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I am submitting herewith a dissertation written by Mark Renald Zitlin entitled "Selected Rorschach Indices of Thought Pathology in Paranoid Schizophrenics." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

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We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

SELECTED RORSCHACH INDICES OF THOUGHT PATHOLOGY IN PARANOID SCHIZOPHRENICS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Mark Renald Zitlin

June 1988

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For

Vivian and Shannon

ACKNOWLEDGEMENTS

I am in the debt of my Chairman, Dr. Alvin G. Burstein, without whose invaluable assistance, encouragement, and support this dissertation would not have been possible. I would also like to express my appreciation to Professors Charles Cohen, Lance Laurence, Sandra Loucks, John Lounsbury, Gary Klukken, Gary Peterson, and Robert Wahler for their invaluable advice and support throughout my academic career.

I would also like to acknowledge the hard work and dedication of the members of the Burstein/Loucks Laboratory, without whose help this project would have been impossible. Of particular help and support were David Winecoff, Julie Shaing, Laura Saxton, Kathryn White, Peter Young, Cheri Kenna, and Scott Glass, Ph.D. Thank you all!

The contribution of Don Broach of the University of Tennessee Computing Center was incalculable; his technical mastery and patience as a teacher will be remembered gratefully.

This research project would not have been possible without the helpful cooperation of the patients and staffs at Lakeshore Mental Health Institute, Ridgview Psychiatric Hospital and Center of Oak Ridge, Helen Ross McNabb Community Mental Health Center in Knoxville, and Cherokee Community Mental Health Center in Morristown.

ABSTRACT

Burstein and Loucks have recently developed a new scoring system for the Rorschach inkblot test. In particular, a greatly expanded set of perceptual cognitive characteristics (special scorings) have been introduced. This study explored the clinical usefulness of these indices in discriminating and describing paranoid schizophrenics. The Rorschach was administered to a carefully selected sample of 45 paranoid schizophrenics. It was predicted that specific cognitive perceptual variables (Card Description, Cut-Off Detail, Egocentric Justification, Loss of Distance, Predicate Thinking, Card Rejection, and Transposition Response) would be the most descriptive of the paranoid schizophrenic sample, and the most discriminating of the paranoid sample when compared to a sample of mixed psychiatric patients and a sample of healthy adults. An analysis of variance and a canonical discriminant analysis were performed. Eleven perceptual cognitive variables were found to occur with significantly greater frequency in the paranoid subjects; two of these were from the predicted set of variables. The discriminant functions derived from the predicted variables were able to correctly assign subjects into one of the three clinical groups 73% of the time. The discriminant functions derived from all of the perceptual cognitive variables had a successful classification rate of 90%. Nine perceptual cognitive variables were positively associated with assignment of subjects into the paranoid group; two of these were from the group of variables predicted in the literature. The results of this study suggest that the expanded perceptual cognitive indices of the Burstein-Loucks system

are clinically relevant; that a re-evaluation of the traditional indices of paranoid schizophrenia may be needed; that reliance on frequency or summary data alone may be inappropriate; and, that the use of canonical discriminant analysis is appropriate in the analysis of Rorschach scores.

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CHAPTER I

INTRODUCTION

The Rorschach inkblot test (Rorschach, 1964) has been a widely used diagnostic and research tool in psychology for decades. Over the years, various scoring systems (i.e., Beck, et al., 1961; Exner, 1974; Klopfer, et al., 1954; Piotrowski, 1957; Rapaport, et al., 1968) have been developed to help in further refining and expanding the diagnostic and clinical value of the Rorschach. Recently, Burstein and Loucks (1988) have developed their own system of scoring for the Rorschach, in order to address the inconsistencies and problems in existing scoring systems, and to formalize the scoring and clinical interpretation of some hitherto ignored aspects of test responses.

Rorschach scoring methods include many different aspects of the responses. The area of the blot that is used in the response, from its entirety to the most minute detail is noted. The manifest content of the responses, which ranges from human figures in motion to waterfalls, is also noted. Other aspects of the response have come to be known as "determinants". This category includes many of those things the subject identifies as relevant to his choice of percepts, such as the form or shape of the blot, the color or achromatic shading, any sense of depth or dimensionality about the perceived image, and any perception of movement in the image seen. Another scoring category is known as form level. This refers to the accuracy, clarity and appropriateness with which the subject sees the percept. Other scores include the statistical popularity of a given response, and any number

of "special scores" that usually refer to pathological or unusual aspects of a response.

The Burstein-Loucks system has introduced a greatly expanded set of "perceptual-cognitive" characteristics (special scorings) which can be formally scored. Earlier systems usually included some of these scorings, but they were often interpreted informally. These characteristics address the more unique aspects of the test-taker's cognitive and perceptual style, and his or her ability to "think and perceive in realistic, logical, and consistent ways" (Burstein & Loucks, pg. 101). Most of these characteristics typically appear most frequently in the records of disturbed individuals, and in fact are interpreted as signs of distortions in perception and/or cognition. Therefore, these perceptual cognitive categories lend themselves to an investigation of the differences in cognitive and perceptual functioning among acutely disturbed individuals.

Of interest to the present author is the clinical usefulness of these perceptual-cognitive scores in the differential evaluation of the Rorschach responses of paranoid schizophrenics. An analysis of these scores on a clinically distinct diagnostic sample such as this has not yet been done by Burstein and Loucks or their collaborators. In conventional Rorschach scoring systems, the assessment of schizophrenia is usually based on the inferred level of reality testing, degree of perceptual distortion, and on special scorings that reflect bizarre or unusual cognitive processes. The more specific diagnosis of paranoid schizophrenia is then usually based on an analysis of the specific "content" of the responses (Chapman & Chapman,

1973; Cromwell & Pithers, 1981; Weiner, 1966). Burstein and Loucks' extensive elaboration of special scoring categories allows a much richer set of clinical data to be extracted from the Rorschach response; the emphasis then becomes experiential (Schachtel, 1966), rather than quantitative, and the sense of the individual is not lost in an overemphasis on scores and ratios.

The fact that Burstein and Loucks have introduced another scoring system at this time has an historical context. The brief historical review that follows is adapted from a longer history written by Exner (1974). Hermann Rorschach died at the age of 38 in 1922; he had only just begun to formalize the scoring of his inkblots. In the period between 1935 and 1960, fully five different Rorschach scoring systems were developed and in use (Beck, et al., 1961; Hertz, 1951; Klopfer, et al., 1954; Piotrowski, 1957; Rapaport, et al., 1946). Virtually all of these scoring systems paid some attention to special scoring of deviant verbalization responses, some (i.e., Rapaport, et al., 1968) more than others (i.e., Hertz, 1951; Piotrowski, 1957). In fact, Rapaport and his colleagues developed a "fifth column" of Rorschach scores specifically related to verbal deviation, in an early attempt to formalize the analysis of such data. Later Rorschach researchers particularly focused on developing and refining the scoring and interpretation of thought pathology as expressed through deviant verbalization or perception (i.e., Holt, 1977; Watkins & Stauffacher, 1952). The systems differed in numerous other ways as well, including even the scoring symbols used to code "movement" or "color" in a given response.

In the 1970's a new system was introduced by Exner (1974), with the specific aim of empirically combining the best and most clinically useful aspects of all of these systems, and to introduce a single combined scoring system with higher statistical reliability and validity. However, particularly in the scoring of deviant perception and verbalization, the Exner system remained unsophisticated; Exner (1978) describes a total of only six such categories; autistic logic, deviant verbalization, incongruous combination, fabulized combination, contamination, and perseveration. No "norms" or other statistical data accompany these categories; they are to be noted by the test scorer only for clinical interpretation. Exner had earlier stated that the special scorings were "unwieldy to score" (p. 136, 1974). However, he has also noted that separate scoring systems for analyzing special scores, such as Holt's (1977) looked promising, and could profitably be used in conjunction with the Exner system. The Burstein and Loucks Comprehensive Scoring System has a total of twenty two perceptual cognitive scores specifically related to thought pathology, or to a definable perceptual cognitive style. This allows a clinically sophisticated scoring of deviant verbalizations as a routine part of the scoring of Rorschach responses, rather than being done separately, as Exner suggests.

The Rorschach and Psychodiagnostics

Since its introduction, the Rorschach has generated controversy, which continues today. For example, Vizcarro-Guarch, Fernandez-Ballesteros, and Fernandez-Trespalacios (1987) question in a recent study if the Rorschach is actually a test of perception. However,

Atkinson, Quarrington, Alp, and Cyr (1987), taking note of the frequency with which the Rorschach is cited as being unscientific, re-evaluated the basis upon which validation studies were conducted. They found that in studies in which validation efforts were based on conceptual, rather than purely empirical relationships, the Rorschach was found to be valid significantly more often. The Rorschach would seem to be a more powerful test when it is kept firmly rooted in a clinical, experiential viewpoint. This may account for the fact that the Rorschach continues to be among the most commonly administered psychological tests in clinical settings (Piotrowski, 1984). Burstein and Loucks (1988) have also suggested that the statistical measurement of constructs, rather than behaviors might be a more useful way of characterizing the Rorschach.

Cromwell and Pithers (1981) have observed that the Rorschach often reveals pathology where none could be detected in interview and general observation, and where the degree of severity was unclear from other types of projective testing. Harrow and Quinlan (1985) state that the Rorschach is a viable means to assess disordered thinking and representational thinking, and one of the most efficient techniques for investigating bizarre-idiosyncratic speech and thinking. They cite a significant body of research to underscore their claim. Harrow and Quinlan support Cromwell and Pithers' position, with their finding that the probability that schizophrenic verbalizations will appear is diminished when structured stimuli are presented. Put simply, schizophrenics do not act bizarrely in all situations; the Rorschach is the most likely instrument to evoke pathological responses. Harrow and

Quinlan believe that this occurs because the Rorschach procedure demands that the subject draw upon their own internal associations, or supply their own structure, in order to make any sense out of the blots. They have to decide which aspects of their past experience are relevant and appropriate, with minimal guidelines to follow. Hence, the experimenter is most likely to see whatever idiosyncracies there are with this instrument. Weiner (1966) supports this position, further stating that the Rorschach is the major source of data in the clinical test battery that will discriminate paranoid from non-paranoid schizophrenia.

The Rorschach continues to be used in contemporary efforts to assess thinking disorders (Johnson & Quinlan, 1985; Harrow & Quinlan, 1985; Holzman, et al., 1986; Johnston & Holzman, 1979; Lazar & Harrow, 1985; Wynne, et al., 1979). However, most of these approaches utilize the individual Rorschach "special" scores to come up with a sum total, or index score. The results of such research are often reported in general terms of degree of pathology between groups. Such studies, even when they directly attempt to explore the differences between paranoid and non-paranoid schizophrenia, have difficulty making any differentiation, especially in the area of thought disorder (.i.e., Lazar & Harrow, 1985). Burstein and Loucks' development of a clinically rich scoring system for the Rorschach not only offsets the recent trends in Rorschach scoring (i.e., Exner, 1978); it also provides a potential balance to the reductionistic use of Rorschach data that has become common in contemporary research on the thought disorders.

Thought Disorder and Schizophrenia

Since the time of Kraepelin (1896/1950) and later Bleuler (1911/1950), there has been a continuous theoretical and research effort to define and understand the exact nature of psychotic and schizophrenic cognition and perception. As of the present time, many questions remain, and many theories compete (Andreasen, 1987; Chapman & Chapman, 1973).

Bleuler (1911/1950) introduced and emphasized the concept of the "breaking of associative threads" that occurs in schizophrenic cognition, when logical connections commonly found in the thought process are replaced by the irrational. He referred to the often bizarrely discontinuous nature of schizophrenic discourse, in which one theme was illogically replaced by another. Goldstein (1944) proposed a deficit in the ability to abstract to account for this phenomenon. He believed that schizophrenic thinking was limited to the "concrete attitude", in which the schizophrenic is bound by immediate experience, or by particular aspects of the situation at hand. Goldstein believed that the schizophrenic was deficient in his or her ability to make categorical or other reflective responses.

Von Domarus (1944), and later Arieti (1974) both thought that "predicate thinking" was central to the schizophrenic cognitive process. This type of thinking occurs when logical inferences are made upon illogical premises. For example: "Certain Indians are swift; stags are swift; therefore certain Indians are stags." (von Domarus, 1944, p. 110).

Using the basic theme of focus of attention, other researchers have more recently explored the area of "overinclusion" (Cameron, 1944; Harrow & Quinlan, 1985; Payne, 1966; Venables, 1978); this concept refers to the schizophrenic's tendency to include too many stimuli into a given category, with the resulting idiosyncratic responses. Chapman and Chapman (1973) have discussed "excessive yielding to normal biases". By this, they refer to the schizophrenic's propensity to associate words in a culturally determined but bizarre fashion; they are unable to ignore the associations that come to mind, and loose their original train of thought.

In recent years, large scale, multinational studies such as the International Pilot Study of Schizophrenia (World Health Organization, 1973) have been undertaken to clarify the diagnosis of schizophrenia. Wing (1978), in discussing this study reports that when symptoms from the following list of "first rank" symptoms were present, there was a more than 90% probability of a diagnosis of schizophrenia or paranoid psychosis. The first rank list (originally developed by Schneider, 1959) includes loud thoughts, thought echo, thought substitution or insertion, thought broadcasting, voices commenting on the patient's thoughts or actions, voices talking to each other, feelings that bodily functions are interfered with by external agents, and feelings that the patient's will or emotions or behavior are taken over and controlled by external agents or forces (Wing, 1978). This database helps to provide a solid clinical and empirical base from which theory construction (or reconstruction) can take place.

Various other avenues have been explored in the attempt to better understand thinking disorders. One is the investigation of deviant patterns of communication within the families of schizophrenics (i.e., Wynne, et al., 1979). Others have developed methods for evaluating schizophrenia on the basis of "positive" and "negative" thought disorder (i.e., Andreasen, 1987; Andreasen & Grove, 1986; Carpenter, et al., 1985). Positive thought disorder includes such things as hallucinations and bizarre behavior; negative thought disorder refers principally to poverty of speech. Research has also been conducted from an information processing paradigm (i.e., Nuechterlein, et al., 1986; Patterson, et al., 1986; Saccuzzo & Braff, 1986). A variety of psycholinguistic studies, that build on the work of Piaget and Chomsky in their investigations of speech and language disorders in schizophrenia, were recently reviewed by Rabin, Doneson, and Jentons (1979). Biological and genetic factors have also been postulated as the casual factors, including ventricular enlargement and cortical atrophy; decreased volume of specific brain areas, neuronal loss, and other changes in the limbic system, basal ganglia, and frontal cortex; disturbances in dopamine and dopamine receptor activity; viral infections and autoimmune disturbances; and specific genetic abnormalities (i.e., Meltzer, 1987).

Several writers have contended that the effort to find a single broad-brush theory to account for the bizarreness of schizophrenic thinking is ill-advised. Instead, it is suggested that more complicated, multivariate models may be more useful (i.e., Blaney, 1978; Carpenter, 1987; Carpenter & Strauss, 1979; Harrow & Quinlan,

1985; Holzman, 1986; Neale & Oltmanns, 1980). In spite of this apparent agreement that a multivariate approach is warranted, the trend in the field is often in the opposite direction. Theorists are not the only ones guilty of this. For example Johnston and Holzman (1979), Harrow and Quinlan (1985), and Watkins and Stauffacher (1952) have all developed systems for the empirical measurement of thought disorder. All use the Rorschach, and sometimes other instruments as well. However, all of these systems come up with a single "deviance" score, designed to indicate degree of thought disorder. This reductionistic design means that a great deal of the information gathered, information that could indicate variations within severity of pathology, is being lost. There are others, however, such as Holt (1977), who have developed extensive systems for scoring thought pathology on the Rorschach which produce several subscores related to different types of cognitive disturbances.

Another seeming contradiction in the research into schizophrenic thought disorders is the frequency with which the diagnostic category of "schizophrenia" is treated as being a unitary disorder. Rather than examine the heterogeneity within schizophrenia, it seems that researchers are at times more intent on demonstrating that the degree of thought disorder in "schizophrenics" as a group is more pronounced than in "nonschizophrenics" (i.e., Alpert, 1984; Blaney, 1978; Buchsbaum, 1979; Cohen, 1978; Holzman, et al., 1986; Johnston & Holzman, 1979; Koh, 1978; Nuechterlein, et al., 1986). This is even the case when the object of the research is to differentially diagnose schizophrenia, schizoaffective, and affective disorders (i.e., Harrow &

Quinlan, 1985; Holzman, et al., 1986; Saccuzzo & Braff, 1986). Although some of these researchers contest that the commonly accepted subtypes of schizophrenia are not clinically or empirically valid (this will be further discussed below), no alternative subtypings are offered in this research context (i.e., Andreasen, Hoffman, & Grove, 1984).

The stability of schizophrenic thought pathology over time has also been the subject of recent research. It has often been assumed that schizophrenia is a permanent condition, with slight variations (acute episodes). Various researchers (i.e. Andreasen & Grove, 1986; Harrow & Quinlan, 1985; Lazar & Harrow, 1985) have addressed this question, and their consensus is that there is indeed a subgroup that becomes "chronic", that consistently manifests severe thought pathology throughout repeated evaluations in longitudinal studies. However, they tentatively conclude that for many other schizophrenic patients, the "acute" phase may constitute a significantly more pronounced deficit in thinking and perception. Positive thought disorder does tend to persist to a lesser degree after acute episodes, but the differences are significant.

Another problem with the evaluation of thought pathology in severely disturbed patients is the fact that neuroleptic (antipsychotic) medication is often introduced to the patient before the research can begin. To further complicate matters, control subjects, if they happen to be patients in a different diagnostic category (i.e., depressives), may be on a totally different type of medication, with unknown differences in the impact of each type of medication on the cognitive and perceptual functions being measured

(Harrow & Quinlan, 1985). Studies of this problem indicate that although neuroleptic medications clearly reduce the level of thought pathology, they do not appear to eliminate it (Chapman & Chapman, 1973; Harrow, Grossman, Silverstein, & Meltzer, 1982; Harrow & Quinlan, 1985; Spohn, Coyne, Larson, Mittleman, Spray, & Hayes, 1986).

It has been pointed out that formal thought disorder is not limited to schizophrenia; it can be found in mania, depression, and schizoaffective disorders as well (Harrow, et al., 1982; Neale and Oltmanns 1980; Wing, 1978). This further highlights the need for more refined ways to clearly differentiate types and systems of cognitive dysfunctioning in severe psychological disturbances.

Diagnosis Within Schizophrenia

The Diagnostic and Statistical Manual (DSM-III) (American Psychiatric Association, 1980), and more recently, the DSM-III-R (American Psychiatric Association, 1987), provides the most widely used and accepted basis for the diagnosing of the subtypes of schizophrenia and other psychotic disorders (Andreasen, 1987; Carpenter & Strauss, 1979; Kety, 1985; Maxmen, 1986; Wing, 1978; Zubin, Steinhauer, Day, & VanKammen, 1984). The DSM-III-R has made some revisions in the criteria for diagnosis of the various subtypes of schizophrenia. Information regarding the rationale for these changes was not available to this author at the time of writing; and the DSM-III criteria were used in this research. Therefore, the following discussion will principally involve the DSM-III.

The categories of the DSM-III are based on the criteria originally laid out by Bleuler (1911/1950) and Kraepelin (1950/1896),

and these categories are seen by many as reliably discriminating the diagnostic categories that they are supposed to (i.e., Kety, 1985). However, as has been implied by the preceding discussion on the research on thought disorders, there is disagreement about diagnosis of schizophrenic subtypes. As has already been noted, a great deal of research simply does not make distinctions within the research sample of schizophrenic subjects they use; rather, they focus on differences between schizophrenics and other subject groups, such as normals, schizoaffective, or affective disorders.

Another controversy has developed about specific ways that the schizophrenic subtypes are defined. One method, described above, abandons the present (DSM-III) system and instead bases diagnoses on a preponderance of negative versus positive symptoms (i.e., Andreasen, 1987; Holzman, 1986). Most authors agree, however, that success lies in combining the work in both the biological and psychological sciences if a complete understanding of the heterogeneity of schizophrenia is to be developed (Andreasen, 1987; Carpenter, 1987).

Paranoid Schizophrenia

Kraepelin (1950/1896) was the first to note the paranoid type of "dementia praecox" (Bleuler (1911/1950) later coined the term "schizophrenia"). Kendler and Tsuang (1981) explore in some detail the fact that both Kraepelin's and Bleuler's nosological definition of what is now called paranoid schizophrenia continued to change and evolve over many years. The diagnostic category of paranoid schizophrenia has maintained its clinical status, and remains a subtype

of schizophrenia in the DSM-III and DSM-III-R classification system. However, there continues to be disagreement about the validity of this subtype, and the clinical and research effort to define the phenomenon continues. There is the majority group who support the diagnostic validity of the paranoid schizophrenia subtype, and the basic DSM-III definition of it (i.e., Kendler & Tsuang, 1981; Kety, 1985; Zubin, et al., 1984). Another group of researchers has cast doubt on the validity of the existing Kraepelinian subtyping system, believing that these categories are not empirically valid, and do not stand up when applied to the total population of schizophrenics (i.e., Andreasen, 1987; Meltzer, 1987; Carpenter, et al., 1985). Alternative diagnostic schemes include diagnostic classification on the basis of positive and negative symptoms, and on the basis of specific biological indicators or other "markers". Carpenter and Strauss have tried to formulate new diagnostic categories based on statistical clustering of schizophrenic symptoms; they found no evidence to substantiate the paranoid type as a viable subcategory. They concluded that the diagnostic process should not be based on a just a few overt behavioral (psychopathological) symptoms. Instead, diagnosis should be based on a longitudinal, multilevel evaluation of the patient's ability to establish rapport, his or her capacity for insight and treatment, assessment of the environmental impact of the patient's decompensation, and so on.

The root of this diagnostic controversy is described by Kendler and Tsuang (1981), in their extensive review of the literature on the nosological classification of paranoid schizophrenia. They state that (p. 608):

> In the diagnosis of paranoid schizophrenia, the controversy has focused on thought disorder and affective deterioration. While all diagnostic systems agree on the prominence of delusional symptoms in this disorder, there is disagreement about the diagnostic assignment of patients who in addition to their delusions also display thought disorder and/or markedly flat or inappropriate affect.

What these authors are referring to is the fact the organized delusions of persecution or grandiosity are often accompanied by symptoms that are associated with other types of schizophrenia, such as hallucinations, or symptoms that are associated with the affective disorders, such as mania or severe depression. This blending of symptoms contributes much to the difficulty of classification. It is possibly the most difficult to differentiate paranoid schizophrenia from a "schizoaffective disorder", especially when clinical data is limited, as both diagnostic types can include paranoid delusions.

Another diagnostic paradigm is that the disorder presently labeled "paranoid schizophrenia" is in fact an extreme form of paranoid disorder, but is not a type of schizophrenia (i.e., Magaro, 1981; Meissner, 1981). Magaro clearly takes the stronger stand in this argument; he contends that paranoia and schizophrenia are two separate and distinct clinical entities. Meissner (1981) sees the paranoid process as an independent psychological process that interacts with the schizophrenic process; he believes that the two can and do exist separately and distinctly from one another in extreme form, but that they more commonly coexist in the same patient. From another perspective, Gruzelier (1981) reviewed the recent evidence that

hemispheric imbalances in the brain account for the differences between paranoid and non-paranoid subjects.

Kendler and Tsuang seem to speak for the majority view when they state (p.608):

> Those paranoid psychotic disorders characterized by bizarre, fragmented delusions associated with the emergence of thought disorder and affective deterioration belong within the group of schizophrenic disorders.

On the other hand, they state that (p. 608):

> ...if the delusions are well-systematized, non-bizarre, and without hallucinations, then it is generally agreed that this is a disorder distinct from the schizophrenias.

They point out that it is the cases that fall in between these two poles that are nosologically troublesome, and over which there is the most disagreement in the field. This is said to be especially true in the cases where thought disorder and/or affective deterioration (markedly flat or inappropriate affect) occur. Almost as proof of the controversial nature of this issue, one of the major differences between DSM-III and DSM-III-R is that the revised version specifically excludes flat or blunted affect from the diagnostic criteria for the paranoid type of schizophrenia, whereas DSM-III included it.

In their extensive review of the thought disorder literature, Chapman and Chapman (1973) conclude that the nature of the difference between paranoid and non-paranoid schizophrenia remains unresolved. There are conflicting data in the research, much of which may be the result of problems with accurate evaluation and diagnosis of research

subjects. Andreasen (1987) states that since the early 1970's researchers have been more precise about how they defined their research population samples; however, the controversies centered around differential diagnosis remain. It is noteworthy that Chapman and Chapman (1973) have concluded that the comparison of paranoid and non-paranoid schizophrenia is "one of the most promising ways of seeking meaningful varieties of thought disorder within schizophrenia (p. 29)."

Paranoid Schizophrenia and Thought Disorder

The following section will discuss the findings, covering several decades, of research on the differential diagnosis of the schizophrenic subtypes using the Rorschach test. It is outside the scope of this discussion to explore all of the behavioral and psychological characteristics that are associated with paranoid schizophrenia. The focus of this review will be on those aspects of paranoid schizophrenic functioning that are included in the cognitive-perceptual realm; that is, primarily the expressive style that denotes this thought disorder, the inferences that can be made from such verbalizations, and the related test-taking behaviors. Therefore, even though such phenomenon as delusions of persecution, grandiosity, and reference are among the symptoms considered central to the diagnosis of paranoid schizophrenia, the analysis of this aspect of the response fall into the category of "Content" in the Rorschach scoring system (Burstein & Loucks, 1988), and so will not be explored further at this time.

Before begining the review of the research on thought disorder in paranoid schizophrenia, a few general remarks are in order. There are

numerous "threads" that have been followed, some consistently by the same researchers, and some not. One group of threads consists of the different theories extant to account for the thinking and speech anomalies readily observed in schizophrenia. Another set of conflicts lies within the Rorschach research per se, in that there is a confusion of similar and dissimilar terms used to describe the same and different phenomenon. A third problem lies in the overall diagnostic confusion that has occurred, such that the population sample that is reported may or may not resemble a population sample (with the same label) in another study. Another factor which is especially difficult to evaluate is that some of the data to be reported were gathered on subjects prior to the introduction of anti-psychotic medication to the general treatment of psychoses. At such times that this is believed to be a factor, it will be pointed out; but, even then, this will be a speculative (on the part of the writer) causal association.

Von Domarus'(1944) observations about predicate thinking in schizophrenia in general have more recently become associated with paranoid schizophrenia in particular (Arieti, 1974; Magaro, 1980, 1981; Meissner, 1981; Schafer, 1954; Weiner, 1966). As Weiner (1966) describes paranoid schizophrenic thinking (p.306-7):

> ...he may develop a <u>strengthened</u> capacity to assign logical meanings to environmental events, with the result that he achieves a "triumph of logic over common sense" and his established meanings firmly resist the influence of conflicting possibilities... [and they] are inclined to scan their environment extensively but filter their consequently abundant information input into relatively narrow conceptual categories.

Meissner (1981) describes the "paranoid construction" as "a cognitive elaboration which serves the specific function of reinforcing, sustaining, and providing a context within which the projective system of the individual can be maintained (p. 306)." Meissner further describes the projective system of the paranoid schizophrenic as being rigid and inflexible. Magaro (1980) also notes that paranoids rely on rigid conceptualization without being sufficiently attentive to perceptual data. Magaro notes that research on "information processing" in paranoid schizophrenia has found that they have a need to form an incorrect hypothesis, rather than have none at all. Andreasen and Grove (1986), with a research focus on positive and negative symptoms, provide indirect support for "rigidity" with their finding that paranoid schizophrenics show less loosening of associations than do hebephrenics (disorganized type schizophrenia). Although it is said in different ways, it appears that many writers believe that paranoid schizophrenics rely on an especially self-referenced cognitive style, one that allows them to fit into their unique conceptualizations what others would define as ill-fitting indeed.

In Rorschach scoring systems, the confabulated whole response, in which the entire blot was labeled primarily on the basis of a detail of the blot, is conceptually very similar to the type of predicate thinking described above. However, the research reports are mixed on the tendency for paranoid schizophrenics to favor this response. Rapaport, et al. (1968) and Phillips and Smith (1953) specifically state that the confabulation is very much associated with

schizophrenia, but definitely not with the paranoid type. Beck et al., (1961) and Klopfer et al., (1954) associate this response only with deficit thinking in general. However, both Schafer (1954) and Weiner (1966) associate the confabulatory response specifically with paranoid schizophrenia. The differences in these reports may be due to a variety of factors, including the viability of the hypothesis that predicate thinking will express itself in this way on the Rorschach. Some other possible factors are differences in how paranoid schizophrenia was defined by each writer; differences in the scoring of "DW" (confabulated whole); or cultural differences related to the geographical region in which the data were collected. For example, although Rapaport, et al. (1968) state that DW are not likely to occur in paranoid schizophrenics, they do indicate that autistic logic is very common in that diagnostic group. They define autistic logic as occurring when the subject gives a weird reason to justify their response. They give as an example "North Pole... because its at the top (p439)." The type of response they describe certainly fits into a definition of predicate thinking. Rapaport and his colleagues also describe their research subjects as particularly guarded about emitting deviant verbalizations, which could also account for the lack of DW they report.

Another possible explanation that has occurred to the present writer is that these differences may be the result of the impact of neuroleptic medication. The majority of the data collected by Rapaport, Klopfer, Beck, Piotrowski and their associates were accumulated prior to 1950; major tranquilizers did not come into

widespread use until the 1950's. The unmedicated paranoid schizophrenic of 1935 is different from the medicated paranoid schizophrenic of 1960, and of today. Although there is no ready way to verify this possibility, it is suggested that neuroleptic medications, among other things, may have an impact on the production of confabulated responses in the Rorschach records of paranoid schizophrenics.

Some writers have noted the propensity for paranoid schizophrenics to be self-referential on the Rorschach (Phillips & Smith, 1953; Rapaport, et al., 1968; Weiner, 1966). These writers all note that as the pathological nature of self-references increases, so does the "loss of distance to the blot". Paranoid schizophrenics are reported as especially prone to responses in which their perception of the blot is directly related to themselves, such as a feeling that the eyes in the blot are looking at them.

Phillips and Smith (1953), in their extensive review of the Rorschach literature of that time, identified the oligophrenic detail (the "cut-off detail" in the Burstein-Loucks system) as being particularly indicative of paranoid schizophrenia. Many writers have noted the paranoid schizophrenic's propensity for detail responses in general (i.e., Chapman & Chapman, 1973; Phillips & Smith, 1953; Rapaport, et al., 1968; Schafer, 1954; Weiner, 1966). Meissner (1978) and Arieti (1974) have both noted the paranoid preoccupation with bodily harm or "castration fears"; such anxiety could be reflected in the perception of cut off parts, rather than whole objects, animals or people.

Phillips and Smith (1953) and Weiner (1966), in his review, all noted card description as a factor associated particularly with paranoid schizophrenia. Many writers have suggested that a high rate for both rejection of cards, or the overall refusal to take the test altogether, is also very much associated with paranoid schizophrenia (Piotrowski, 1957; Rapaport, et al., 1968; Schafer, 1954; Weiner, 1966). Klopfer (1956) has also identified the transposition response as being particularly associated with paranoid schizophrenia.

A particular form of thought pathology that has been linked with paranoid schizophrenia is "overinclusion" (Chapman & Chapman, 1973; Meissner, 1981). However, this construct is usually measured with various sorting procedures, and research results have been variable. As it is presently defined, such a construct would be difficult to measure using the Rorschach.

Both Magaro (1980, 1981) and Meissner (1981) have discussed the conceptual rigidity of paranoid schizophrenic thinking, as have earlier authorities (i.e., Weiner, 1966). Johnson and Quinlan (1985) recently reported finding that paranoid schizophrenics had higher levels of rigid boundaries (as measured on the Rorschach) than did non-paranoid schizophrenics, or "intermediate" schizophrenics. Their measure of rigidity/fluidity was derived from an additive scale based on the frequency of the occurrence of contaminations, confabulations, and fabulized combinations (as defined by Rapaport, et al., 1968). Bower, Testin, & Roberts (1960) developed scales they called "Arbitrary Tightening (AT)" and "Disorganization". The AT scale was intended to measure exaggerated attempts at control, as manifested through

Rorschach responses. As with Johnson & Quinlan, the paranoid schizophrenics in their sample scored highest on the AT scale, compared to catatonics and depressives. However, contamination responses are part of the Disorganization scale, as are confabulations. Of course, confabulation in this study is defined by Beck's (1952) version, which differs from Rapaport's. The problem with both of these studies is that (even though "weightings" were assigned in the Bower, et al. study) the contribution of any single deviant verbalization or perception is lost, and the resulting single index score is rendered much less valuable, and readily confounded with existing findings.

The Perceptual-Cognitive Characteristics

Hermann Rorschach (1942/1964), who created the test that bears his name, was also the first to identify certain types of responses that were associated with psychoses or schizophrenia. It has already been noted that as the Rorschach gained widespread use, clinical researchers began to describe additional types of responses that were indicative of thought pathology. These descriptions added much to the clinical and diagnostic usefulness of the Rorschach. However, a great deal of confusion has been created as various researchers used the same term to describe different things, and different terms to describe the same thing; or distinctive characteristics were omitted. Burstein and Loucks have drawn their indices from throughout this literature, with the intent of describing the relevant response variables, while at the same time providing a clear terminology for both research and clinical purposes.

In the descriptions that follow (Burstein & Loucks, 1988) those perceptual cognitive characteristics thought to apply particularly to severe psychopathology and thought disorder will be defined. In addition, some reference will be made to other theorists' identification and inclusion of these indices in their own systems. The list is presented in alphabetical order, and is not intended to represent increasing or decreasing levels of emotional disturbance or thought pathology.

Affective toning (AT). "The subject invests more in the response, i.e., is more involved and more expressive through: (a) vividness of language; (b) affective language and attributes posited; and (c) degree and amount of elaboration." (Burstein & Loucks, 1988, p. 101). An example of AT is "a blazing furnace."

Schafer (1954), for example, has described undue emotionality in the subject's response as an indication that defensive and adaptive operations have become ineffective. Using the term "affective verbalization" Rapaport, et al. (1946) considered this to be a deviant response; such affective elaborations represented a significant loss of distance to the blot. This type of response has also been identified as significant by Holt (1977), Klopfer, et al., (1954), and Phillips & Smith (1953).

Bizarre content (BC). "Responses in which the percepts reported have a bizarre quality or in which the associational process has a quality of eerie symbolic elaboration. Bizarre responses can be

socially inappropriate, if not disgusting." (Burstein & Loucks, 1988, p. 102). An example of BC is "two green worms; it looks like they're coming out of the eyes of a rabbit."

This category is readily attributable to psychotic thinking, and virtually all researchers of cognitive disorder include it in their systems (i.e., Beck, et al., 1961; Harrow & Quinlan, 1985; Holt, 1977; Rapaport, et al., 1968).

Card description (CD). "When the subject gives an evaluative comment as to the aesthetics, level of difficulty of the card, or any other evaluative statement; comments on the design of the card or geometric shapes or colors; or comments on the symmetry of the card." (Burstein & Loucks, 1988, p. 103). An example of CD is "Oh, what pretty colors!"

Phillips and Smith (1953) report that this type of test behavior reflects a high anxiety level; Weiner (1966) notes that this reflects extreme guardedness and concern in the testing situation. Klopfer et al., (1954) states that card descriptions are an attempt by the subject to protect himself against breaks with reality, and that this type of response is often found in records high in poor form quality.

Concrete perseveration (CP). "The third occurrence of exactly the same response. Do not count populars." (Burstein & Loucks, 1988, p. 104).

Rapaport, et al. (1956) described perseveration as the most extreme form of stereotypy. They note that the patient fixes on a

specific content, such as a butterfly, and the need to see this response is so dominant that while the patient may see some form congruent butterflies on some cards, they also report the same percept in cards that seem totally unrelated to the form of a butterfly. Thus, the patient's thinking is dominated by a fixed idea or theme, to the detriment of reality testing. Klopfer et al. (1954) associated perseveration with "quite irrational clinical cases" (p229-230). This is also one of the few categories listed by Exner (1978) as indicative of thought pathology.

Contradiction of reality (CR). "Parts from different percepts are combined to create a new organism which does not exist in culturally defined reality. The response (a) combines odd parts; (b) adds or distorts parts; (c) violates logical spatial organization; (d) violates size/proportion found in nature; (e) mixes percepts inappropriately; (f) involves an internal conceptual contradiction; and (g) contains inappropriate color." (Burstein & Loucks, 1988, p. 105). Some examples of CR are "a rabbit with bat's wings"; "A face with a nose with one nostril"; "A man leaning against a tree, asleep -- he's arguing with his wife"; and "green sheep."

The process of combining parts in a unique and surreal fashion was called a fabulized combination by Rorschach (1964/1942). Klopfer (Klopfer, et al., 1954) has stated that this type of response shows a lack of relational, hierarchical organization in the thought processes, and is common in very disturbed schizophrenics. Blatt and Ritzler (1974) state that the fabulized combination represents the "mildest"

form of responses indicating a boundary disturbance. In this case, the boundary difficulty lies in maintaining the relationship between external objects. This overall set of characteristics is a central feature of virtually all Rorschach scoring systems (i.e., Rapaport, et al., 1968; Weiner, 1966) and of systems assessing thought disorder in particular (i.e., Harrow & Quinlan, 1985; Holt, 1977; Johnston & Holzman, 1979; Watkins & Stauffacher, 1952).

Cluster thinking (CT). "Responses in which ideas, concepts, or themes are so interpenetrated or indiscriminately combined that there are not recognizable causal or logical connections." (Burstein & Loucks, 1988, p. 108). An example of CT is "Could be a pretty garden. Blue like my sister's coat. She's a nice woman and her husband flows pleasantly into a column of green meadow."

This characteristic was described by Cameron (1944) in his studies of schizophrenic thinking and language. It has also been included by Holt (1977) in his system for scoring primary process. Called "incoherence" by Rapaport (et al., 1946) it was described as "...always a psychotic indication and... the diagnosis is schizophrenia (p. 354)." This category generally includes the more severe forms of what is usually called "loose associations" in the thought disorder literature (i.e., Andreasen, 1987; Harrow & Quinlan, 1985; Johnston & Holzman, 1979).

Cut-off detail (Dx). "The subject sees only part of a percept when the whole, larger percept would normally be seen." (Burstein & Loucks, 1988, p. 109).

This was called an "oligophrenic detail" by Rorschach (1964/1942). Phillips and Smith (1953) and Rapaport et al., (1946) suggest that this response is related to severely disturbed and schizophrenic adults, and Holt (1977), includes this in his index of primary process thinking. Piotrowski (1957) describes this phenomenon as a pathological inability to grasp the whole of a problem that others would grasp with ease, and associates it with high anxiety levels.

Deterioration color (DC). "The subject uses color to justify content having to do with death, illness, weakness, decay, etc. The colors most often used in this way are yellow, oranges, and browns." (Burstein & Loucks, 1988, p. 108). An example of DC is "Withered grass--it's brown and old."

This characteristic was included on Rapaport, Gill, & Schafer's (1968) list of deviant verbalizations. Watkins and Stauffacher (1952) and Holt (1977), for example, also believe this to be evidence of maladaptive cognition.

Egocentric justification (EJ). "Verbalizations suggesting that the subject views his or her personal experience as adequate to fully define the reality of others." (Burstein & Loucks, 1988, p. 110). An example of EJ is "Cotton candy--I don't know (why it looks like it)--I guess I'm just hungry."

This category reflects the thinking of Sullivan (1944, 1962) and his concept of parataxic thought. As Sullivan describes it, parataxic thought is the type of cognition that occurs without external consensual validation. For the infant, it would be the infant's own conclusions about the relationships of experiences and events, whereas interactive language acquisition, for example, would by definition require consensual validation in order to be successful. The loss of distance in this instance is so pervasive that the subject no longer distinguishes between internal and external experience, nor seems to see any reason to do so. This basic idea of an egocentric, autistic, non-consensual frame of reference in schizophrenic thought is common to the writings of many authorities (i.e., Beck, et al., 1965; Holt, 1977; Lidz, 1973; Phillips & Smith, 1953; Rapaport, et al., 1968). The scoring for this category is rigorous; EJ cannot be scored if <u>any</u> other justification for the response is given. As such, occurrences of EJ represent highly autistic and self-referenced cognitive functioning.

<u>Fixed concept perseveration (FCP)</u>. "The third occurrence, and only on the third [occurrence], of a theme. A theme is a concept or specific category represented by the percepts given." (Burstein & Loucks, 1988, p. 111).

Klopfer (1956) describes this phenomenon in the records of both preschizophrenic children, and schizophrenic adults, and attributes it to a severe lack of reality testing. Rapaport, et al. (1946) cite this type of perseveration as the most severe form of what they label "preoccupation responses (p.299)." They state that perseveration of

this nature indicates the devastating effect of psychoses on the associational processes of the subject. Beck (1952) refers to it as "a nonadaptive stickiness of the attention (p. 27)." Exner (1978) refers only to the category of fixed content perseveration.

Loss of distance (LD). "The subject becomes overly involved in the percept, overemphasizing personal perspective, personal idiosyncracies, or over-personalizing." (Burstein & Loucks, 1988, p. 111). An example of LD is "That looks like a pit bull coming at you, those things come in so fast--that's all you see when those things come to get you--a blur."

This phenomenon is discussed by virtually all workers in the area (i.e., Holt, 1977; Phillips & Smith, 1953; Weiner, 1966; Rapaport, et al., 1968). It is associated with a general loss of reality testing, and of the ability to make self-other distinctions. As Rapaport, et al. (1946) describe it, the examiner can determine the degree of pathological, autistic thinking by the degree to which the subject loses distance to the card; the card takes on an increasing "reality" of its own for the subject.

Lost response (LR). "A response in the free association is forgotten or cannot be found in the inquiry." (Burstein & Loucks, 1988, p. 112). This is considered pathological by Holt (1977), who categorizes such responses as a primitive form of denial and defense.

Perceptual stabilization defect (PSD). "The cognitive perceptual phenomenon scored is one in which the subject has difficulty stabilizing his or her perceptual experience of the blot. The more common manifestations are (a) figure-ground reversal; and (b) condensation (sometimes known as contamination)." (Burstein & Loucks, 1988, p. 113). Some examples of PSD are "Rats climbing a tree... now the whole thing has turned into a flower"; or "A Southern Belle--this is a bell and a clapper--it also looks like a woman."

This category includes Rorschach's original conceptualization of a contaminated whole response, which he stated occurred only in schizophrenics. This is the most severe form of boundary disturbance, in which multiple percepts readily fuse into a single, often garbled entity. Indeed, this is one of the categories that virtually all authorities agree on as being indicative of severe thought pathology (i.e., Beck, et al., 1965; Exner, 1978; Harrow & Quinlan, 1985; Piotrowski, 1957). The aspect of perceptual "fluidity" and instability is also elaborated by Holt (1977).

Predicate thinking (PT). "Autistic reasoning or idiosyncratic induction in which the subject relies exclusively on a non-criterial attribute(s) in justifying a percept (non-criterial means peripheral, incidental, or irrelevant characteristics of the blot). Types of predicate thinking are (a) confabulations; (b) non-criterial color; (c) position responses; and (d) participation thinking." (Burstein & Loucks, 1988, p. 115). An example of PT is "a magician--because this looks like a wand."

This characteristic of disturbed thinking has been described extensively by many theorists (i.e., Arieti, 1974; von Domarus, 1944); in the works of these authors, it is seen as a central and possibly definitive feature of schizophrenic thought and reasoning. The phenomenon of "confabulation" was first noted by Rorschach (1964/1942) as occurring when the subject uses "a single detail... as the basis for the interpretation of the whole picture (p. 37)." (Rorschach called it a confabulated whole). Some Rorschach systems have kept this same term (i.e., Klopfer, et al., 1954; Piotrowski, 1957). However, this same phenomenon has also been called "autistic logic" by others (Exner,1978; Holt, 1977; Rapaport, et al., 1968). Blatt and Ritzler (1974) suggest that a confabulated response represents a more severe form of boundary disturbance, indicating difficulties in maintaining relational boundaries between internal and external objects, associations, and responses.

Rejection (Rej). "The subject does not respond to the card." (Burstein & Loucks, 1988, p. 117). Like many of the perceptual-cognitive characteristics, card rejection can sometimes occur in normals. However, as the rate of rejection increases above once per record, it rapidly comes to be seen as pathological (i.e., Beck, 1952; Piotrowski, 1957; Schafer, 1954; Weiner, 1966). Increased levels of card rejection represents a failure of the subject to be able to modulate and/or organize his or her perceptual experience. Therefore, the subject resorts to "abandoning the field" as their only acceptable course of action.

Self reference (SR). "The subject justifies the response in some way and self-discloses as an associational elaboration to the initial percept or some part of the inquiry." (Burstein & Loucks, 1988, p. 118).

This category is scored for occurrences of milder forms of some of the above described characteristics (i.e., Egocentric Justification) that reflect a general loss of distance (i.e., Rapaport, et al., 1968; Weiner, 1966). The elaboration of degrees of severity within a perceptual-cognitive category (i.e., Self Reference, Loss of Distance, Egocentric Justification) follows the trend of other researchers, who have sought to establish levels of severity in thinking disorder (i.e., Harrow & Quinlan, 1985; Holt, 1977; Johnston & Holzman, 1979; Watkins & Stauffacher, 1952).

Transposition response (TR). "The subject partially avoids seeing a response in its proper location by displacing it to another one through one of the following: transposition, shifting, and inversion." (Burstein & Loucks, 1988, p. 119).

Transposition per se was noted by Klopfer (1956), who suggested that this response reflects the distrust of the schizophrenic of that which seems obvious to others. He stated that the rarity of these responses suggests an especially negativistic stance, in which the schizophrenic is quite convinced that they are right and everyone else is wrong. The elaboration of this characteristic to include shifting (shifts to a smaller area of the blot a percept that is usually seen in a larger area of the blot" (p.75, 1987)) and inversion ("inverts the

blot area to see a response usually seen in that location in the inverse position; that is, upside down, if the plus response is now minus" (p. 75, 1987)) is an original contribution of Burstein and Loucks.

Extreme verbal peculiarity (VP). "In verbalizing a response, the subject's use of language noticeably violates common norms of syntax or semantics. These deviations in word choice or language usage serve to reduce the accuracy of verbal interpersonal communication. The more serious forms include (a) neologisms; (b) homonymic or clang associations; and (c) metonymic distortions." (Burstein & Loucks, 1988, p. 120). Some examples of VP are "a witch holding a sabbath--she's conjuring up a grebolication to destroy her enemies"; or, "A crab that has captured his first menu of the day."

This type of distorted language is one of the hallmarks of schizophrenia, and its recognition predates even the work of Kraepelin (1950/1896) and Bleuler (1911/1950). Extreme peculiarity (this type of deviant verbalization was originally called "queer", but this term has fallen into disuse for obvious reasons) is seen as significant and indicative of extreme thought pathology by many Rorschachers (i.e., Exner, 1978; Holt, 1977; Phillips & Smith, 1953; Rapaport, et al., 1969; Schafer, 1954; Watkins & Stauffacher, 1953; Weiner, 1966). Bizarre and idiosyncratic language continues to fascinate and be investigated by many researchers (i.e., Andreasen, 1987; Arieti, 1974; Exner, 1978; Harrow & Quinlan, 1985; Johnston & Holzman, 1979; Holzman, et al., 1986).

Mild verbal peculiarity ((VP)). "The subject uses a word, phrase, or more in a slightly idiosyncratic manner which deviates from everyday verbal convention. There is no clear violation of common semantic or syntactic form. This type of language might pass as appropriate outside the test situation, but close scrutiny will reveal idiosyncratic use of words subjectively rather than socially determined." (Burstein & Loucks, 1988, p. 122). An example of (VP) is "A belligerent dog--might have had its autonomic nervous system aroused and the adrenal glands sent out their stimulation."

This category allows for the differentiation of the milder, more consensually linked verbalizations that are nonetheless deviant. As has been noted, the elaboration of degrees of severity within a perceptual-cognitive category follows the trend of other researchers, who have sought to establish levels of severity in thinking disorder (i.e., Harrow & Quinlan, 1985; Holt, 1977; Johnston & Holzman, 1979; Watkins & Stauffacher, 1952).

Figure-ground reversal (S) and incorporated white space ((S)). A figure-ground reversal occurs when "White space becomes the area of interest, the figure, and the darker or colored area becomes the background or are ignored." (Burstein & Loucks, 1988, p. 117). Incorporated white space is scored "when the subject uses a white space as part of a response to a printed blot area, making the white space an integral part of the percept (p. 117)."

Authorities differ on the significance of space responses. Rorschach was the first to link space responses to a negative or oppositional tendency. However, Rorschach noted that other scores affected the way such an oppositional tendency should be interpreted, suggesting that space responses could be linked to such things as feelings of inadequacy, ambivalence, or stubbornness, depending on the context. Rapaport (et al., 1946) also noted the oppositional trend, and suggested also that higher frequencies were very indicative of paranoia. Piotrowski (1957) suggested that the space response could be a sign of healthy independence and self-confidence, rather than opposition. Beck (1952) related space responses to obsessive-compulsive traits, and difficulty with impulse control. When found in paranoids, he suggested that space responses reflect "the stubbornness with which they cling to their delusions (p. 61)."

Most of these writers agree that space responses should be interpreted only in light of other Rorschach scores; this position is held by several other authorities as well (i.e., Exner, 1974; Klopfer, 1954; and Phillips & Smith, 1953). Exner, in his review of the research of the area, does suggest that there is a general anger or opposition affect, but that it should be interpreted with caution. However, neither Holt (1977) nor Weiner (1966) mention space responses as being related to the presence of thought pathology. Thus, the occurrence of space responses remains very difficult to interpret.

Hypotheses

Based on the foregoing review of the literature, it is believed that the following perceptual-cognitive characteristics delineated by

the Burstein-Loucks Comprehensive System are most likely to indicate the presence of paranoid schizophrenia: Card Description; Cut-Off Detail; Egocentric Justification; Loss of Distance; Predicate Thinking; Card Rejection; and Transposition Response.

1. It will be found that all of the perceptual cognitive variables, in particular Card Description (CD), Cut-Off Detail (Dx), Egocentric Justification (EJ), Loss of Distance (LD), Predicate Thinking (PT), Card Rejection (REJ), and Transposition Response (TR), are statistically distinct variables with intercorrelations that do not exceed .50.

2. The following seven perceptual cognitive characteristics will be the more frequently scored characteristics for the research sample of paranoid schizophrenics, compared to a mixed psychiatric as well as a healthy adult subject group; CD, Dx, EJ, LD, PT, REJ, and TR.

3. It is further hypothesized that as a group, CD, Dx, EJ, LD, PT, REJ, and TR will be significantly higher in frequency of occurrence among the paranoid subjects when compared to the mixed psychiatric and healthy adult subject groups.

4. A discriminant function analysis will be employed to determine if CD, Dx, EJ, LD, PT, REJ, and TR are the strongest contributors to the statistical process of correctly classifying paranoid schizophrenics from a sample that also contains mixed psychiatric and healthy adult subjects.

The remaining characteristics are expected to be equally distributed among the mixed psychiatric and paranoid groups, or to be more prominent in the mixed psychiatric sample; they are not seen as

highly related to the responses expected from paranoid subjects. A relatively low frequency of all of these characteristics (with the exception of the "Popular" response) is expected in the non-clinical sample. The remaining characteristics are Affective Toning (AT), Mild ((VP)) and Extreme Verbal Peculiarity (VP), Bizarre Content (BC), Cluster Thinking (CT), Concrete Perseveration (CP), Contradiction of Reality (CR), Perceptual Stabilization Defect (PSD), Self Reference (SR), Fixed Concept Perseveration (FCP), Deterioration Color (DC), Incorporated White Space ((S)), Figure-Ground Reversal (S), and Lost Responses (LR). There are several other perceptual cognitve characteristics that are not necessarily linked to thought pathology. These include Popular (P) responses, Precision Alternatives (PA), and Pantomime (PM).

CHAPTER II

METHODOLOGY

The investigation examined the relationship of the perceptual-cognitive scores on paranoid schizophrenic Rorschach records with those of two other research samples. One, called "mixed psychiatric" consists of a group of 14 males and 6 female psychiatric inpatients, with varied diagnoses (including bipolar, schizoaffective, substance abuse, intermittent explosive disorder, undifferentiated and paranoid schizophrenia, and others). The other, labeled "healthy adult", consists of a group of 25 male and 25 female psychologically healthy adults. The data on the latter two research groups had been collected in previous research studies, as a part of the ongoing data collection effort conducted by Burstein, Loucks, and their associates at the University of Tennessee. It was expected that there would be significant differences in the distribution of cognitive-perceptual scores among these three groups. The Burstein-Loucks system was employed, using that system's identified perceptual-cognitive scoring categories to measure these characteristics.

Selection Criteria

The criteria for selecting the sample of 21 adult male and 24 adult female paranoid schizophrenic subjects was based on the DSM-III (American Psychiatric Association, 1980) diagnostic category of Schizophrenia, Paranoid Type, Chronic (DSM #295.32).

There was a change in the criteria for this diagnostic category in the DSM-III-R (American Psychiatric Association, 1987), which went

into effect during the course of the data collection. In the DSM-III, the Paranoid type was defined by either persecutory delusions, grandiose delusions, delusional jealousy, or hallucinations with persecutory or grandiose content. In the DSM-III-R, the Paranoid type is defined simply by "Preoccupation with one or more systematized delusions or with frequent auditory hallucinations related to a single theme" and by "None of the following: incoherence, marked loosening of associations, flat or grossly inappropriate affect, catatonic behavior, grossly disorganized behavior (p. 197)." The reasons for these changes are not made clear in the DSM-III-R. Various authors (Arieti, 1974; Kendler & Tsuang, 1981; Rabin, et al., 1979) indicate that flat affect is often associated with paranoid schizophrenia. Neale and Oltmanns (1980) cite findings from the International Pilot Study on Schizophrenia (World Health Organization, 1973) that flatness of affect is one of the primary ways to differentiate paranoid schizophrenia from schizoaffective disorder. Further, there remains general agreement about the significance of the content of the delusions or hallucinations (as indicated in the DSM-III criteria) in the diagnosis of paranoid schizophrenia. Finally, the DSM III criteria was used at the onset of data collection, and so for the sake of consistency of subject selection, as well as for the other reasons listed, the diagnostic criteria of the DSM-III was used throughout. Diagnostic screening of subjects was determined by psychiatric diagnosis (as listed in the chart).

It has been noted in the literature (i.e., Chapman and Chapman, 1973) that past research on schizophrenia has often been flawed by a

sole reliance on hospital (chart) diagnosis for subject selection. In order to address this problem, other factors (in addition to the hospital diagnosis) were utilized to identify potential research subjects. Chart diagnosis was used to identify potential subjects; however, two patients were included who were not diagnosed as paranoid (diagnosed schizophreniform and schizoaffective). Subjects were approached to participate if there was evidence of the specific presence of persecutory or grandiose delusions, delusional jealousy, or hallucinations with persecutory or grandiose content (as documented in the hospital chart), accompanied by flat, angry or fearful affect. Potential subjects were also evaluated for and rejected if there was evidence of affective components, such as mood swings, euphoric, or other manic-type behaviors; evidence of severe, chronic depression or repeated suicide attempts; evidence of chronic alcohol or other substance abuse; evidence of mental retardation (obtain highest grade completed); evidence of organicity or history of electroconvulsive or electroshock therapy. Patients were also not tested if the hospital or mental health center staff felt that the patient was too agitated, or if the experimental procedure would be disruptive.

The following information was also obtained by a review of charts: indications of current grandiose or persecutory delusions or hallucinations; age, socio-economic status (to include employment status, income); basic hospital status (management problem, violent, etc.); present level/type of medications, and medication history; duration of illness.

Procedure

Once identified as meeting the criteria, subjects were given the Rorschach. The standard Rorschach adminstration procedure is used in the Burstein-Loucks Comprehensive System, including an initial free association phase and later inquiry about each response. The one significant difference in the administration under the Burstein-Loucks system is in the initial instructions (1988, p. 33):

> "I'm going to show you ten cards, each containing a picture of an inkblot. I'll give them to you one at a time. I'll ask you to look at each card and tell me what it looks like. Spend as much time as you like on each card but be sure to tell me everything that occurs to you."

Some scoring systems (i.e., Exner, 1974) do not instruct the subject regarding how much time to take, or encourage the subject to report everything that they see.

Data Collection

The initial source of patients was Lakeshore Mental Health Institute in Knoxville, Tennessee. After data collection began, difficulties in procuring subjects made it obvious that additional clinical settings would have to be included. Additional data were collected on out-patient subjects at The Ridgeview Psychiatric Hospital and Center Villager Program in Oak Ridge, Tennessee. Data were also collected on outpatient subjects at the Helen Ross McNabb Mental Health Center in Knoxville, Tennessee. A formal review of potential subjects was also conducted at Cherokee Mental Health Center in Morristown, Tennessee; however, only one subject met the criteria, and she did not produce a usable protocol. The final research sample included a total

of 20 inpatient and 25 outpatient subjects. All subjects were taking antipsychotic medication at the time of their participation in the study.

One problem that made the data collection difficult was that many potential subjects were eliminated as a result of confounding factors in their diagnosis, such as a history of alcohol or substance abuse. As a result of the selection criteria employed, many patients who had a hospital chart diagnosis of paranoid schizophrenia were nevertheless ineligible to participate in the study. Another problem was that a significant number of subjects who fit the research criteria and who agreed to participate produced protocols of such a small number of responses (less than ten) that they were unusable in the study (this happened in 9 out of a total of 54 protocols that were collected). Three other subjects left the testing session prematurely, and thereby nullified their participation.

A difficult problem was that in both acute and chronic status, many patients that appeared to fit the research criteria would refuse to participate. This act of refusal tended to confirm the diagnosis, as it reflected the suspicious, oppositional, and noncompliant stance that is a part of paranoid schizophrenic pathology. The group of patients that met the research criteria and also refused to participate is operationally defined as containing the more paranoid, suspicious patients. The sample that was collected was therefore unrepresentative to the degree that the many of the most "paranoid" of the available paranoid schizophrenic subjects refused to participate, and therefore were not included in the research sample.

Scoring Procedures

Once each Rorschach record was obtained, it was scored under the rules of the Burstein-Loucks System. Each record was initially scored by the writer, and then scored independently a second time by a trained scorer who was blind to the research hypotheses. Any discrepancies that arose in the two scorings were resolved by a reconciliation team composed of two experienced scorers, who were also blind to the research hypotheses. This procedure minimized any inter-rater reliability problems.

CHAPTER III

RESULTS

Relationships Among the Perceptual Cognitive Variables

Pearson correlations were calculated for all of the perceptual cognitive variables. Table 1 contains a correlation matrix for the mean frequencies of the scores as they occurred in the paranoid sample. By inspection, it can be seen that there were no significantly elevated correlations, with only a few that exceeded .50. The highest correlation (.78) occurred between CT* and VP. This is not surprising, as both characteristics are heavily associated with extreme psychosis. In particular, the hypothesized variables (CD, Dx, EJ, LD, PT, REJ, and TR) all show relatively low correlations, with the slight exception of PT, which shows a mild association (.58) with CR and (.43) with VP.

Table 2 contains the correlation matrix for the means of the independent variables for the three-group pooled research sample. As before, most of the correlations are low; the highest correlation is .75 (again between VP and CT), and the number of values that exceed .50 is small. In this pooled sample, EJ (for the paranoid subjects, EJ = EJ + LD) is mildly correlated with (VP), CT, and PSD, which is an unexpected set of relationships; however, this is not a strong enough correlation to warrant any special consideration of these variables. Both matrices support the relative construct merit of each of the independent variables; there appears to be little overlap in the

*Abbreviations for the perceptual cognitive characteristics will be used from this point forward in the text. A complete list of theses abbreviations appears in Appendix A.

TABLE 1

PEARSON CORRELATION COEFFICIENT MATRIX
OF PERCEPTUAL COGNITIVE VARIABLES
FOR PARANOID SCHIZOPHRENIC SUBJECTS
(N = 45)

	REJ	P	S	(S)	AT	CD	EJ	SR	CR	BC	VP	(VP)	PT	CT	PSD	TR	Dx	FCP	LR	LD
REJ	1.00																			
P	0.12	1.00																		
S	-0.17	-0.17	1.00																	
(S)	-0.13	0.04	0.02	1.00																
AT	-0.13	-0.03	0.27	-0.12	1.00															
CD	0.18	0.17	-0.05	0.04	0.26	1.00														
EJ	-0.13	-0.03	0.16	0.10	0.13	0.06	1.00													
SR	-0.04	0.01	0.17	-0.04	-0.09	0.39	0.31	1.00												
CR	-0.01	-0.25	0.33	-0.22	0.39	-0.15	-0.07	-0.24	1.00											
BC	-0.14	-0.28	**0.49**	-0.13	**0.44**	-0.05	0.06	0.07	**0.54**	1.00										
VP	-0.21	-0.14	0.38	-0.29	**0.57**	-0.09	**0.46**	0.12	**0.42**	**0.57**	1.00									
(VP)	-0.28	-0.15	0.05	-0.05	0.07	0.01	0.14	0.14	0.02	0.07	0.22	1.00								
PT	0.14	-0.24	0.05	-0.25	0.37	-0.15	0.01	-0.10	**0.58**	0.24	**0.43**	0.01	1.00							
CT	-0.13	-0.26	**0.50**	-0.21	**0.50**	-0.09	0.28	0.29	0.34	**0.61**	**0.78**	0.18	0.36	1.00						
PSD	-0.25	-0.12	0.35	-0.19	0.52	0.11	0.33	0.18	**0.51**	**0.59**	**0.57**	0.18	0.18	**0.40**	1.00					
TR	0.14	-0.04	-0.12	-0.08	-0.08	-0.11	-0.17	-0.17	-0.04	-0.13	-0.16	-0.18	-0.15	-0.17	-0.13	1.00				
Dx	-0.01	-0.17	-0.09	0.04	-0.25	-0.23	-0.10	-0.18	0.05	-0.15	-0.13	-0.15	-0.08	-0.13	-0.06	0.13	1.00			
FCP	-0.20	**-0.44**	0.05	-0.26	0.34	0.07	0.08	0.15	0.20	0.31	**0.41**	0.05	0.37	0.31	0.28	-0.08	-0.11	1.00		
LR	-0.01	-0.26	-0.12	-0.04	-0.13	-0.14	-0.06	-0.30	0.18	0.07	-0.10	-0.07	0.15	-0.10	0.13	0.07	-0.08	-0.01	1.00	
LD	-0.21	-0.03	0.31	-0.25	0.38	**0.41**	0.39	0.28	0.34	**0.49**	**0.46**	0.26	0.07	0.38	**0.65**	-0.11	-0.15	0.23	-0.06	1.00

Correlations of .40 or higher are printed in **boldface** type. Correlations were derived from proportionally weighted scores.

REJ	Card Rejection	CD	Card Description	VP	Extreme Verbal Peculiarity	TR	Transpostion Response
P	Popular	EJ	Egocentric Justification	(VP)	Mild Verbal Peculiarity	Dx	Cut-Off Detail
S	Figure Ground Reversal	SR	Self Reference	PT	Predicate Thinking	FCP	Fixed Concept Perseveration
(S)	Incorporated WhiteSpace	CR	Contradiction of Reality	CT	Cluster Thinking		
AT	Affective Toning	BC	Bizarre Content	PSD	Perceptual Stabilization Defect	LR	Lost Response
						LD	Loss of Distance

TABLE 2

POOLED WITHIN-GROUPS CORRELATION MATRIX
OF PERCEPTUAL COGNITIVE VARIABLES
FOR PARANOID, MIXED PSYCHIATRIC, AND HEALTHY SUBJECTS
(N = 115)

	REJ	P	S	(S)	AT	CD	EJ	SR	CR	BC	(VP)	VP	PT	CT	PSD	TR	Dx	FCP	LR
REJ	1.00																		
P	-0.29	1.00																	
S	**0.64**	-0.26	1.00																
(S)	-0.24	-0.04	-0.07	1.00															
AT	-0.04	-0.10	0.09	0.02	1.00														
CD	0.06	0.20	-0.09	-0.13	0.16	1.00													
EJ*	-0.04	-0.04	0.08	-0.09	0.31	0.19	1.00												
SR	0.10	-0.14	0.18	0.05	0.10	0.13	0.32	1.00											
CR	-0.10	-0.05	0.04	-0.04	0.35	-0.03	0.17	-0.20	1.00										
BC	-0.07	-0.20	0.12	-0.06	0.39	-0.05	0.36	0.03	**0.46**	1.00									
(VP)	-0.08	-0.09	0.01	0.11	0.08	-0.08	0.21	0.10	0.08	0.06	1.00								
VP	-0.06	-0.16	-0.08	0.10	**0.54**	-0.08	**0.53**	0.16	0.38	**0.53**	0.18	1.00							
PT	0.02	-0.17	0.01	-0.11	0.36	-0.11	0.05	-0.07	**0.53**	0.23	0.03	**0.41**	1.00						
CT	-0.05	-0.16	0.13	-0.07	**0.46**	-0.04	**0.40**	0.21	0.32	**0.60**	0.15	**0.75**	0.35	1.00					
PSD	-0.04	-0.10	0.10	-0.07	0.24	0.07	**0.59**	0.16	**0.46**	**0.54**	0.16	**0.54**	0.17	0.38	1.00				
TR	-0.01	-0.05	-0.05	0.01	-0.06	-0.09	-0.16	-0.11	-0.01	-0.12	-0.16	-0.13	-0.13	-0.16	-0.12	1.00			
Dx	0.34	-0.20	-0.12	-0.06	-0.10	0.04	-0.07	-0.07	-0.01	-0.10	0.01	-0.08	-0.03	-0.08	-0.04	0.05	1.00		
FCP	-0.17	-0.37	-0.09	-0.02	0.30	-0.03	0.19	0.10	0.14	0.35	0.26	0.40	0.31	0.30	0.21	-0.03	-0.13	1.00	
LR	0.03	-0.20	-0.05	-0.09	-0.11	-0.11	-0.07	-0.24	0.16	0.05	-0.07	0.03	0.13	-0.10	0.11	0.05	-0.07	0.04	1.00

Correlations of .40 or higher are printed in **boldface** type. Correlations were derived from proportionally weighted scores.

* for the paranoid schizophrenic subjects, the EJ score is calculated by adding EJ + LD.

REJ	Card Rejection	CD	Card Description	VP	Extreme Verbal Peculiarity	TR	Transpostion Response
P	Popular	EJ	Egocentric Justification	(VP)	Mild Verbal Peculiarity	Dx	Cut-Off Detail
S	Figure Ground Reversal	SR	Self Reference	PT	Predicate Thinking	FCP	Fixed Concept Perseveration
(S)	Incorporated WhiteSpace	CR	Contradiction of Reality	CT	Cluster Thinking		
AT	Affective Toning	BC	Bizarre Content	PSD	Perceptual Stabilization Defect	LR	Lost Response

Rorschach manifestations of thought pathology that these variables attempt to measure. Hypothesis Number 1 is therefore accepted; the perceptual cognitive variables are statistically distinct variables that are not well intercorrelated.

Differences Within the Paranoid Schizophrenic Sample

A comparison was made (using the t test) of the response rates for the perceptual cognitive scores between the male (n = 21) and female (n = 24) subjects in this sample. Only one variable, (S), was found to be significantly different at the $p < 0.05$ level. Therefore, the paranoid schizophrenic sample was treated as a single group, and no particular analysis was conducted on the basis of gender. In their evaluation of the healthy adult sample, Burstein and Loucks (1988) found a similar lack of significant differences, and therefore made no gender distinctions in their analysis of that data.

A comparison (using the t test) was also made between the inpatient (n = 20) and outpatient (n = 25) subjects in this sample. Significant ($p < .05$) differences were found on several variables; AT, CR, VP, PT, CT, and LR). However, it was also found that the outpatient group of schizophrenics consistently scored significantly higher ($p < .05$) on the perceptual cognitive variables than did the mixed psychiatric subjects and the healthy adults. This suggests that even though there are some differences between the paranoid subgroups, the paranoid subjects as a group were consistently different from the other two groups. Further, the purpose of this study is to compare paranoid schizophrenics with other types of diagnostic samples, rather than to examine subtypes or degrees of paranoid schizophrenia. For

these reasons, no analyses were made based on the treatment status distinction.

At the time data were collected on the mixed psychiatric and healthy adult samples, responses currently scored as "LD" were at that time scored as a type of "EJ" response. Therefore, throughout the data analysis, the EJ score for the paranoid schizophrenics was calculated by adding EJ and LD scores together for each subject. Other than being reported in the frequency and correlation data, the LD scores are not analyzed, and will not be included in discussions about the group of "hypothesized variables".

Differences Among the Sample Means

Table 3 presents the mean cumulative frequency of the variables as they occurred in the pooling of the three subject samples. The variables are ranked from highest to lowest frequency for the paranoid subjects. The statistical procedure used to determine significance was a one factor analysis of variance, followed by a post hoc Scheffé test. Table 4 shows the proportional mean frequencies of the three subject groups. Proportional data is calculated by dividing the total number of occurrences of a given variable by the total number of Rorschach responses given on that record. The differences in the rankings between the proportional and cumulative means for the paranoid group are negligible, as are the differences in the rank orders of the other two groups. Differences in significance levels using these two methods were also few in number.

Proportional data were used in an effort to equalize the differences that occur between Rorschach records of varying size. This

TABLE 3

CUMULATIVE MEAN FREQUENCIES OF PERCEPTUAL COGNITIVE CHARACTERISTICS IN PARANOID SCHIZOPHRENIC, MIXED PSYCHIATRIC AND HEALTHY SUBJECTS

Variable	PARANOID (N = 45)	MIXED PSYCHIATRIC (N = 20)	HEALTHY (N = 50)
Affective Toning	5.11[a,b]	0.5[c]	2.0
Popular	4.51	3.6[c]	5.4
Contradiction of Reality	3.68[a,b]	1.0	0.7
Self Reference	2.40[a]	0.7	1.3
Predicate Thinking*	2.33[a,b]	0.1	0.1
Mild Verbal Peculiarity	2.06[a,b]	0.3[c]	0.3
Fixed Concept Perseveration	2.00[a,b]	1.0[c]	0.2
Card Description*	1.35[a]	0.6[c]	1.8
Extreme Verbal Peculiarity	1.28[a,b]	0.4	0.1
Egocentric Justification + Loss of Distance**	1.42[a,b]	0.1	0.0
Perceptual Stabilization Defect	0.97[a,b]	0.1	0.1
Egocentric Justification*	0.77	---	---
Loss of Distance*	0.64	---	---
Bizarre Content	0.53[b]	0.2	0.0
Cluster Thinking	0.46[b]	0.1	0.0
Incorporated White Space	0.46[a,b]	1.3	1.5
Card Rejection*	0.31[a]	---	---
Lost Response	0.35[b]	0.1	0.0
Transposition Response*	0.17[b]	0.1	0.0
Figure Ground Reversal	0.17[b]	0.2	0.6
Cut-Off Detail*	0.11	0.3	0.1
Concrete Perseveration	0.02	---	0.0
Deterioration Color	0.04	0.0	0.0

* Indicates Perceptual Cognitive Characteristics hypothesized to be most indicative of presence of paranoid schizophrenia.

** In the Mixed Psychiatric and Healthy Adult subjects, responses that in the present system are scored either LD or EJ were scored as EJ. EJ is therefore not an equivalent score across subject samples.

[a] denotes $p < 0.05$ for comparisons of Paranoid and Mixed Psychiatric subject means.

[b] denotes $p < 0.05$ for comparisons of Paranoid and Healthy subject means.

[c] denotes $p < 0.05$ for comparisons of Mixed Psychiatric and Healthy subject means.

Values for p were determined by an ANOVA and a post hoc Scheffé's test of significance.

TABLE 4

PROPORTIONAL MEAN FREQUENCIES OF PERCEPTUAL COGNITIVE IN PARANOID SCHIZOPHRENIC, MIXED PSYCHIATRIC AND HEALTHY SUBJECTS

Variable	PARANOID (N = 45)	MIXED PSYCHIATRIC (N = 20)	HEALTHY (N = 50)
Affective Toning	0.307[a,b]	0.021	0.078
Popular	0.281	0.278	0.232
Contradiction of Reality	0.203[a,b]	0.078	0.029
Self Reference	0.146[a,b]	0.056	0.048
Predicate Thinking*	0.133[a,b]	0.002	0.005
Mild Verbal Peculiarity	0.112[a,b]	0.028	0.011
Fixed Concept Perseveration	0.106[a,b]	0.059[c]	0.008
Card Description*	0.086	0.060	0.085
Extreme Verbal Peculiarity	0.085[a,b]	0.017	0.004
Egocentric Justification + Loss of Distance**	0.082[a,b]	0.008	0.001
Perceptual Stabilization Defect	0.049[a,b]	0.004	0.002
Egocentric Justification*	0.041	---	---
Loss of Distance*	0.041	---	---
Cluster Thinking	0.029[b]	0.008	0.000
Bizarre Content	0.028[b]	0.010	0.000
Incorporated White Space	0.024[a,b]	0.088	0.059
Card Rejection*	0.023[a]	0.240[c]	---
Lost Response	0.015[b]	0.006	0.000
Transposition Response*	0.009[b]	0.002	0.001
Figure Ground Reversal	0.009	0.028	0.025
Cut-Off Detail*	0.005[a,b]	0.028	0.003
Concrete Perseveration	0.01	---	0.000
Deterioration Color	0.01	0.000	0.000

* Indicates Perceptual Cognitive Characteristics hypothesized to be most indicative of presence of paranoid schizophrenia.

** In the Mixed Psychiatric and Healthy Adult subjects, responses that in the present system are scored either LD or EJ were scored as EJ. EJ is therefore not an equivalent score across subject samples.

[a] denotes $p < 0.05$ for comparisons of Paranoid and Mixed Psychiatric subject means.

[b] denotes $p < 0.05$ for comparisons of Paranoid and Healthy subject means.

[c] denotes $p < 0.05$ for comparisons of Mixed Psychiatric and Healthy subject means.

Values for p were determined by an ANOVA and a post hoc Scheffé's test of significance, calculated using the proportionally weighted scores.

was done to offset the potentially unequal impact of the occurrence of a given variable in different size records. Proportional data were used in all data analysis, except where otherwise noted.

Examination of Tables 3 and 4 reveals that Hypothesis Number 2 is not supported; the predicted perceptual cognitive variables (CD, Dx, EJ, LD, PT, REJ, and TR) are not the most frequent scores for the paranoid subjects. A total of 11 variables significantly ($p < .05$) distinguished the paranoid subjects (on the basis of frequency) from both the mixed and healthy subjects (from Table 4). The significant variables are AT, CR, SR, PT, (VP), FCP, VP, EJ+LD, PSD, (S), and Dx. However, only PT and EJ+LD (among the group of hypothesized variables) were actually the most frequent in occurrence for the paranoid subjects when compared to both of the other subject groups. For the remaining hypothesized variables, REJ was the only variable significantly different from the mixed subjects, while TR was significantly different only from the healthy subjects. Even when combined (for the purpose of comparison to the other two groups), the score of EJ and LD was only the eighth highest in frequency. Finally, the highest mean frequency of Dx actually occurs in the mixed psychiatric subjects, then followed in descending order by the paranoid and then the healthy adult subjects. Although a high frequency of Popular responses was anticipated for the healthy adult subjects, the equally high frequency of this response in the paranoid schizophrenic sample was not expected. The high frequency of AT, CR, and SR scores for the paranoid group was also not anticipated from the review of the literature.

Examination of the lack of significant difference in the mean frequency of the REJ variable between the paranoid and healthy subjects reveals a statistical anomaly. The problem is related to the extremely small (N = 2) total number of card rejections given by the healthy subjects. Interpretation of card rejection is further complicated by a unique aspect of this particular variable. Card rejection, by definition, is the only perceptual cognitive variable that is innately correlated to the number of responses given. The more frequently REJ is scored on a given protocol, the more likely there is to be a small number of total responses on that protocol. In fact, five of the Rorschach protocols that were collected (but not used in this study) were rejected on the basis of too few responses; one such record contained a total of seven card rejections. Therefore, any interpretation of the contribution of the REJ variable in the diagnostic identification of paranoid schizophrenics as it is manifest in this data analysis should be undertaken cautiously, that is, with the above information in mind.

The high incidence of AT scores was more closely evaluated, as this particular variable was not expected to occur with this frequency in the paranoid sample. An examination of individual records found nine paranoid schizophrenic subjects who had an AT frequency of greater than 50%. A frequency analysis was performed to compare the remaining 36 subjects to the total group of 45 subjects. The results of this new rank ordering of means can be seen in Table 5. Virtually the only variable affected by the removal of these nine subjects was AT. This table demonstrates that the removal of the high AT subjects has little

TABLE 5

COMPARISON OF THE MEAN FREQUENCIES OF PARANOID SCHIZOPHRENIC SUBJECTS WITH AND WITHOUT HIGH FREQUENCY AFFECTIVE TONING RESPONDERS

Variable	All Subjects (N = 45)	Low AT Subjects[a] (N = 36)
Affective Toning	5.11	3.94
Popular	4.51	4.61
Contradiction of Reality	3.68	3.58
Self Reference	2.40	2.50
Predicate Thinking*	2.33	2.22
Mild Verbal Peculiarity	2.06	2.06
Fixed Concept Perseveration	2.00	2.08
Egocentric Justification + Loss of Distance**	1.42	1.42
Extreme Verbal Peculiarity	1.42	1.28
Card Description*	1.35	1.06
Perceptual Stabilization Defect	0.97	1.03
Egocentric Justification*	0.77	0.86
Loss of Distance*	0.64	0.56
Bizarre Content	0.53	0.47
Incorporated White Space	0.46	0.47
Cluster Thinking	0.46	0.36
Lost Response	0.35	0.41
Card Rejection*	0.31	0.25
Figure Ground Reversal	0.17	0.13
Transposition Response*	0.17	0.22
Cut-Off Detail*	0.11	0.13
Deterioration Color	0.04	0.02
Concrete Perseveration	0.02	0.03

* Indicates Perceptual Cognitive Characteristics hypothesized to be most indicative of presence of paranoid schizophrenia.

** In the Mixed Psychiatric and Healthy Adult subjects, responses that in the present system are scored either LD or EJ were scored as EJ. This frequency should be interpreted with caution.

[a] The elimination criteria for "high AT" was any subject that had an AT score on more than 50% of their responses. On this basis, nine subjects were eliminated.

Note: Means shown are cumulative.

impact on the distribution of AT, or on the mean of any other variable for that matter. This suggests that although there is clearly a definable subgroup of high AT scorers, the proclivity for the AT score is consistent throughout the paranoid subject sample. It was therefore decided that further statistical analysis would include all 45 subjects in the paranoid schizophrenic research sample.

The review of the data in Tables 3 and 4 also indicates that the frequency of occurrence of the variables CP and DC was negligible. The variables CP and DC were therefore omitted from the correlational matrices and the discriminant function analysis. This was also helpful as it allowed more sophisticated statistical procedures to be used, as the number of "cells" was reduced, thereby increasing the number of subjects per cell.

Differences Among Sample Means Using Pooled Hypothesized Variables

A multivariate analysis of variance (Manova) procedure was conducted on the hypothesized variables. In this procedure, the means of the seven hypothesized variables were summed. The frequency of the occurence of this new summary score was then compared for the three subject groups. Significant differences ($p = 0.0001$) were found among the groups. Three individual t tests were then conducted to determine in which particular pair of group comparisons the differences in frequency had been significant. All three subject groups were found to be significantly different from each other at or below the level of $p = 0.006$. Hypothesis Number 3 is accepted; the hypothesized variables as a group occur at significantly different rates among the three groups; they occur with the most frequency in the paranoid group.

Classification of Subjects Into Groups on the Basis of Perceptual Cognitive Scores.

The following discussion of canonical discriminant analysis is taken from Norusis (1985). Canonical discriminant analysis is most appropriately employed when a number of variables are to be used to categorize subjects among mutually exclusive groups. This analysis also helps to identify the specific subset of variables that are the most important for assigning group membership. Therefore, only the variables which are the most significantly associated with this process of classification into groups are included in the discriminant "function" that is the result of the discriminant analysis. This function can then be effectively used to predict group classification for subjects whose group has not been previously assigned.

The canonical discriminant function is a linear combination of coefficients that differentially weight the selected independent (or predictor) variables in linear equation form.

The linear discriminant equation

$$D = B_0 + B_1X_1 + B_2X_2 + \ldots + B_nX_n$$

where the X's are the values of the predictor variables, and the B's are the coefficients that have been estimated. B_0 is a "constant" that is also generated by the analysis, and becomes a fixed part of the function. The discriminant equation is similar to the multiple regression equation. The coefficients are derived so that the ratio of between groups sum of squares to the within group sum of squares is maximized. This linear equation is calculated for each subject, resulting in a single "score". Depending on the type and number of independent variables given for each subject, the score is high or low,

positive or negative. It is on the basis of the discriminant score that the subject is assigned to a group. For example, a high score could mean placement in "group one", and a low score in "group two."

In a three-group discriminant analysis, two separate discriminant functions are calculated, and each subject receives two discriminant scores. As in a two way analysis, group classification is made on the basis of these scores. A single discriminant function can be calculated in a three-way analysis, but this typically results in a lower percentage of correct group classifications. A two dimensional field (composed of two perpendicular lines) is used to "plot" the two discriminant function scores. In essence, the scores fall on an X and Y axis; the resulting position determines the group that the subject is classified into. For example, a subject with two negative scores would land in a different quadrant than would a subject with two positive scores; in turn, each would be assigned to a different group.

Each variable that is used in the discriminant function is weighted by a coefficient score and contributes to the assignment of subjects. The interpretation of individual variables should be done with caution, however. Along with the coefficient value, data about group centroids, the success rate of the classification, and the correlations between the discriminant variables and the discriminant function is also necessary. The interpretation of variables and coefficient weights will be further elaborated as the functions derived from the canonical discriminant analysis of the data are examined.

The variables and function coefficients are determined by a multi-step algorhythm procedure, in which a series of computations is

performed several times. This stepwise procedure is based on the minimization of the Wilks' Lambda statistic for any given variable. The Wilks' Lambda is the ratio of the within-groups sum of squares to the total sum of squares. The stepwise procedure ends when no more variables can significantly reduce Lambda, and all significant coefficients have been added to the discriminant function.

Another factor in the assignment of subjects to a given group is called the prior probability. This refers to the known probability that a given subject will be assigned to a given group. In the present study, 95 out of 115 subjects' group membership was known, with a high probability of membership in a third (potentially distinct) group for the remaining subjects (the mixed psychiatric sample). The discriminant analysis, once given these conditional probabilities of group membership, then tends toward this basic ratio of group assignments (i.e., 39.9% for the paranoid, 17.4% for the mixed, and 43.5% for the healthy groups). Clearly, this process requires rigorous pre-selection of subjects for each group in order for the analysis to be effective and meaningful.

In addition to the percentage of subjects correctly classified, another way to determine the viability of the discriminant functions is to check the eigenvalue. The eigenvalue is the ratio of the between-groups to within-groups sums of squares. Unlike the Wilks' Lambda (the ratio of within-groups sums of squares to total sums of squares), it is large eigenvalues that are associated with good functions. A large value is considered to be anything above 1.0. Another way to assess the discriminant functions is to evaluate the percent of the

variance accounted for. Finally, canonical correlations, functioning like eta^2 in a oneway Anova, give information about the relationship between the discriminant function scores and the three groups.

The discriminant functions for the hypothesized variables. A canonical discriminant analysis was performed using the hypothesized perceptual cognitive variables (CD, Dx, EJ, PT, REJ, and TR) as the basis for assignment to one of the three research samples. Table 6 lists the two discriminant functions that were calculated for the hypothesized variables, in rank order (most powerful positive coefficient first). Negative values can be equally powerful, but tend to represent a very different group assignment. The analysis found five out of the six hypothesized variables to contribute significantly to the functions. The variables TR and PT appear to have a positive weighting, (i.e., Function 1 is 30.04 for TR, and 10.09 for PT) which contributes to the classification of subjects into the paranoid group. EJ has a small positive weighting, which might indicate a lesser role for classification of subjects. Dx and REJ have a mix of negative and positive weightings, which suggests that these variables are related to the assignment of subjects into the mixed or healthy groups, rather than the paranoid group. CD was not included in the discriminant functions; this means that it may have had some relationship with the group classification process, but it was not a significant one. All of these "interpretations" of the coefficients are speculative. Based on weighting alone, there is not enough information to even approximate a

TABLE 6

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
USING HYPOTHESIZED VARIABLES ONLY
FOR POOLED SUBJECT GROUPS (N = 115)

Variable	Function 1	Function 2
Transposition Response	30.04	5.47
Predicate Thinking	10.09	0.28
Egocentric Justification	.10	2.15
Cut-Off Detail	-0.43	17.45
Card Rejection	-0.43	3.13
(Constant)	-0.85	-0.42
Eigenvalue	1.04	0.19
% of S^2	84.80	15.20
CanCorr	0.71	0.40
$p <$	0.000	0.001

given variable's role in the overall function. The process of coefficient interpretation will be elaborated in a later section.

Table 7 shows the rate of prediction and classification for the discriminant functions that utilized the hypothesized variables. It lists the number of subjects assigned (on the basis of individual discriminant scores) to each subject group. It also shows the cumulative percentage of subjects in each sample that were assigned to a given group. Finally, the cumulative percentage of subjects correctly assigned is given at the bottom. The discriminant functions calculated from the hypothesized variables were very successful in

TABLE 7

GROUP PREDICTION AND CLASSIFICATION RESULTS
OF DISCRIMINANT FUNCTIONS FOR POOLED SUBJECT GROUPS
USING HYPOTHESIZED VARIABLES ONLY

	Predicted Group Assignment		
Group	(1) Paranoid	(2) Mixed	(3) Healthy
(1) PARANOID	**29** **64.4%**	0 0.0%	16 35.6%
(2) MIXED	1 5.0%	**5** **25.0%**	14 70.0%
(3) HEALTHY	0 0.0%	0 0.0%	**50** **100.0%**
Total % of Subjects Correctly Classified:		**73.04%**	

* Variables "DC" and "CP" are excluded from this group.

Rates showing accurate classification of subjects to group are printed in **boldface** type.

classifying the healthy subjects (100%); moderately successful at paranoid schizophrenic assignment (64.4%); and somewhat weak at classifying the mixed psychiatric subjects (25.0%). The overall rate of successful classification for all subjects in all groups was 73.04%.

The discriminant functions for all variables. A second canonical discriminant analysis was performed using all 19 of the perceptual cognitive variables. This was possible, as the three-group pooled

sample allowed at least six subjects per variable; five is considered to be the minimum N for such an analysis. Tables 8 and 9 show the results of this analysis. On Table 8, the functions derived from all of the variables (except CP and DC) are ranked with the most powerful positive coefficient first. Examination of this data indicates that the hypothesized variables (in boldface on Table 8), although significant, do not appear to form the most important group of variables that contribute to the discriminant functions' efficacy at classification of subjects. In this analysis of all of the independent variables, the hypothesized variables EJ and Dx were not included in the resulting discriminant functions. Further analysis indicates that variables such as LR, FCP, (VP) and P are positively associated with the classification of subjects into the paranoid schizophrenic sample as well. Furthermore, as will be shown, two of the hypothesized variables, CD and REJ, seem to actually be negatively associated with assignment to the paranoid group. The inclusion of all of the perceptual cognitive variables allowed for a significantly improved classification rate, particularly for the assignment of subjects to the paranoid group, as seen in Table 9. The functions are now very successful in classifying both healthy (100.0%) and paranoid (88.9%) subjects, and moderately successful at selecting the mixed subjects (70.0%) as well. The overall classification rate for these functions was 90.43%. For ease of comparison, Table 9 also shows the classification data for the discriminant functions that used only the hypothesized variables.

TABLE 8

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
USING ALL VARIABLES*
FOR POOLED SUBJECT GROUPS (N = 115)

Variable	Function 1	Function 2
Transposition Response**	21.35	-7.55
Lost Response	9.76	3.53
Fixed Concept Perseveration	8.31	9.81
Mild Verbal Peculiarity	7.19	-1.39
Popular	4.52	4.19
Predicate Thinking**	3.88	-6.31
Self Reference	3.48	0.26
Perceptual Stabilization Defect	2.69	-6.94
Contradiction of Reality	1.63	3.97
Affective Toning	1.59	-2.27
Card Rejection**	1.56	4.98
Card Description**	-1.89	-1.45
Incorporated White Space	-3.56	10.12
Figure Ground Reversal	-3.85	-7.72
Extreme Verbal Peculiarity	-4.36	4.94
(Constant)	-2.66	-1.84
Eigenvalue	2.78	0.93
% of S^2	74.88	25.12
CanCorr	0.86	0.69
$p <$	0.000	0.000

* Variables "DC" and "CP" are excluded from this group.

** Indicates Perceptual Cognitive Characteristics hypothesized to be most indicative of the presence of paranoid schizophrenia.

TABLE 9

GROUP PREDICTION AND CLASSIFICATION RESULTS
OF DISCRIMINANT FUNCTIONS FOR POOLED SUBJECT GROUPS
USING ALL VARIABLES OR HYPOTHESIZED VARIABLES ONLY

	Predicted Group Hypothesized Variables			Predicted Group All Variables*		
Group	(1)	(2)	(3)	(1)	(2)	(3)
(1) PARANOID	**29**	0	16	**40**	1	4
	64.4%	0.0%	35.6%	**88.9%**	2.2%	8.9%
(2) MIXED	1	**5**	14	0	**14**	6
	5.0%	**25.0%**	70.0%	0.0%	**70.0%**	30.0%
(3) HEALTHY	0	0	**50**	0	0	**50**
	0.0%	0.0%	**100.0%**	0.0%	0.0%	**100.0%**
Total % of Subjects Correctly Classified:		**73.04%**			**90.43%**	

* Variables "DC" and "CP" are excluded from this group.

Rates showing accurate classification of subjects to group are printed in **boldface** type.

A closer look at Table 9 seems to indicate that the discriminant functions tended to place subjects in either Group 1 (paranoid) or Group 3 (healthy), particularly when only the hypothesized variables were used in the discriminant analysis. As has been discussed, this is due in part to the prior probability rates; Group 2 (mixed psychiatric) is the smallest group (less than half the size of either group), and the case classification rate reflects this imbalance to some extent. This sort of problem would best be remediated by using research samples

of equal N. In spite of this, the classification problems for Group 2 (mixed psychiatric) that are so evident using only the hypothesized variables as the predictors are much less evident when all of the variables are used as predictors; the rate improves from 25% to 70%.

Table 10 shows the means (centroids) of each of the discriminant function scores that have been calculated using the two independent variable sets. One pair of centroids is calculated for each group, and serve as coordinates on the two-dimensional distribution of the discriminant scores that are calculated for the pooled subject groups. Each pair of centroid coordinates indicate the "location" for each subject sample. Therefore, the more closely a given subject's discriminant scores match a centroid pair, the more likely that the subject will be assigned to that group. For example, the Function 1 and 2 centroids for the analysis (all variables) of the paranoid group (Table 10) are 2.006 and -0.247. This indicates that pairs of discriminant scores that are closer to these values (and/or this relationship to each other) will result in the subject being assigned to the paranoid group.

It can be observed on Table 10 that the group centroids for assignment to the healthy group are both negative values. A look at the values for the discriminant function "constants" (Table 8) shows that they too are negative numbers. In the discriminant function equation, if no variables are scored, then the discriminant score becomes simply the value of the constant. Therefore, healthy subjects, who typically generate few of the perceptual cognitive scores with positive weighting to begin with, are the most likely to obtain

TABLE 10

CANONICAL DISCRIMINANT FUNCTION SCORES
EVALUATED AT GROUP MEANS
(GROUP CENTROIDS)

Group	All Variables* Group Centroids		Hypothesized Variables Group Centroids	
	Function 1	Function 2	Function 1	Function 2
PARANOID	2.006	-0.247	1.253	0.014
MIXED	-0.596	2.047	-0.858	0.853
HEALTHY	-1.567	-0.596	-0.785	-0.354

* Variables "DC" and "CP" are excluded from this group.

discriminant scores that are both negative, and so tend to be placed toward the centroids of group 3, the healthy group. However, a psychologically disturbed subject who generates a minimal number of perceptual cognitive scores has a higher probability of being assigned to the healthy group. This sort of misclassification is less likely to occur if the values that are scored are of the more pathological variety; this is the entire rationale of the coefficient weightings, and can help to eliminate misdiagnosis on the basis of frequency alone.

Evaluation of the discriminant function coefficients. The results of the two discriminant function analyses indicate that it is appropriate to reject hypothesis Number 4; the hypothesized variables do not appear to constitute the "best" basis for classifying subjects

into diagnostic categories. However, it is appropriate to make a somewhat closer examination of the perceptual cognitive characteristics that did receive coefficient weightings in the canonical discriminant functions. These include some of the hypothesized independent variables; but as has already been noted, some unpredicted variables appear to have a significant relationship with the paranoid response pattern as well. For the most part, the following analysis will focus primarily on the functions and coefficients obtained when all of the perceptual cognitive variables were used in the discriminant function analysis.

The most heavily weighted discriminator variable for either analysis group is TR. However, using only the coefficient's weight as a basis for any clinical conclusions about the Transposition Response would be inappropriate. At no time should a single coefficient be interpreted out of the context of the entire function. As shall soon be evident, the TR variable is a good example of why this is true. However, a general sense of any single coefficient's "meaning" can be determined by the following steps.

The group centroids (the group means of the canonical discriminant functions) for the functions for each group give basic information about the "direction" of group assignment. It has already been noted that the group centroids (Table 10) for the paranoid subjects are positive for Function 1, and negative for Function 2, when all variables are included. Table 8 shows that Function 1 for TR is positive, and Function 2 negative. Therefore, we can now say that the TR weighting is associated with the paranoid subject sample.

We now have to turn to Table 11 to determine the relative strength of the relationship between the TR coefficient, the overall discriminant function, and assignment to the paranoid group. Table 11 contains the pooled within-group correlations between the individual discriminant variables and the canonical discriminant functions. This Table provides data for both of the discriminant function analyses; in the upper section for the hypothesized variables only, and in the lower for all the variables. The variables are ranked in descending order. The upper section is ranked only by the hypothesized variables, and the following section by all of the independent variables. This table provides a listing of correlations, not coefficients; it should not be confused with the data in Tables 6 and 8, which are similar in appearance. The values given describe the degree to which any single independent variable correlates with the canonical discriminant function. Another way to think of these correlations is to view them as an estimate of how much that variable "contributes" to the discriminant function. Therefore, the correlation provides additional information about the relative strength or weakness of a given variable's role in determining group assignment of subjects.

Table 11 provides the correlations of all of the independent variables, including those that were not used as coefficients in the canonical discriminant analysis. Some of these excluded variables (i.e., EJ, BC, and CT) have higher correlations than do variables that were included in the analysis (i.e., LR and P). For one thing, this demonstrates the danger in using only one factor, such as a correlation coefficient, to make assessments of the importance of a given variable

TABLE 11

POOLED WITHIN-GROUP CORRELATIONS
BETWEEN DISCRIMINANT VARIABLES
AND CANONICAL DISCRIMINANT FUNCTIONS
USING ALL VARIABLES AND HYPOTHESIZED VARIABLES ONLY

Variable	All Variables**		Hypothesized Variables Only	
	Function 1	Function 2	Function 1	Function 2
Hypothesized Variables Only				
PT*	0.46	-0.18	0.78	0.02
EJ*	0.21	-0.10	0.47	0.10
TR*	0.16	-0.03	0.27	0.07
REJ*	-0.01	0.41	-0.11	0.88
Dx*	-0.06	0.28	-0.09	0.75
CD*	0.01	-0.10	-0.04	0.09
All Variables				
PT*	0.46	-0.18	0.78	0.02
FCP	0.42	0.15	--	--
(VP)	0.40	-0.12	--	--
CR	0.40	0.01	--	--
AT	0.38	-0.26	--	--
PSD	0.30	-0.10	--	--
VP	0.28	0.01	--	--
SR	0.24	-0.06	--	--
EJ*	0.21	-0.10	0.47	0.10
BC	0.21	-0.03	--	--
CT	0.21	-0.06	--	--
LR	0.17	0.03	--	--
TR*	0.16	-0.03	0.27	0.07
S	-0.09	0.05	--	--
REJ*	-0.01	0.41	-0.11	0.88
(S)	-0.21	0.28	--	--
Dx*	-0.06	0.28	-0.09	0.75
P	0.10	0.01	--	--
CD*	0.01	-0.10	-0.04	0.09

* Indicates Perceptual Cognitive Characteristics hypothesized to be most indicative of presence of paranoid schizophrenia.
** Variables "DC" and "CP" are excluded from this group.

PT = Predicate Thinking; FCP = Fixed Concept Perseveration; (VP) = Mild Verbal Peculiarity; CR = Contradiction of Reality; SR = Self Reference; AT = Affective Toning; PSD = Perceptual Stabilization Defect; Dx = Cut-Off Detail; LR = Lost Response; REJ = Card Rejection; S = Figure-Ground Reversal; TR = Transposition Response; BC = Bizarre Content; CD = Card Description; EJ = Egocentric Justification; P = Popular; VP = Extreme Verbal Peculiarity; CT = Cluster Thinking; (S) = Incorp. White Space.

to the discriminant function. As mentioned earlier, independent variables are included and excluded from the discriminant function on the basis of minimizing the variance of the Wilks' Lambda score. Only those independent variables which do this the most effectively remain in the function at the conclusion of this process.

In the case of TR, we see on Table 11 that there is a positive correlation, but not a terribly strong one (the decision of how much importance to give second function correlations is aided by consideration of eigenvalues, canonical correlations, etc., from Tables 6 and 8). The weakness of the function correlations indicates that although a positive relationship does exist between TR and assignment to the paranoid group, TR does not exert nearly as strong an influence on classification as its high coefficient weightings initially suggested. A review of Table 3 (page 50) also indicates that TR occurs with low frequency. This low frequency may have been a contributing factor in the high coefficient weighting of TR, as well as toward its weak correlation with the discriminant functions.

It cannot be emphasized enough that it is the discriminant scores that ultimately place a subject into a specific group, and that any individual function coefficient value simply makes a contribution to that total discriminant score. At best, the analysis undertaken to evaluate the impact of TR responses on group assignment can only reveal the relative contribution toward the ultimate total score; that score is always influenced by the very complex set of statistical interactions that occur among the variable values and the coefficients. As always when interpreting the Rorschach, it is unwise to evaluate

scores out of context; this would seem to be true for statistical evaluations of the Rorschach as well.

The question arises, then, as to which of the coefficients listed on Table 8, when all levels of the analyses are considered (as was done with TR), show a significant relationship with the classification of subjects into the paranoid schizophrenic group. There are three variables which show a relatively high correlation with the discriminant function, and which are relatively heavily weighted coefficients in the discriminant functions as well; they are FCP, PT, and (VP). These three are of relatively equal impact, with FCP showing slightly more weighting to its coefficient. The coefficient for P is equally strong on both functions, but very weakly correlated to the discriminant function; it appears to have only a very weak relationship with the paranoid group. LR also has a strongly weighted coefficient, but this weighting is greatly offset by LR's weak correlation with the discriminant functions. Therefore, LR, along with AT, P, PSD, SR, and TR are all variables that have a positive but more mild relationship with the paranoid subjects than do FCP, PT, and (VP). It may be recalled from Table 4 (page 51) that AT, P and SR had higher mean frequencies than did PT, FCP, or (VP). Again, this is evidence that all of these findings must be interpreted in context. The results of the discriminant analysis also suggests caution when relying solely on frequency data as the basis for diagnostic classification in clinical settings.

Of the other hypothesized variables, EJ is only weighted as a coefficient in the analysis that used only the hypothesized variables

(Table 6, page 60). Even in this instance, the weighting is low. Its correlation (0.47) appears high (Table 11), but it should be remembered that there are fewer variables being considered in this discriminant analysis, so correlations with the discriminant function will show a higher value. However, the most difficult problem in assessing the contribution of EJ is that the EJ score is a composite score (EJ + LD) for the paranoid group. The relative contribution of LD and EJ to the total EJ score was not analyzed. Table 4 shows that there is a roughly even frequency split between LD and EJ, but this does not give us any information about the pattern of distribution of these scores among the paranoid schizophrenic research subjects. Without this data, any conclusions about the relationship between EJ, LD and paranoid schizophrenia await future research and analysis.

The discriminant analysis indicates that REJ and CD actually play a positive role in assignment of subjects to the mixed psychiatric and healthy adult samples, respectively. It was already noted that there were several problems with the REJ variable, including the low frequency of occurrence in the healthy adult sample, as well as its inherent positive correlation with low N, non-responsive Rorschach records. On this basis, it is believed that the numeric values given for REJ in this analysis are not meaningful, and again future studies will hopefully rectify this.

The same does not appear to be true for Card Description; there is no apparent reason to discount the discriminant function data about this variable. The CD variable appears to function as a weak positive contributor to the assignment of subjects to the healthy group.

CHAPTER IV

DISCUSSION

The basic hypothetical assumption behind this study was that certain identifiable aspects of paranoid schizophrenics' responses to the Rorschach inkblot test could be predicted in advance. The hypothesized variables were chosen after a review of the literature on the Rorschach (i.e., Beck, 1961; Klopfer, 1954; Phillips & Smith, 1953; Rapaport, et al., 1968; Schafer, 1954; Weiner, 1966) and on the thought pathology of paranoid schizophrenia (i.e., Arieti, 1974; Magaro, 1980; Meissner, 1981; von Domarus, 1944). In fact, several of the variables that were chosen had only been identified by a single author, or a related group of researchers (i.e., Bruno Klopfer associated the Transposition Response with paranoid schizophrenia). Statistical analysis found that the paranoid subjects could be successfully discriminated from other subjects on the basis of the perceptual cognitive variables. However, the group of variables that best made this type of discrimination did not contain all of the variables that had been hypothesized, and contained variables that had not been predicted as well.

The results of this study suggest that the understanding of extreme thought pathology and its expression on the Rorschach test is incomplete. It is further suggested that the use of the expanded set of cognitive perceptual indices, as described by Burstein and Loucks (1988), greatly increases the discriminating power of the Rorschach test. Using discriminant analysis, an interactive group of these

indices has been identified in relationship to paranoid schizophrenia. The derivation of this group of variables stands in contrast to the single construct or single index orientation that is sometimes taken in the theoretical and diagnostic literature on paranoid schizophrenia.

Although the hypothesized variables were not, as a group, the more powerful predictors of paranoid schizophrenia, some of the hypothesized variables were found to be very significant. This research also seems to point toward some aspects of Rorschach scoring that may need clarification, and particular indices that may need further refinement in scoring and interpretation.

The basic findings of the study will be presented first. This will be followed by a discussion of some of the implications of these findings for research and diagnosis. A final section will present the conclusions that can be drawn from this research.

Findings

Eight perceptual cognitive variables were hypothesized to be the most significant in the Rorschach response patterns of paranoid schizophrenic subjects. These variables are Card Description, Cut-Off Detail, Egocentric Justification, Loss of Distance, Predicate Thinking, Card Rejection, and Transposition Response. In particular, it was predicted that these responses would occur more frequently in the records of paranoids, and that these variables would be the most useful in distinguishing the Rorschach responses of the paranoid subjects from those of the two comparison groups; mixed psychiatric and healthy adult subjects.

The hypothesized perceptual cognitive variables were neither the most common variables chosen by the paranoid subjects, nor were they the most effective combination of variables for discrimination of subjects among the three groups. However, at least one of the hypothesized variables, PT, was among the top five most frequently chosen by paranoid subjects. Furthermore, five out of the six hypothesized variables were able to accurately predict subject assignment to the paranoid group 64% of the time (although two of these variables were actually positively associated with classification into the mixed psychiatric group). The hypothesized variables, taken as a group, were also scored significantly more often by the paranoid subjects than by either of the two comparison samples of mixed psychiatric patients and healthy adults. Considering that most Rorschach statistical data are often reported in the form of frequency data, it can be said that at this level of analysis there is indeed clinical relevance to the hypothesized group of variables, particularly when considered as a group.

However, there have been a number of problems in the measurement and data analysis of the LD, EJ, Dx, and REJ variables. LD was only scored for the paranoid group, and was combined with EJ scores for the data analysis. REJ occurred so infrequently in the healthy adult subject sample that it created anomalous values, which were not interpretable. The frequency and values of Dx were also so small that any interpretation of the significance of the occurrence of this variable remains open to question as well. Many of these problems could be overcome as more data are collected; this is true of all four

variables that have been difficult to effectively evaluate using the parametric statistical techniques that are currently available.

The data indicate that the hypothesized variables do occur with some frequency in the paranoid subjects, and can be used to predict group placement of the paranoid subjects with some success. However, the data analysis has revealed that if the non-predicted perceptual cognitive variables are also given consideration, then the significance and usefulness of the data analysis improves noticeably. For example, when all of the independent variables were available for the discriminant analysis, a success rate of 89% was obtained for accurate assignment of paranoid subjects, compared to 64% using only the hypothesized predictors. Similarly, the overall classification rate went from 73% to 90%.

Nine perceptual cognitive indices were positively associated with the paranoid subjects. A primary group of variables consisting of FCP, PT, and (VP) were the more "powerful" (in terms of coefficient weighting, correlation, etc.) discriminating variables in this group. These primary variables made a somewhat stronger positive contribution to the discriminant function than did a secondary group of variables that includes AT, LR, P, PSD, SR, and TR.* Only two of these variables (PT and TR) were specifically associated with paranoid schizophrenia in the review of the Rorschach literature. However, each of these identified variables will be individually evaluated in light of what is

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* The terms "primary" and "secondary" are used for ease of discussion, and should not be taken too literally; these variables are more readily placed on a continuum than into groupings (precise rankings of this type are difficult due to the complexity of the discriminant data).

known clinically about these variables and their degree of relatedness to paranoid schizophrenia.

It should also be noted that by definition, each of the individual coefficients that result from the discriminant function analysis have to always be understood and interpreted in conjunction not only with the other eight predictors that are positively associated with paranoid schizophrenia, but also with the remaining coefficients in the function, as well as a constant (a fixed numeric value automatically added to each discriminant score). Therefore, the following interpretations of these variables and coefficient weightings on an individual basis is undertaken with caution. The purpose for doing so is to enhance the clinical applicability of this research. It is hoped that diagnostic acuity will be enhanced, that previously overlooked aspects of paranoid functioning (as seen on the Rorschach) will be brought forth, and that previous clinical "wisdom" can be reevaluated, if the data so indicates. The statistical conclusions about these variables are made on the basis of how the variables interact as a group; clinical conclusions about the applied meaning of the data will ultimately have to be made on this basis as well.

The hypothesized variables. Beginning with the early work of von Domarus (1944), through the writings of Arieti (1974), until today (Magaro, 1980; Meissner, 1981), predicate thinking has been seen as a central aspect of paranoid schizophrenic thought pathology. The Predicate Thinking variable in fact received the strongest support of all of the scores that were predicted on the basis of the review of the

literature. PT was ranked 5th (out of 21 variables) in frequency chosen by the paranoid subjects, and its coefficients were among the most heavily weighted (of the coefficients derived by the discriminant analysis that used all of the perceptual cognitive scores). The prominent status of the PT variable in this study also supports the contention that a variety of clinical and diagnostic points of view do not necessarily blend well together. In this case, predicate thinking as scored in the Burstein Loucks system has the clearest and most unequivocal support of any of the hypothesized variables.

The Transposition Response is the only other hypothesized variable that was included in the discriminant function that is positively associated with the classification of paranoid subjects. Its degree of association with the discriminant function is milder than PT, and in this discussion it is given the status of a secondary variable. It was Klopfer (1956) who described the TR variable's relationship with paranoid subjects. He reported that the TR response reflects a negativistic stance in which the subject distrusts that which is obvious to others, and is quite convinced that they are right and everyone else is wrong. TR occurs with low frequency; nonetheless it is well related by the discriminant functions to paranoid subject selection. Therefore, it would appear that Klopfer's observations are supported by this data.

Card Description was the hypothesized variable that, when incorporated into the discriminant analysis, actually became a positive predictor (of mild strength) for classification into the healthy adult group. CD was also the variable that was the third

highest in mean frequency for the healthy subjects. CD is considered to be a pathological response if given in the context of a generally poor record. Weiner (1966) associated this response with guardedness; Phillips and Smith (1953) related it to high anxiety. However, CD most likely does not have this same clinical meaning when scored for a healthy subject making an aesthetic comment. This data suggests that the scoring criteria for CD may have to be re-examined.

Other significant variables. Fixed Concept Perseveration was also found to be a relatively strong contributing score to the accurate placement of paranoid subjects, and is included in the primary group of discriminant variables. When discussed in the literature, this response style was not associated with paranoid schizophrenia. To review, FCP is scored when the subject perseverates on the same theme on at least three occasions. This implies a true rigidity of mind set, a somewhat remarkable ability to ignore outside stimuli in favor of internal directives. Rapaport and his colleagues (1946) described this phenomenon in terms of extreme preoccupation; Beck described it as a "stickiness of attention (p. 27, 1952)." An examination of the paranoid thought process reveals that delusional ideas about the world, and beliefs about the world's intentionality toward the patient, remain fixed and unyielding to various types of evidence and experience that others might find persuasive. It is suggested that this same tendency to ignore that which does not fit with the paranoid subject's inner view, or delusional mind set, is also a factor in the way that paranoid schizophrenics may respond to the inkblots. The nature of all

schizophrenias is such that all Rorschach responses are likely to be colored by inner, disrupted experience. The argument being made here is that the paranoid schizophrenic's perseveration is a reflection of the paranoid tendency to organized (albeit surreal) rather than chaotic delusional systems. So, Rorschach responses are not only distorted by psychotic experience; the psychotic experience has a repetitive, rigidly defined quality to it. Further comparisons with other types of disturbed subjects could clarify this relationship, and help to verify if the scoring of FCP in this context indeed is particularly related to the paranoid subtype of schizophrenia.

It would seem that the "schizophrenic" aspect of paranoid schizophrenia is reflected in this research sample by the appearance of positive coefficient weightings for (VP) and PSD. Mild Verbal Peculiarity is scored primarily for the use of idiosyncratic language; (VP) is to be distinguished from Extreme Verbal Peculiarity, which is scored for neologisms, clang associations, and metonymic distortions. Less pathological than PSD, (VP) also has the stronger positive contribution to paranoid group assignment (it is the third of the primary indices, along with FCP and PT). (VP) reflects a certain degree of self-referenced, idiosyncratic language use. This type of cognitive attitude is reminiscent of the literature describing the cognitive style of the paranoid schizophrenic. One aspect of cognitive functioning that is emphasized is the paranoid's need to make some kind of classification of the world around him or her, even if good reality testing is sacrificed in the process (Magaro, 1980). Using words and phrases in odd ways may be a reflection of some paranoid subjects'

struggle to be able to identify the unfamiliar stimuli of the inkblots. They may be more at ease naming things in this fashion than at having to confront the anxiety that is produced by acknowledging ignorance.

Perceptual Stabilization Defect is the more pathological of these two scores, but its degree of positive association with the classification of paranoid schizophrenia is milder than that of (VP) (it is considered a secondary variable). For example, PSD is often an appropriate score for a subject who is actively hallucinating as s/he looks at the blot. This writer is uncomfortable with a specific or direct association of PSD with paranoid schizophrenia. This disquiet is not based on the results of the statistical analysis; in that regard, PSD comes by its coefficients honestly. Rather, both a review of the literature (i.e., i.e., Harrow and Quinlan, 1985; Piotrowski, 1957) and clinical experience indicate that PSD is a trait that can be associated with psychoses of many types. As Kendler and Tsuang (1981) note, the presence of thought disorder, in addition to organized delusions is what makes it paranoid schizophrenia, rather than being a severe paranoid disorder. The data from this study seem to emphasize the "paranoid" over the "schizophrenic" in the variables found to discriminate the paranoid schizophrenic sample. The predictor variable associated with more disrupted, disorganized psychotic functioning (PSD) is among the more weakly weighted "secondary" coefficients of the paranoid group. Variables that are scored for the more organized and internally consistent cognitive patterns (i.e., PT, FCP, and (VP)) have the more heavily weighted and/or correlated coefficients in the discriminant functions. It is also worth noting that some variables,

such as BC and CT, are clearly not associated with the paranoid subjects, and are not even included in the discriminant functions. These perceptual cognitive variables are also clinically associated with disorganized, affectively deteriorated schizophrenia and psychosis. The lack of the significance of these "nonparanoid" scores in correctly classifying paranoid subjects enhances the clinical relevance of the discriminant function coefficient weightings, and further supports the diagnostic validity of the paranoid schizophrenic research sample.

In light of what is currently understood about the thought pathology of paranoid schizophrenia, it remains unclear how or why PSD has attained even this secondary status in the discriminant analysis. As has been discussed, PSD does take a secondary role in the discriminant functions, relative to some of the scores that are much more readily linked to paranoid functioning. However, the status of the PSD variable in the discriminant functions is just as legitimate as is that of other secondary variables that are more easily linked to our present theoretical and diagnostic understanding of paranoid schizophrenia. These results demonstrate the Burstein-Loucks system's capacity to provide a powerful enough diagnostic tool to begin to make fine distinctions and discriminations among pathological subtypes, and to potentially expand our understanding of these patients as well.

The presence of PSD in the discriminant function may also be a reflection of the rigorous selection of subjects for inclusion in this study. The majority of the subjects in the paranoid schizophrenic sample clearly manifest the types of responses associated with thought

pathology. The two comparison groups were significantly less psychologically disturbed than were these paranoid subjects. Several writers (i.e., Carpenter, 1987; Chapman & Chapman, 1973; Neale & Oltmanns, 1980) point out that patients often do not fit perfectly into diagnostic niches. The significance of PSD in this research sample may indeed be a reminder of the inevitable lack of diagnostic exactness in clinical population samples. More clarity about the clinical and/or statistical meaning of PSD when evaluating paranoid schizophrenia will occur at such time that the paranoid schizophrenics can be compared to another well-defined, but also severely disturbed research sample.

The Self Reference variable has a secondary coefficient weighting that had a mild association with the positive classification of paranoid subjects. The clinical implications of the SR response can be integrated with what has been written and hypothesized about paranoid schizophrenic Rorschach responses. Several authorities have noted the general propensity of paranoid schizophrenics to be self-referential on the Rorschach (Phillips & Smith, 1953; Rapaport, et al., 1968; Weiner, 1966). The SR response is seen as a milder form of the EJ and LD responses. The SR response reflects what has been described as the paranoid's tendency to be "lose distance" and to be self-referenced in their thinking and in their interpretation of events around them. In this respect, the SR response is similar to the (VP) response; however, these two variables tend to be poorly correlated, and are measuring different phenomenon. However, the literature indicates that the more pathological forms of loss of distance, such as LD or EJ, were even more likely to occur. This was not the case in this sample, either on

the basis of their combined frequency or the coefficient weightings that were generated by this combination in the discriminant analysis.

The frequency of the SR response was relatively high in the paranoid schizophrenic group (although SR is only moderately weighted as a discriminant coefficient). These responses were not justifications of percepts in self-referenced fashion. Rather, SR is scored when the subject simply makes some personal remark or reference. It seems as if for many of the paranoid schizophrenic subjects, the response to the external stimuli apparently could not be left to stand alone; anxiety was reduced if a personal element was added. The data, as has been described, make it impossible to determine why only this mild form of loss of distance to the card, of self-absorption, was a contributor to a significant discrimination. Further research will be needed to clarify the relative roles of EJ, LD and SR in paranoid thought pathology.

Lost Responses were also a secondary variable that was mildly associated with paranoid schizophrenic group assignment. LR is scored when the subject fails to remember a response seen earlier. It is considered a primitive form of denial, a weak effort to "cover up" (Holt, 1977). There may be a potential link with this behavior and the suspicious, withholding style of the paranoid. This is a little unusual, in that what is being described is a sort of after-the-fact guardedness. However, the "hiding" aspects of this behavior seem clear, and can be interpreted as either self-protective or as being frightened. The danger seems to lie in the threat of the subject's own words being used against him or her. Further evaluation of this

particular response would be useful, such as an investigation of the relationship between LR frequency and overall number of responses on the record; this might begin to statistically substantiate the theorized relationship between LR and a generally guarded, withholding, or fearful stance.

Affective Toning, although it did not ultimately have the significance that was suggested by its presence at the top of the frequency table (Table 4, page 51), nevertheless had a moderately significant secondary coefficient weighting in the positive classification of subjects into the paranoid group. AT was second only to Popular responses in the records of the healthy adults, as well. It is not suggested that the subjects in the healthy adult sample had preconscious paranoid tendencies. What is apparent is that this particular type of reaction to the blot is best interpreted in light of other Rorschach scores. Authorities such as Schafer (1954) and Klopfer (et al., 1954) relate AT to emotionality and loss of distance. However, no prior research has made a specific connection between this type of response and the diagnosis of paranoid schizophrenia.

However, the data of this study do support clearly at both the levels of frequency analysis and of discriminant analysis that AT is significantly associated with the responses of paranoid schizophrenics. As a way to account for the clinical relationship of this variable to paranoid schizophrenia, it is suggested that the frequency of AT is a possible reflection of the paranoid tendency to not take things lightly. Personality factors such as hypervigilance and suspiciousness would suggest that the paranoid schizophrenic often focuses closely and

intently on his or her surroundings. The Rorschach testing situation is usually experienced as unfamiliar and anxiety producing. As such, it is likely that the subject will attend to and get involved with the one thing in room that is changing, and therefore a source of potential threat; the inkblots themselves. To give a more colorful, more vividly elaborated response may be an effort to control the threat of the undefined card; or, it may reflect the intensity with which the paranoid is overreacting to what is after all a printed piece of cardboard. So, one of the ways that this intensity may be reflected in paranoid Rorschach records is in their high frequency of AT responses.

The Popular variable has a stronger weighting and a very weak correlation with the overall discriminant function, and is considered to be a secondary variable. Nonetheless, P is positively related to classification of subjects into the paranoid group. Populars are seen to represent good reality testing, social adjustment, and a general ability to perceive the world in ways similar to others (i.e., Exner, 1974). This is not a response that is expected of a paranoid schizophrenic, or of any other severely disturbed individual; certainly not with this frequency and wide distribution in a group of paranoid schizophrenics. It should be noted that the P variable originated with Rorschach, and is not a novel contribution of the Burstein Loucks System. The position of P in the frequency distribution and in the discriminant functions is difficult to account for clinically. One explanation that can be offered is that to a degree previously undocumented, paranoid schizophrenics are able to sustain the

consensual point of view at the same time as the delusional. There may be a relationship between the organized quality of the paranoid's delusional style and the retained capacity for consensually validated perception. This linkage is speculative; the importance of the P variable in this data analysis remains the most difficult to account for satisfactorily.

Just as the EJ variable was recently split into the EJ and LD variables in the evolving Burstein Loucks system, variables such as CD or AT may suffer a similar fate, if future research supports the finding of this study that they may be ambiguous in their role in diagnosis and interpretation. Future research may also shed some light on the findings regarding the P variable, as well.

A final word of caution about the clinical interpretation of these findings. The data indicate that this research sample of paranoid schizophrenics represents a very discrete group in comparison to the two additional research groups used. The findings also seem to support that this is indeed a group of severely disturbed paranoid schizophrenics. The subjects in this research group were after all recruited using rigorous criteria. On the other hand, the sample contains only those eligible patients who agreed to take the test on a voluntary basis. There were many patients who met the criteria but refused to participate in the study, and yet more potential subjects that the ward or clinic staffs deemed as too oppositional or agitated to be asked to participate. Therefore, a clinically significant and unique subset of paranoid subjects was not included in the data analysis.

Clinical application or interpretation of the data should take this untested group into consideration. For example, this unsampled subgroup of paranoid schizophrenics may be similar (by way of level of agitation and hostility, degree of fearfulness or suspiciousness, or fixity of delusions) to the pre-phenothiazine (major tranquilizers) subjects that were used in the early Rorschach research. Therefore, the absence of this type of subject may have been a factor in the lack of significance and/or frequency of some of the hypothesized scores. The most "paranoid" subjects were, after all, the most likely to be excluded by the nature of the research data collection. Since no institutional or interpersonal pressure was used to coerce subjects into participation, those most suspicious or hostile were most likely to turn down an "opportunity" to be the subject of psychological research.

Other Considerations

The canonical discriminant analysis makes the assumption that subjects can be assigned to mutually exclusive groups. As the literature review (i.e., Andreasen, 1986, 1987) has indicated, there are those who state that paranoid schizophrenia is not a clinically distinct phenomenon. If this were true, then this basic assumption (required for appropriate use of the discriminant analysis) has been violated. It is this writer's contention, however, that it is just this type of multivariate research that can begin to answer this very question. The subjects were readily assigned to groups on the basis of discrete variable scores that were not significantly correlated with each other. Patterns of the relationships of the perceptual cognitive

variables to paranoid schizophrenia have been presented which now challenge clinicians and researchers alike to corroborate and integrate these findings. If indeed there are better ways to classify psychiatric syndromes, than statistical approaches such as canonical discriminant analysis will provide direction as to their nature and form as more data become available to integrate into the model.

An unresolved problem identified in the literature (i.e., Chapman & Chapman, 1973; Spohn, et al., 1986) was the apparent impediment that psychoactive medicines created for the measurement and evaluation of thought pathology. Every patient in the research sample was taking phenothiazines at the time of their participation in the study. However, there is an abundance of Rorschach data that indicate the clear and sometimes overwhelming presence of thought disorder in the paranoid schizophrenic research subjects. For example, one subject gave two different responses that were both scored with seven separate and distinct perceptual cognitive scores. The position is taken that the medicated status of these subjects did not significantly eliminate the presence of observable thought pathology.

The findings of this study reveal the limitations of lumping variables together as a single score. There may be some predictive power in this approach (the summed frequency of the hypothesized variables did result in statistically significant differences between all three groups), but there is even more predictive power, along with more flexibility and fine discrimination ability in the approach that looks at the unique contribution of all of the relevant variables. As has been noted, with the exception of the work of Holt (1877), the

trend in research on thought pathology using the Rorschach is toward using a single summary score based on the frequency of the occurrence of selected special scores (i.e., Harrow & Quinlan, 1985; Holzman, et al., 1986; Wynne, et al., 1979). The present research seems to indicate that this type of research strategy sacrifices much of the potentially available data. A single score can at best only assess the degree or intensity of pathology; the ability to discriminate between types of thought disorder is lost. In contrast, the Burstein-Loucks system provides an improved basis for clinical classification, for the assessment of the degree of pathological disturbance, and for the reevaluation of the criteria for delineation of the subtypes of thought disorder.

Research Implications

There are several ramifications of this study for future research. Foremost among them is the need to identify and clearly define the role of all of the perceptual cognitive indices in all types of psychopathology. A variable such as FCP is related in this study to paranoid schizophrenia; clinically, FCP might also be scored in the records of obsessionals or children, as well. The importance of the various indices can change as a function of personality type; a given symptom means different things in different diagnostic contexts.

There are questions about the high frequency and discriminant importance (for the paranoid schizophrenic sample) of P and AT, two indices that have been primarily associated with non-pathological records. The present level of knowledge about these scores can result in interpretation difficulties. Research which further contributes to

the clarification of the frequency (or role in a discriminant function) that each of the perceptual cognitive characteristics play for the various diagnostic groups is needed. The REJ variable was certainly important in the low response rates of many of the subjects; however, its statistical significance in this subject group could not be properly determined. Further data collection could resolve these and some of the other questions that remain about the role of the Dx, EJ, and LD scores that were hypothesized but did not produce significant results in this study.

Recent Rorschach research and development has emphasized parametric considerations, possibly at the expense of clinical validity and diagnostic utility. The present approach integrates a clinically rich scoring system with a sophisticated statistical analysis. The result is a multidimensional evaluation of the variables involved. Discriminant analysis by definition takes the investigator away from a variable by variable consideration of the Rorschach. Instead, we can begin to approximate the actual homogeneous, embedded, in context functioning that these variables are intended to measure. The results are not clear cut or easily reduced to simple "rules" or predictions. However, this lack of simplicity is much more akin to the way human thought and behavior actually occur. Personality structure operates at many levels of interaction within itself, and with the surrounding world. When the clinician or researcher attempts to codify and simplify this, distortions will inevitably occur. Attempting to understand the interactions of the perceptual cognitive variables may help to minimize this. The Rorschach may also be the most efficacious

at revealing what is distinct and idiosyncratic about individuals, and in discriminating individuals from one another. Therefore, any over-reliance on statistical "norms" can work against this. The most clinically useful approach should incorporate data such as group norms, while at the same time attending to the individual nuances of a given Rorschach record.

Further research is also warranted on the viability of clinical reliance on frequency distributions in the forming of diagnostic impressions. Rorschach scoring and interpretation is traditionally done on the basis of the frequency of occurrence (or simple ratio relationships) of a number of individual and cumulative indices. Interpretations are made on the basis of comparisons to the expected rates of such scores. The present study has clearly shown that multivariate analysis can at least on some occasions produce very different results, and lead to a very different rank ordering of variable importance and significance. A discriminant analysis that combined other types of Rorschach scores (i.e., determinants, location, form level, etc.) with the perceptual cognitive indices has the potential to be productive for both the laboratory and clinical setting.

The specific findings of this study would be best evaluated by comparisons of the paranoid schizophrenic subjects to other equally disturbed, but differently defined research sample groups. This would help to clarify the exact relationship that the indices related to cognitive deterioration have with the more familiar aspects of paranoid schizophrenic thought.

The variables that were identified by the discriminant analysis point to a description of the paranoid schizophrenic that includes both the predicate thinking paradigm, and also the self-referenced, egocentric model of cognition. Elements of both are evident. The paranoid schizophrenic is usually conceptualized as rigid and inflexible; the coefficient weightings of the discriminant analysis seem to support this. However, AT and PSD are not variables associated with rigidity; instead, they are related to elaboration, shifting, and other types of flexibility. For this and other reasons, it would be worthwhile to further analyze the subgroups within the paranoid schizophrenic population sample, to obtain a better understanding of these phenomenon, and to determine if there are indeed statistically identifiable functions that discriminate among the paranoid subjects.

Diagnostic Implications

At the present time, care should be taken in making any diagnostic assumptions on the basis of this study. Several of the expected indices were shown to have a significant relationship with the paranoid schizophrenic sample. However, several other unexpected indices were also found to be important in paranoid classification, and to occur in the records of these subjects with surprising frequency. What is least understood are the nuances of the interrelationships of these variables, both statistically and clinically. This reminder of the incomplete state of our clinical understanding also underscores the need for further research in the areas of projective testing and thought disorder. In addition, the findings of this study can be borne in mind while working and researching in the clinical setting. It is

possible that some previously unsuspected variable, such as FCP, may indeed be a significant indicator of the presence of paranoia, or of paranoid schizophrenia. The prevalence of the Popular response in the paranoid records may also lead to new understanding about thought disorders, paranoia, and levels of impairment. As with all clinical research, laboratory findings have to not only be replicated in other studies and in other laboratories, but also shown to have relevance in the consulting room. Such testing in the field and in the laboratory will ultimately determine the validity and viability of the "new findings" of this research.

Conclusions

The research hypotheses were given only indirect support by this study. However, statistical analysis of the data permitted the inference of more significant and clinically relevant findings. The indices identified by the canonical discriminant analysis do tend to emphasize variables that support the description of the paranoid schizophrenic found in the literature. Some of this support comes from perceptual cognitive indices that were unanticipated by the literature; however, reflection on the data indicates that the expected patterns of rigidity, predicate thinking, and self-referenced cognition are present. Other elements are also present, however, and time and more research will tell if these are anomalous or clinically and empirically important.

This study demonstrated that the group of variables chosen on the basis of a review of the literature did not discriminate paranoid schizophrenic subjects as successfully as did the group of variables

derived from the total pool of perceptual cognitive indices described by the Burstein-Loucks system. Therefore, it is believed that employing the full array of these indices is a more effective procedure than is the pre-selection of a limited number indices for diagnosis, or the summation of many indices into a single index. Furthermore, the use of the full set of perceptual cognitive variables in the data analysis has suggested that the present understanding of the manifestations of paranoid schizophrenia on the Rorschach test may need re-evaluation. This in turn may be true about the current models of paranoid schizophrenic thought pathology, as well.

This study supports the efficacy of combining clinically rich data with sophisticated statistical analysis. The findings of this project suggest that this could be a more powerful way to understand the raw data that are generated by the Rorschach Test.

Finally, this research raises a number of questions that can only be addressed by further data collection and analysis. Not only are there questions about the relevance of specific indices to the diagnosis of paranoid schizophrenia; there are also suggestions of ambiguity in some of the independent variables; theoretical and clinical questions about the inter-relationships of the variables among themselves and with paranoid functioning; and, unanswered questions about the homogeneity of the paranoid subject group itself.

This research supports the use of the Rorschach as a clinically and statistically relevant procedure. It also supports the ongoing effort of Burstein, Loucks, and their colleagues to improve and refine the scoring of the Rorschach inkblot test.

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APPENDIX

List of Abbreviations for the Perceptual Cognitive Characteristics

1	**AT**	Affective Toning
2	**BC**	Bizarre Content
3	**CD**	Card Description
4	**CP**	Concrete Perseveration
5	**CR**	Contradiction of Reality
6	**CT**	Cluster Thinking
7	**DC**	Deterioration Color
8	**Dx**	Cut-Off Detail
9	**EJ**	Egocentric Justification
10	**FCP**	Fixed Concept Perseveration
11	**LD**	Loss of Distance
12	**LR**	Lost Response
13	**P**	Popular
14	**PSD**	Perceptual Stabilization Defect
15	**PT**	Predicate Thinking
16	**REJ**	Card Rejection
17	**S**	Figure-Ground Reversal
18	**(S)**	Incorporated White Space
19	**SR**	Self Reference
20	**TR**	Transposition Response
21	**VP**	Extreme Verbal Peculiarity
22	**(VP)**	Mild Verbal Peculiarity

VITA

Mark Renald Zitlin was born in Glendale, California on January 22, 1954. He attended primary and secondary school in Los Angeles, California, and in the fall of 1972 entered the University of California at Los Angeles, which he attended for two years. He entered Duke University in January, 1976, and was awarded a Bachelor of Arts Degree in Psychology (Magna Cum Laude) in December, 1977. The author subsequently worked for Duke University Medical Center as a psychiatric attendant and later as a psychodiagnostic technician.

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