3.22</u>

^a $M_R - M_P$, et cetera, indicates the mean for the reactive group minus the mean for the process group.

^b Underlining designates significance at the .01 level of confidence.

null hypothesis comparing the reactive and normal groups could not be rejected on the basis of the findings.

The implications of the results are discussed further in the subsequent section.

3. Discussion.

In general, the results were in support of the research hypothesis and the specific null hypotheses rejected conformed to the predicted direction which evolved from the review of the literature. With emphasis placed upon the control of the subject variable, the heterogeneity of variance noted may be, in itself, behaviorally meaningful. To the extent that generalizations can be made to the population from which the samples were drawn, the implication is that at least two groups of schizophrenics can be distinguished through judgments of premorbid adjustment and that the differences are reflected in their ability to abstract. Much of the discussion that follows is not limited to the specific results of the study except by implication. However, the extent to which conclusions can be drawn from the present findings is reserved for the final paragraphs.

From the observation of the distributions of scores as presented in the tables of Appendix 1, it is evident that the range of scores overlapped despite the significant differences between the groups. As far as the individual

differences were concerned, the cut-off four-minus system appears to be the more discriminating. To explain the variability of scores and the overlapping performance, particularly between the reactive and process schizophrenics, it might be well to consider the two groups as end points of a continuum rather than two dichotomous groups.

Theoretical support for this contention can be derived from a reconsideration of what Bellak⁶ has proposed as the ego functions. He suggested that the schizophrenic manifested a disturbance of various ego functions and abstract ability, for one, was mentioned. In that both the reactive and process subjects bore a schizophrenic diagnosis, the implication of a dichotomy with respect to these groups would suggest an "all or none" approach in the evaluation of ego intactness in schizophrenia. Adopting such an approach would eliminate the possibility of explaining the observable gradation in individual differences.

The apparent dilemma with respect to the question of whether or not schizophrenics function concretely or abstractly, the literature exposing support for both points of view, may be, in part, reconciled through a re-evaluation of the sampling procedures. The majority of authors simply

⁶ Leopold Bellak, (ed.), "The Schizophrenic Syndrome", in Schizophrenia: A Review of the Syndrome, New York, Logos, 1958, p. 8.

describe their samples in terms of diagnostic label, age, or education, to mention a few, and usually the criteria are at best only remotely related to the control of the numerous subject differences that appear in the broader category of schizophrenia.

The results of this study tend to coincide with those of studies investigating perceptual ability wherein a similar distinction was made between reactive and process groups.^{7,8} Considered together, the studies would suggest that the reactive-process dimension provides a more systematic method of organizing the gross individual differences among schizophrenics thereby enabling more controlled research in this area. Moreover, the concept of multiple causality of this disease entity with emphasis on a subdivided psychogenic factor, or more generally, the observable characteristics, excludes the necessity of making assumptions about hereditary influences or organic abnormalities and, yet, it permits the inclusion of such factors for theoretical purposes.

7 Glen A. Brackbill and Harold J. Fine, "Schizophrenia and Central Nervous System Pathology", in The Journal of Abnormal and Social Psychology, Vol. 52, No. 3, May 1956, p. 310-313.

8 Harold J. Fine and Carl N. Zimet, "Process-Reactive Schizophrenia and Genetic Levels of Perception", in The Journal of Abnormal and Social Psychology, Vol. 59, No. 1, July 1959, p. 83-85.

Another approach that may be useful in explaining the somewhat conflicting results apparent in the literature with respect to abstraction in schizophrenia, is a clarification in the use of the terms abstract or concrete attitude and abstract ability. To recall briefly, Goldstein and Sheerer⁹ defined the abstract attitude as when the individual goes beyond specific boundaries and responds to an individual thing in a manner which may be representative of a category or class. This attitude does not necessarily imply that the individual has sufficient ability. The confusion may result from Goldstein's use of sorting techniques as a measure of abstract behavior; his writings are not always clear. For example, he indicates, on the one hand, that a particular individual is characterized by an impairment of the abstract attitude while, on the other, the statement is based upon the individual's concrete behavior as measured by a particular sorting test.

To illustrate the point, reference can be made to Cameron's¹⁰ concept of overinclusion and Chapman's¹¹ comments

⁹ Kurt Goldstein and M. Sheerer, "Abstract and Concrete Behavior: An Experimental Study with Special Tests", in the Psychological Monographs, Vol. 53, No. 2, 1941, p. 3.

¹⁰ Norman Cameron, "Deterioration and Regression in Schizophrenic Thinking", in The Journal of Abnormal and Social Psychology, Vol. 34, No. 2, April 1939, p. 265-270.

¹¹ Loran J. Chapman, "Distractionability in the Conceptual Performance of Schizophrenics", in The Journal of Abnormal and Social Psychology, Vol. 53, No. 3, November 1956, p. 286-291.

regarding distractibility. Cameron viewed overinclusion as an inability to maintain adequate boundaries by the exclusion of inappropriate stimuli. Chapman declared that the schizophrenic could abstract because he was distracted by other concepts. Here, two authors are seemingly representing essentially opposing points of view when they say, in fact, be describing the same phenomenon. Overinclusiveness as well as distractibility can be interpreted as an exhibition of the abstract attitude. However, more important is the appropriate use of the abstract attitude and this becomes magnified when emphasis is placed upon abstractibility.

From the results of this study, as it was measured, it would appear that both the reactive and normal groups have both the abstract attitude and abstract ability, the latter presupposing the former, whereas the process schizophrenics manifested an impairment of abstract ability relative to the other two groups. The impaired ability, however, in no way can be considered as evidence for the absence of the abstract attitude. A review of some of the qualitative aspects of the process schizophrenic's performance would indicate that they, too, have the abstract attitude in spite of an impaired ability.

Without direct investigation and the aid of statistical analyses, these qualitative descriptions are posed only for discussion purposes. Referring at this point to the

process group only, it was not uncommon for a given subject to separate the blocks by forming what Hanfmann and Kasanin¹² have described as "primitive complexes". Groupings of this type are based upon similarities between individual blocks and not between all blocks in the particular group. The subject may start with a pair, for example, a yellow triangle and a yellow square, here suggesting color as the principle for sorting. However, the yellow square then is matched with a blue square that is brought into the group and this, in turn, leads to the inclusion of a blue circle and so on. Thus the first block serves only as a starting point for successive pairings. Another approach taken was that of relating the included blocks in some fashion to the first, but one to another, there was no apparent relationship.

If the reasoning follows, this performance can be likened to distractibility and overinclusion. The subject could not effectively ignore the impinging irrelevant stimuli. The end result is a quantitative score suggestive of impaired abstract ability, but for some cases at least, the abstract attitude was present though inappropriately applied. It is noteworthy that some of the reactive and normal subjects also, when the task became overly difficult, reverted to this

¹² Eugenia Hanfmann and J. Kasanin, "Eight Keys to Schizophrenic Thinking", in Reflexes to Intelligence, Samuel J. Beck and Herman B. Wolish, (eds.), Glencoe, Illinois, Free Press, 1959, p. 312.

kind of behavior though they did not persevere to the same extreme. Combinations were most frequent in the sortings of the reactive schizophrenics and the normal subjects in that they would attempt to sort the blocks by incorporating two principles. One inference which could be made is that a similar attitude toward the abstract prevailed in each group but with the primary distinction being in the abstract ability.

As an aside, though granted extensive experimental verification of the above proposal is required, it would appear that the presence of these qualitative features in conjunction with the previously mentioned notion of a continuum between reactive and process schizophrenia, would contraindicate the assumption that impaired abstract ability is indirect evidence of organic brain damage.¹³ In other words, the diagnosis of brain damage on the basis of a measure of abstract ability may not be totally justified.

Another qualitative aspect of the performance of the process schizophrenics was that of construction, i.e., the placing of the blocks in such a manner as to build something or make a design. One subject referred to the blocks in terms of their stability, while another was concerned about

¹³ John Altrocchi and Benjamin G. Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", in the Journal of Clinical Psychology, Vol. 14, No. 1, January 1958, p. 38-40.

how the "church" might feel. This behavior could possibly be considered as the ascription of personal themes to the stimuli or the influence of the symbolic quality of the blocks themselves. This interpretation would be in keeping with previous findings.^{14,15} In addition, a similar notion was advanced by Goldstein¹⁶ when he indicated that the schizophrenic develops characteristics of individual patterns in his concrete procedure which reveals the influences from the patient's ideas and feelings. On the other hand, Goldstein claimed that the pattern the organic patient shows in his concrete behavior can be understood as a result of disintegration of sensory-motor and mental processes in that he demonstrates the characteristic of dedifferentiation of function.

To carry the distinction further, an obvious difference noted between the process schizophrenics and the reactive and normal subjects in this study, was the extent to which they were apparently ego involved, in this sense meaning a

14 Eugenia Hanfmann, "Thought Disturbances in Schizophrenia as Revealed by Performance in a Picture Completion Test", in The Journal of Abnormal and Social Psychology, Vol. 34, No. 2, April 1939, p. 249-264.

15 Eugen Bleuler, Dementia Praecox or the Group of Schizophrenias, Translated by Joseph Zinkin, New York, International Universities Press, 1950, p. 63.

16 Kurt Goldstein, "The Organismic Approach", in the American Handbook of Psychiatry, Silvano Arieti, (ed.), Vol. 2, New York, Basic, 1959, p. 1341.

concern for the task and their performance. This difference was observed by Coons¹⁷ when he compared schizophrenics to organics; the latter group demonstrated the ego involvement. From a theoretical viewpoint, the results are fitting. In that schizophrenia is typified by the extent to which ego functions are disturbed, it would follow that the schizophrenic would remain uninvolved in comparison, particularly, to the normal subject. This type of behavior could be more generally related to the symptom of withdrawal. The normal or the organic, at least theoretically, does not typically exhibit the withdrawal symptom nor are they considered as suffering from ego dysfunction. Thus, by implication, this interpretation would suggest, again, that attention must be given to other features of test performance. Furthermore, increased definitiveness should be exercised in any discussion of abstraction wherein attitude and ability may be distinguished.

Despite the qualitative differences, the quantitative results of this study may be viewed in yet another context. To the extent that the process group demonstrated significantly less abstract ability than either the reactive schizophrenics or normal subjects, with the performance of the two

¹⁷ W.H. Coons, "Abstract Ability in Schizophrenia and Organic Psychosis", in the Canadian Journal of Psychology, Vol. 10, No. 1, March 1956, p. 43-50.

latter groups being, for all intents and purposes, quite similar, the observable differences in premorbid adjustment and prognosis become more meaningful. With respect to premorbid adjustment, it would be difficult to assess the influence of abstract ability as a determinant of adjustment. However, a reconsideration of withdrawal, often considered an outstanding symptom in schizophrenics, may shed some light on the subject. Adopting the view that withdrawal reduces the individual's contact with reality, it can be considered, in this sense, as a mechanism of defense. Relating this to abstract ability, impairment of the ability may be a means of ensuring the defense. Through concrete behavior, the individual cannot meet with the demands of reality which in and of themselves, may be threatening.¹⁸ As a consequence then, withdrawal would be the end result of impaired abstract ability. Restricting the discussion to the process group, it can be noted that introverted trends and interests and a breakdown in social relationships were criteria for differentiating this group from the reactive schizophrenics. It could be hypothesized that with the gradual onset of the psychosis, there is a breakdown in the use of abstract ability. By analogy, the unreliability of this ego function may have had some influence on the schizophrenic subject thus creating a disturbance in premorbid adjustment.

¹⁸ Goldstein, Op. Cit., p. 1341.

The reactive schizophrenic has made what, at least overtly, appeared to be the better premorbid adjustment. In that the individuals in this group demonstrated abstract ability somewhat comparable to the normal subjects, it would, indeed, seem plausible that these subjects had the use of this ego function to aid their adjustment. Again, from the classification criteria, it appeared that these subjects were less withdrawn in that they exhibited extroverted interests and maintained social relationships. These interpretations might better be regarded as suggestions in that they represent only one viewpoint and require considerable experimental support.

A second notion which can be derived from the results is with regard to the contention that the reactive type of schizophrenic is more likely to remit. This view has been advanced by various authors.^{19,20} One possible explanation might be, providing the assumption is made that adequate adjustment to everyday life requires abstract ability upon which the individual can depend, that having the ability to abstract, the reactive schizophrenic has at least this ego

19 Wesley C. Becker and Robert L. McFarland, "A Lobotomy Prognosis Scale", in the Journal of Consulting Psychology, Vol. 19, No. 3, June 1955, p. 157-162.

20 Bernard A. Stotsky, "A Comparison of Remitting and Nonremitting Schizophrenics on Psychological Tests", in The Journal of Abnormal and Social Psychology, Vol. 47, No. 2, April 1952, p. 489-496.

function intact. Obviously there must be a disturbance in other areas of ego functioning or the diagnosis of schizophrenia would be invalid. Nevertheless, with this area to rely upon, treatment may be more effective. Limiting treatment to psychotherapy, it would not be unreasonable to suspect that the reactive's response would be more favorable in that abstract ability pervades the adequate use of word symbols. Furthermore, in the process of rebuilding what is sometimes referred to as the "shattered" ego of the schizophrenic, the intactness of the abstracting function may serve as a starting point.

The concept of withdrawal would, again, take on significance in this framework. From the point of view that as a result of withdrawal the patient is somewhat unaccessible, the absence of this symptom, which follows from the previous discussion of abstract ability and withdrawal, would permit the occurrence of phenomena sometimes regarded as essential for successful psychotherapy. Needless to say, experimentation investigating this position is necessary.

The interpretations given here are, for the most part, speculations. To remain within the confines of the present results, in summary, the rejected hypotheses indicate that there is a significant difference in abstract ability when comparing process schizophrenics to reactive schizophrenics and normal subjects. As far as the population from which the samples were drawn is concerned, the generalization can be

made that process schizophrenics are significantly less able to abstract than either normals or reactive schizophrenics. All that can be said with respect to the failure to reject the null hypothesis that there is no significant difference between reactive schizophrenics and normals in their ability to abstract, is that this design failed to demonstrate a difference.

It can only be suggested that the reactive schizophrenics and normals are comparable in their ability to abstract as this ability was, herein, measured. It would seem, if the results can speak for the design, that the reactive-process dimension of schizophrenia, being overtly related to the psychogenic factor, may serve as a method for controlling subject differences in the broader category of schizophrenia. The failure to adequately control for these differences may have contributed to some of the controversy regarding abstract ability of schizophrenics in general; not to mention the confusion in the usage of the terms abstract attitude and abstract ability. The results of this study demonstrate that, upon control for subject differences in premorbid adjustment, there is one group of schizophrenics, the reactive group, who can abstract relative to normal subjects and another group, designated as process schizophrenics, which cannot abstract as effectively in that they manifest impaired abstract ability. In terms of the theory, the reactive schizophrenics have the

ego function of abstraction intact or, at least, there is less disturbance in this function when compared to the process schizophrenics.

From this, a number of interpretations evolve which might best be considered as hypotheses for further research. For example, the inclusion of all the schizophrenic subjects may have facilitated an answer to the proposed continuum. The distinction between abstract attitude and ability would require a direct measure of the former. With respect to prognosis, verification of the hypothesis that reactives are more likely to remit would necessitate controlled treatment of the two groups and a follow-up study. It would seem that the interpretations given, the theoretical framework provided and the results of this study, together, allow enough latitude for the derivation of any number of additional hypotheses.

SUMMARY AND CONCLUSIONS

The purpose of the present research was to investigate the reactive-process dimension of schizophrenia as reflected in abstract ability through the comparison of reactive schizophrenics, process schizophrenics and normals. The literature review suggested the plausibility of such a division within the broad category of schizophrenia. Secondly, the review indicated that some controversy exists with regard to the question of whether or not schizophrenics have the ability to abstract and that it may have arisen through the failure to adequately control the subject variables.

The research hypotheses that evolved from the review of the literature were that it could possibly be expected that there is a difference between reactive and process schizophrenics in their ability to abstract, and; if there is less impairment in the reactive group then the reactive schizophrenics should differ less from normals than do the process schizophrenics. Stated in the null form, three specific hypotheses could be derived which, when considered together, allowed for a comparison of each group with the other two. The groups were compared on the basis of their scores on the Yacorzynski Block Technique. Abstract ability was operationally defined in terms of these scores.

The experimental groups consisted of a total of ninety male subjects, thirty in each of the three groups. The means for age and education in completed years between the three groups were, for the most part, comparable. To determine whether a given schizophrenic could be considered as the reactive or process type, case history judgments of premorbid adjustment were made in accordance with established criteria. Two judges were used to evaluate the case history material independently and only those subjects upon which there was complete agreement were retained in the samples. The testing procedure allowed for the simultaneous application of two scoring systems, both of which were employed in the test and retest phases.

The statistical analysis involved the computation of product moment coefficients of correlation for the test-retest reliability. The coefficients were significant though possibly spurious as a result of the nature of the test and the influence of a memory factor. The application of the analysis of variance to the original data of each scoring system resulted in significant F values. The t tests were then applied to test the specific hypotheses. Regardless of the scoring system evaluated, the tests of significance necessitated the rejection of the null hypotheses which compared the process schizophrenics to the reactive and normal groups. In both comparisons, the process group

demonstrated greater impairment of abstract ability. The null hypothesis comparing the performance of the reactive schizophrenics to the normal subjects could not be rejected.

Generalizing within the confines of the defined population, the results indicated that there was a significant difference between reactive and process schizophrenics in their ability to abstract. Using a more adequate control for the subject variable, aside from the more commonly used criteria, in light of these results, the implication was that the existing controversy in the literature may, at least in part, be resolved in that one group of schizophrenics manifested abstract ability somewhat comparable to normals while another group, the process, demonstrated greater impairment of this ability. Also support could be given to the suggested plausibility of using the reactive-process dimension as a control for the subject variable.

The discussion considered the reactive and process schizophrenics as the representatives of end points of a continuum rather than as two dichotomous groups. A distinction between abstract attitude and abstract ability was explored as another issue which may contribute to confusion in a discussion of abstraction. The symptom of withdrawal was related to abstract ability and came into focus in the more theoretical framework of ego function and prognosis. Research possibilities were mentioned as they pertained to the main points discussed.

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Altrocchi, John and Benjamin G. Rosenberg, "A New Sorting Technique for Diagnosing Brain Damage", in the Journal of Clinical Psychology, Vol. 14, No. 1, January 1958, p. 36-40.

Primarily concerned with the validation of the Yacorzynski Block Technique, the authors found the test to be a useful tool for the diagnosis of brain damage. Procedures for scoring are emphasized and outlined. Including schizophrenics in their samples, the interpretations given on the basis of the performance of these subjects are questionable.

Bellak, Leopold, (ed.), "The Schizophrenic Syndrome", in Schizophrenia: A Review of the Syndrome, New York, Logos, 1958, p. 3-63.

The author, in a formalized theory, presents his views on the etiology of schizophrenia as well as comments on diagnosis, prognosis and treatment. Psychoanalytically oriented, the theory is both concise and comprehensive. The ego construct is clarified with a definition that can be considered operational. The value of the theory is that it allows for the delineation of numerous hypotheses for research and provides a framework in which they can be investigated.

Cameron, Norman, "Deterioration and Regression in Schizophrenic Thinking", in The Journal of Abnormal and Social Psychology, Vol. 34, No. 2, April 1939, p. 265-270.

The main thesis is that the schizophrenic is impaired in his ability to abstract. Reference is made to overinclusion as the contributing factor. Interestingly, similar behavior has been observed by others, yet interpreted differently.

Chapman, Loran J., "The Role and Type of Distractor in the 'Concrete' Conceptual Performance of Schizophrenics", in the Journal of Personality, Vol. 25, No. 2, December 1956, p. 130-141.

This is only one of a number of publications to the author's credit. Emphasizing the concept of distractibility as a factor influencing abstract ability in schizophrenia, the bias is in the direction of favoring the position that the schizophrenic can abstract and form concepts. The study contributes to an understanding of the phenomena observed, but some of the interpretations are, at best, only suggestive.

Goldstein, Kurt and M. Sheerer, "Abstract and Concrete Behavior: An Experimental Study with Special Tests", in the Psychological Monographs, Vol. 53, No. 2, 1941, vi-151 p.

This article presents an extensive elaboration of the various sorting tests the authors have, in part, devised. It may be considered a pioneering study in some respects and a valuable contribution despite the fact that no standard scoring procedures are presented. In addition to the measures of abstract behavior provided, a particular value rests in the manner in which the authors have introduced the study through a definition of the abstract and concrete attitudes.

Kantor, Robert E., Julius M. Wallner and C.L. Winder, "Process and Reactive Schizophrenia", in the Journal of Consulting Psychology, Vol. 17, No. 3, June 1952, p. 157-162.

Aside from the differences the authors found in the perceptual ability of schizophrenics, the study emphasizes the importance of controlling for the heterogeneity in schizophrenia. Also contained within the study is an elaborated list of criteria which can serve as an aid for distinguishing schizophrenic groups for research.

Yacorzynski, G.K., "Concept Formation as a Function of Personality Structure", in the American Psychologist, Vol. 5, No. 7, June 1950, p. 322.

Briefly, the author presents a description of the Yacorzynski Block Technique which is essentially a sorting task. Given are a few statistics of the performance of particular groups on the test, but of no real significance. The value is in the description of the test.

APPENDIX 1

TABLES OF RAW SCORE FREQUENCIES FOR BOTH
SCORING SYSTEMS OF THE YBT
FOR ALL SUBJECTS

Table VI.-

Frequency of Scores Achieved by All Subjects on the YBT
Using the Cut-off Four Scoring System.

<u>YBT</u> Score	Reactives	Process	Normals
0		15	
1		5	
2	2	5	
3	5	2	6
4	10	3	11
5	13		13

Table VII.-

Frequency of Scores Achieved by All Subjects on the YBT
Using the Cut-off Four-minus Scoring System.

<u>YBT</u> Score	Reactives	Process	Normals
0.0		13	
.33		2	
.67			
1.00		2	
1.33			
1.67		2	
2.00	1		
2.33	1	2	
2.67		3	
3.00	4	1	
3.33		1	1
3.67			4
4.00	1	2	6
4.33	3	1	2
4.67	4	1	3
5.00	8		9
5.33	4		2
5.67	3		1
6.00	1		
6.33			2

APPENDIX 2

ABSTRACT OF

A Comparison of Conceptual Ability
in Reactive and
Process Schizophrenics

APPENDIX 2

ABSTRACT OF

A Comparison of Conceptual Ability in Reactive and Process Schizophrenics¹

The present research has been directed toward an investigation of the influence of the subject variables in schizophrenia upon what appeared to be differences among schizophrenics in their ability to abstract. In the review of the literature, it was noted, from a variety of studies, that there existed differences of opinion with respect to this ability within the disease entity. One factor, among others, evolved as a standout in contributing to the observed differences and that was the failure to adequately control for the heterogeneity of subjects. There was no clear cut evidence which could serve as an explanation of the apparent dilemma.

From these considerations, the design of this study was formulated to investigate the reactive-process dimension of schizophrenia as reflected in abstract ability through a comparison of reactive and process schizophrenics and normals. Previous research has suggested that this dimension may serve the purpose of controlling for essential subject

¹ Donald W. Proud, doctoral thesis presented to the School of Psychology and Education, University of Ottawa, March 1964, viii-103 p.

differences and thus provide a means for more systematic research in the area of schizophrenia.

The research hypotheses were that it could possibly be expected that there is a difference between reactive and process schizophrenics in their abstracting ability, and; if there is less impairment in the reactive group then the reactive schizophrenics should differ less from normals than do the process schizophrenics.

With the scores obtained on the Yacorzynski Block Technique serving as the measure of abstract ability, the analysis of the data yielded results in support of the hypotheses tested in the null form.

The results were interpreted as lending support to the contention that the reactive-process dimension is a feasible means of controlling the subject variable and that this variable, if not adequately controlled, may contribute to the controversy concerning abstract ability in schizophrenia. It was demonstrated that reactive schizophrenics and normals have the ability to abstract which exceeds the ability of the process schizophrenics. Attention was given to the notion of a continuum in schizophrenia, the distinction between abstract attitude and abstract ability, and the symptom of withdrawal was linked to abstract ability along with the prognostic implications. Suggestions for further research were presented.