The Relationship between Thought Disorder and the Diagnosis of Schizophrenia

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THE RELATIONSHIP BETWEEN THOUGHT
DISORDER AND THE DIAGNOSIS OF
SCHIZOPHRENIA

by

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THE RELATIONSHIP BETWEEN THOUGHT DISORDER AND THE DIAGNOSIS OF SCHIZOPHRENIA

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The diagnosis of schizophrenia has been considered unreliable, especially when derived by psychiatric interview. Thought disorder is one symptom that has been accepted by most clinicians as a major indicator of schizophrenia. The purpose of this study was to examine the relationship between thought disorder and the diagnosis of schizophrenia in a state hospital setting.

The sample consisted of 88 patients, 58 males (mean age = 32.0) and 30 females (mean age = 38.6) and was gathered from newly admitted patients in a large state hospital. Thought disorder was measured by the Whitaker Index of Schizophrenic Thinking (WIST) Form A, (Whitaker, 1980). Two diagnostic methods were employed; psychiatric interview utilized by the hospital and the Millon Clinical Multiaxial Inventory (MCMI), (Millon, 1982).

The relationship between WIST scores and the psychotic scales of the MCMI; psychotic thinking (SS), psychotic depression (CC) and psychotic delusions (PP) were examined by calculating correlation coefficients. Significant P<0.05 relationships were discovered between the WIST Error scores and the MCMI (SS), and (CC) scales.
of .36 and .31 respectively. These results suggest a modest relationship exists between two different measures of thought disorder and lends credibility to the idea that thought disorder can be objectively measured.

Six patients were identified as schizophrenic by the MCMI, while 54 were diagnosed as schizophrenic by hospital psychiatrists. Agreement of the diagnosis of schizophrenia occurred in only two cases out of the entire sample. No systematic relationship was discovered between the two methods of diagnosing schizophrenia.

Minor differences were detected in the WIST performance of patients in diagnostic groups generated by the MCMI. No differences in WIST performance were detected between diagnostic groups generated by psychiatric interview. The WIST did not successfully differentiate schizophrenics from non-schizophrenics under either diagnostic method.

It was concluded that the WIST may be best employed as a screening device to measure disordered thinking rather than thinking unique to schizophrenia. Also the diagnosis of schizophrenia appeared to be unreliable by both methods in this study and not related to thought disorder.
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This study is dedicated to the memory of

Frank A. Fatzinger

remembered with love as a father and a friend
ACKNOWLEDGMENTS

I would like to thank Dr. Kenneth Bullmer for his guidance, encouragement and support. He has influenced my development as a professional more than any one person.

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David Frank Fatzinger
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGMENTS</th>
<th>iii</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
</tbody>
</table>

## CHAPTER

### I. INTRODUCTION

- Background .................................. 1
- Statement of the Problem .................. 4
- Research Objectives ...................... 7
- Significance of the Study .............. 8
- Limitations ............................... 9
- Summary ................................. 10

### II. REVIEW OF RELATED LITERATURE

- Schizophrenia and Thought Disorder . 11
- Diagnosis of Schizophrenia ............ 35
- Summary ................................. 38

### III. METHOD

- Population and Sample .................. 40
  - Population ............................ 40
  - Sample ............................... 41
- Criteria Instruments .................... 43
  - The Whitaker Index of Schizophrenic Thinking (WIST) .......... 43
  - The Millon Clinical Multiaxial Inventory (MCMI) ............. 49
- Diagnostic Conditions ............... 57
LIST OF TABLES

1. Pearson Product-Moment Correlation Coefficients Between the WIST Error and Time Scores and the (SS), (CC), and (PP) Scales of the MCMI ........ 65

2. Frequency of Diagnostic Classification Within the Major Diagnostic Groups .................. 67

3. Diagnostic Agreement of MCMI and Hospital Diagnosis of Schizophrenia ............... 68

4. Diagnostic Agreement of MCMI and Hospital Diagnosis of Psychosis .................... 70

5. Means and Standard Deviations on the WIST Error, Time and Index Scores by MCMI Groups .......... 73

6. Analysis of Variance for Dependent Variable Error ............................................ 74

7. Pairwise Contrasts for the Five MCMI Diagnostic Groups ....................................... 75

8. Hospital Diagnosis of the MCMI Diagnosed Major Groups ................................... 76

9. WIST Error, Time, and Index Means and Standard Deviations .............................. 77

10. MCMI Axis II Diagnoses for Project Sample ...... 79

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A review of the literature reveals a long standing controversy involving the accurate conceptualization, definition and utility of the broad diagnostic category of schizophrenia. Early historical accounts, dating back thousands of years, describe human behavior fundamentally identified by its unusual or bizarre verbalizations which reflect the disordered thinking characteristic of schizophrenia. Ever since Kraepelin (1896) synthesized the observations and ideas of others in an attempt to develop a unified theory to describe schizophrenia, disagreement has followed his and every other theory formulated to explain this complicated phenomenon. Bleuler (1950), who coined the term schizophrenia, was the first major author to specifically identify "loosened associations" or the symptom of thought disorder as essential to the establishment of a diagnosis of schizophrenia.

Cancro (1978) conceptualizes the diagnostic category of schizophrenia as a man-made construct which is superimposed on various individuals who have certain symptoms in common. He further states that the utilization of the classic signs of formal thought disorder is the
most accurate predictor of a schizophrenic diagnosis and is most unique to that syndrome. Goldstein (1979) also espouses the basic importance of using a demonstration of thought disorder as pathognomonic in the diagnosis of schizophrenia. Goldstein (1979) states:

> It should be emphasized that if a patient clearly demonstrates a thought disorder...the clinician should think in terms of schizophrenia. Obvious defects in this area seem to be highly correlated with defects in other areas that are typical of many schizophrenic patients. Thus, even though one is evaluating only one ego function here, if there is obvious pathology in this area in a patient, it is highly likely that the patient will be judged schizophrenic by most other approaches. (p. 591)

Whitaker (1980) conceptualizes schizophrenia in terms of three spheres; the somatic, experiential and behavioral and states:

> All of these viewpoints—somatic, experiential and behavioral, suggest that the foremost psychological function disrupted in schizophrenic reactions would be that of thinking. (p. 4)

Since disordered thinking is nearly universally recognized as the major symptom of schizophrenia, two questions need to be answered: 1) What is the relationship between disordered thinking and schizophrenia? 2) How can schizophrenia be most accurately measured and diagnosed?

Goldstein (1983) defines a thought disorder as an intrusion of primary process into secondary process thinking. Primary process thinking is defined as being typical of the thinking of children and of dreams and has
such characteristics as; displacement, timelessness, illusions, contradictory ideas co-existing simultaneously and absence of negativisms and qualifiers. Secondary process thinking is goal-directed, logical, reality oriented and typical of normal adult thinking. Kraepelin (cited in Reed, 1970) noted that incoherence of the train of thought was a basic symptom. "The most different ideas follow one another with the most bewildering want of connection." (p. 405) Bleuler (cited in Reed, 1970) wrote:

The innumerable actual and latent ideas which determine associations in normal trains of ideas may be rendered, singly or in any combination, ineffective in schizophrenia. In turn, ideas may come into play that have little or no connection to the main idea, and should have been excluded from the train of thought. Logical directives are replaced by influences which would be in abeyance under normal conditions. (p. 406)

Attempts have been made through research to go beyond the psychodynamic-theoretical approach characterized by Goldstein and the essentially descriptive approaches of Kraepelin and Bleuler by testing schizophrenics on a variety of specific cognitive tasks.

Silverstein and Harrow (1983) investigated the relationship between reaction time and three major verbal word association tests using schizophrenics and non-schizophrenic controls. Reaction time was viewed as a major index of associative disturbances characteristic of schizophrenia. Silverstein and Harrow (1983) revealed no significant difference between the performance of
schizophrenics and non-schizophrenics on any of the three tests. They were essentially unsuccessful at demonstrating that reaction time was a significant differential deficit in schizophrenia. Harrow, Lanin-Kettering, Prosen and Miller (1983) examined whether disordered thinking in schizophrenia was related to intermingling of personal material into thinking and a loss of goal-directed thinking. This study showed that schizophrenics and other psychotic patients did demonstrate a marked tendency to engage in less goal-directed thinking and had an increased tendency to intermingle personal material inappropriately in their thinking process. Attentional deficits in schizophrenics have been studied by (Oltmanns and Neale, 1975) who reported the effects of auditory distractors and found a differential deficit in schizophrenics. According to Chapman (1978), the results of these studies are mixed and inconclusive and lead to no strong statement as to whether schizophrenics, as a group, are deficit in memory functions.

Statement of the Problem

It would seem that theoretical formulations of schizophrenic thought, as demonstrated by Goldstein (1983), descriptive approaches, as demonstrated by Kraepelin (1919) and Bleuler (1950) and the myriad of attempts to identify specific cognitive deficits in
schizophrenics, while heuristically useful are not useful in terms of operationally defining or objectively measuring disordered thinking in schizophrenia. Furthermore, the theoretical, descriptive and specific deficit studies are of little pragmatic use to the clinician interested in a cost effective, objective, measurement of disordered thinking in schizophrenia.

Disordered thinking is regarded as a fundamental symptom of schizophrenia. The diagnosis of schizophrenia is highly related to the identification of the symptom of disordered thinking. Controversy exists, however, as to the exact nature of the relationship between the symptom of disordered thinking and the diagnosis of schizophrenia. Indeed, the concept of schizophrenia itself and its accurate diagnosis has been a source of major debate since the term was first coined.

The predominate method utilized to diagnose schizophrenia is clinical judgement by interview. This method typically relies on the individual clinician, background, observational abilities and theoretical orientation to arrive at an accurate diagnosis. The interview method can range from unstructured, where the clinician totally determines what information is gathered, to a highly structured format where various checklists could be used to dictate exactly what information is gathered. Problems exist with the interview method of
diagnosis.

The interjudge reliability of the diagnosis of schizophrenia by routine clinical evaluation is notoriously low as demonstrated by many studies (Spitzer and Fleiss, 1974). Andreasen (1979) indicates that the influence of Bleulerian concepts of identifying schizophrenia in terms of four major areas (associations, affect, ambivalence and autism) has been powerful and sustained. She further criticizes such approaches as being unreliable. The reliability and validity of six different research criteria for diagnosing schizophrenia have been evaluated in two different studies. Studies by (Overall and Hollister, 1979; Fenton, Moshier and Mathews, 1981) suggest that such methods may improve reliability somewhat but are not necessarily valid and both suggest that more research is needed in the area of diagnosis of schizophrenia.

Another method of diagnosis is the use of psychological tests. This method requires that the patient respond to standardized information presented by the instrument. Psychological tests can take many forms. Examples of psychological tests include personality inventories such as the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1967) or the new Millon Clinical Multiaxial Inventory (MCMI) (Millon, 1982). Projective tests, such as the Rorschach technique
(Rorschach, 1942) or the Holtzman Inkblot technique (Holtzman et al., 1961) have been used to diagnose schizophrenia. Another type of test attempts to measure specific characteristics highly correlated with the syndrome of schizophrenia. The Whitaker Index of Schizophrenic Thinking (WIST) (Whitaker, 1973) is designed to measure "schizophrenic thinking" and can be used to diagnose schizophrenia based on the major symptom of disordered thinking.

A controversy exists concerning the reliability and validity of the various methods utilized to diagnose schizophrenia. The specific relationship between the diagnosis of schizophrenia and the presence of disordered thinking has not clearly been established, although thought disorder is commonly accepted as a major symptom of schizophrenia.

Research Objectives

The primary research objectives of this study are to investigate to what extent thought disorder relates to the diagnosis of schizophrenia in hospitalized patients, and to establish a basis for more accurate diagnoses of such patients. To accomplish these objectives, an objective method of measuring disordered thinking must be utilized. Two different diagnostic methods must be employed to provide a basis of measuring the relationship between
thought disorder and diagnosis, and to compare the performance of different diagnostic methods.

Significance of the Study

Thought disorders have been considered pathognomonic of schizophrenia, yet, the concise definition and measurement of such phenomena has proved difficult. There presently is no consensus as to what exactly constitutes disordered thinking, or what boundaries separate disordered thinking from normal thinking processes. While other symptoms are important to the diagnosis of schizophrenia, clinicians have typically placed heavy emphasis on disordered thinking when diagnosing individuals as schizophrenic. If the symptom of disordered thinking is ill-defined and difficult to objectively measure, then questions as to the accuracy of a diagnosis of schizophrenia based primarily on that symptom of disordered thinking must be considered. The possibility that disordered thinking exists in diagnostic groups other than schizophrenia must also be considered. Such a situation increases the possibility that a diagnosis of schizophrenia by clinical judgment, using thought disorder as a fundamental symptom, is producing a large number of inaccurate schizophrenic diagnoses. Treatment is based on diagnosis, therefore inaccurate diagnosis greatly increases the probability of inappropriate treatment. The accurate differential
diagnosis of schizophrenia is important since many individuals are committed to hospitals and treated with powerful medications, which have potentially harmful side effects. This is not a small problem since the number of patients hospitalized at any one time in 1980 was 132,164 in state hospitals, and 140,831 in private hospitals (Rednich and Williams, 1983).

The possibility exists that psychological tests may be a more accurate method of diagnosing schizophrenia and of objectively measuring disordered thinking. This study will seek to explore this possibility.

Limitations

The populations in state hospital settings are extremely heterogenous, often manifesting several major problems at once. For example, it is not uncommon for a patient to be admitted to the hospital with various amounts of medication, street drugs and environmental stresses affecting the expression of pathology. Psychotic illnesses, in general, and schizophrenia, in particular, are known to vary over time and have particular stages. Day to day stresses involved in the hospitalization process itself can affect the expression of pathology. This study can not control for medication effects while in the hospital.

All subjects will be volunteers, which could be a
source of bias since no data will be available from those individuals who refuse to participate in this study. This problem is common for research using human subjects and warrants consideration by the reader. The procedures of the hospital and the legal system could further complicate the project by transferring or releasing patients before they might be tested. Finally, one must be aware that a state hospital presents a population that is not representative of all schizophrenics but rather those patients who have failed to make satisfactory adjustment to outpatient treatment and/or hospitalization in private hospitals.

Summary

The question of how the degree of thought disorder relates to the accurate diagnosis of schizophrenia is of fundamental importance to this study. Thought disorder has been considered pathognomic of schizophrenia, yet both concepts of thought disorder and schizophrenia remain loosely defined and a source of controversy in the mental health profession. The question of clinical judgment as compared with psychological testing will also be considered in this study.
CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to review the research and literature relating to two major areas; schizophrenia and thought disorder and diagnosis of schizophrenia. The information in this chapter represents only a sample of the vast amount available on these broad areas of study, and reflect this writer's fund of knowledge. The reader should be aware that information, conclusions, and opinions expressed by this writer are based on this sample of the total available fund of knowledge on schizophrenia, thought disorder and diagnosis.

Schizophrenia and Thought Disorder

While many researchers and clinicians have contributed to the fund of knowledge, certain individuals stand out as having made a significant impact on the development of theories and ideas relating to schizophrenia. Schizophrenia has probably always existed in man's history. Ancient records describe aberrant human behavior which is similar to symptoms described in modern mental hospitals. The earliest of these recorded accounts, found in early (1400 B.C.) Hindu Vedos or "Works of Wisdom", describe individuals who are gluttonous, filthy,
naked, memory impaired and agitated. These behaviors were differentiated from alcoholism, poisoning and excited disorders of a manic-depressive nature.

Hippocrates (460-377 B.C.), a Greek physician, described patients who demonstrated unusual thinking, hallucinations and disturbed reality orientation. Plato also wrote of patients with mental disorders which closely approximated a description of schizophrenia. Again these patients were clearly differentiated from alcoholics, depressives, toxic reactions and epileptics.

Romans such as Celsus (50-25 B.C.) and Aretoeus (30-90 A.D.) were able to differentiate patients with schizophrenic symptoms from toxic deliria, brain injuries, alcoholism, mania and hysteria. Willis, an Englishman (1674) described "stupidity" and "morosity" in certain young people. He observed that this process could result in deterioration of mental functioning, although he may have been the first writer in history to record that the deterioration was reversible in some cases (Hoch and Zubin, 1966).

Pinel (1745-1826), a member of the French "school" of psychiatry was describing cases of dementia praecox under different names, although the term dementia praecox was first used by Morel in 1856 and later popularized by Kraepelin (1919). Pinel described several different syndromes such as catatonia and a deteriorated patient

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syndrome he called "idiotism". The French school of psychiatry is responsible for differentiating "idiocy", a congenital disorder, from "dementia", an acquired disorder usually manifesting itself in adolescence or early adulthood. Morel (1809-1873) further refined the descriptions of various subtypes of insanity and was responsible for the idea that dementia praecox might be an inherited disorder with a prognosis of deterioration. He first attempted to develop a comprehensive theory in terms of cause, course and outcome. His work was furthered by Kahlbaum (1828-1879) who used Morel's ideas to formulate a theory of the whole disease, including etiology, course, physical and mental data and prognosis (Hoch and Zubin, 1966).

Emil Kraepelin (1855-1926) was the first psychiatrist to recognize common characteristics among the heterogenous mass of the "insane" housed in "insane asylums". In 1896 he defined this group of symptoms as "dementia praecox". The term "praecox" referred to the fact that symptoms first appeared when the patients were relatively young. The term "dementia" was used to indicate that the outcome of the disease was deterioration. Kraepelin (1919) examined and observed thousands of patients and ultimately divided the patients into three major groups: the hebephrenic, the catatonic, and the paranoid. These patients shared the following symptomatology: (a)
hallucinations; (b) delusions; (c) inappropriate affect; (d) impaired attention span; (e) negativism, manneristic behavior; and (f) progressive deterioration in spite of a relatively intact sensorium. Kraepelin (1919) later added two groups of patients to this list, simple schizophrenic and the paraphrenic (Arieti, 1974). Kraepelin (1919), as a master observer, carefully described the many individual symptoms his patients exhibited. He considered dementia praecox to be an endogenous illness with either an organic pathology of the brain or a metabolical disorder as the cause.

The most significant contribution of Kraepelin was his synthesis of the works of Kahlbaum, Morel, Wundt and others into his own system. The major weakness with his theory is that not all cases of dementia praecox resulted in deterioration as Kraepelin later recognized. Unfortunately, Kraepelinian thought, with its negative prognosis, influenced and reinforced the popular negativistic attitude towards mental illness and discouraged therapeutic attempts (Arieti, 1974).

Eugen Bleuler (1857-1930) built on Kraepelin's work, added his own ideas, and attempted to go beyond the purely descriptive style of Kraepelin. Bleuler (1950) published a monograph on dementia praecox in which he renamed the syndrome "schizophrenia" to imply splitting psychic functions rather than a deterioration to dementia. Bleuler
(1950) enlarged the boundaries of what was recognized as schizophrenia by including many other syndromes not accepted at that time as schizophrenias.

This contribution marked the beginning of a major controversy between the Kraepelinian school of thought which considered schizophrenia to be limited to patients who ultimately developed dementia; often called process schizophrenia today, and the Bleulerian idea which includes many other syndromes. Bleuler (1950) not only broadened the definition of schizophrenia but proposed that "normal" people show schizophrenic symptoms; "peculiar associations, incomplete concepts and ideas, displacements, logical blunders, and stereotypes" (Bleuler cited in Arieti, 1974 p. 13). He also believed that the largest numbers of cases of schizophrenia are latent, never requiring hospitalization. Bleuler (1950) clearly believed that the disorder of the process of association in cognition was a major deficit in schizophrenia. Bleuler (cited in Arieti, 1974) writes:

...single images or whole combinations may be rendered ineffective, in an apparently haphazard fashion. Instead, thinking operates with ideas and concepts which have no connection, or a completely insufficient connection, with the main idea and therefore should be excluded from the thought process. The result is that thinking becomes confused, bizarre, incorrect and abrupt. (p. 14)

Many of the commonly recognized thinking disorder symptoms such as; blocking, neologisms, clang associations,
reference associations, were explained by Bleuler in terms of loosening of associations.

The major influence of Bleuler is that disordered thinking is the fundamental and primary symptom of schizophrenia. Also of major importance to the development of diagnostic categories is that Bleuler expanded the number of syndromes which could be included under the schizophrenic diagnosis which increased the heterogeneity of patient groups labeled schizophrenic.

Sigmund Freud (1855-1939) had so profound an influence on the field of psychiatry that, while he did not specialize in the study of schizophrenia, his works had great influence on the works of others. Freud (1914) attempted to fit psychotic disorder into his theory of psychoneurosis which resulted in some useful concepts.

Freud explained the disordered thinking inherent in schizophrenia as an impairment of the ego functions and a rise of the primary process thinking. Primary process thinking is the magical, unconscious thinking common to young children. Certain symptoms such as delusions and hallucinations represent not only a loss of contact with reality through primary process thinking, but a distorted way of trying to reinvest libidinal energy into the environment. Freud focused on the symbolization evident in schizophrenic symptoms. He described schizophrenic deterioration as regression to previously successful
levels of functioning when the patient could no longer function at an age appropriate level.

Many of Freud's ideas have little acceptance today, due partially to his attempt to make the phenomenology of schizophrenia fit his theory rather than develop a theory to fit the disease. Like Kraepelin, Freud's ideas served to discourage treatment of schizophrenics by analytic methods. He believed that since all libido in the schizophrenic was withdrawn from the external reality, no transference was possible with the therapist. With no transference, treatment was impossible. He was successful in explaining psychosis in psychological terms both phenomenologically and etiologically. His explanations of several symptoms such as projections, regression, wish-fulfilling fantasies remain useful today.

Carl Jung (1875-1961) gave thinking disorders secondary importance in schizophrenia. He believed that thought and action were only symptoms of affectivity which was the essential basis of personality. Jung (1903) believed that schizophrenic symptoms were caused by the autonomous complexes which were not under conscious control. For example, a series of ideas could be removed from consciousness and have their own independent existence. The dissociation of these ideas into unconsciousness was dynamically determined. The dissociated ideas were driven with emotion and isolated by
psychodynamic defense mechanisms.

Jung (1917) believed that an organic pathology existed in schizophrenia but that the emotional disorder of schizophrenia produced abnormal metabolism which ultimately damaged the brain producing other symptoms. He did not entirely embrace this concept and considered the possibility of the organic deficit as primary to the schizophrenic process.

Jung (1920) attempted to describe the basic personality of a schizophrenic which he labelled an introvert because of a tendency to direct psychic energy inward, away from the environment. The classical Jungian idea of "the collective unconscious" was used to explain the manifestations of schizophrenic symptoms. These symptoms were seen as reproductions of the archetypes deposited in the "collective unconscious". Finally, Jung (1933) emphasized the importance of congenital factors and minimized the effect of the environment and interpersonal relations in the development of schizophrenia (Arieti, 1974).

Harry Stack Sullivan (1892-1949) attributed the major issue involved in schizophrenia to the difficulties in interpersonal relationships. All problems, thoughts, and feelings revolve centrally around the relationship between people. Sullivan (1924) expressed the psychodynamic interpretation in terms of interpsychic energy rather than
intrapsychic energy. He did not give the ultimate importance to sexual energy in the parent-child relationship but stressed the relationship as a whole. The child develops a self-concept through "reflected appraisals" from significant adults; usually parents. Reflections of a negative nature can be disassociated from consciousness which may result in "parataxic distortions", or distorted interpretations of interpersonal situations. If these distortions are not corrected, the individual will be able to obtain less consensual validation from others which, in turn, increases difficulties with interpersonal relations.

Sullivan (1929) believed that schizophrenia developed when unpleasant childhood experiences, originally disassociated, reemerged in adult life. The disassociative process breaks down, the personality disorganizes and the patient is overwhelmed with anxiety and fear. He emphasized that the entire person is affected and disagreed with Bleuler's emphasis of a loosening of association as the primary symptom of schizophrenia. He also believed that schizophrenic symptoms were not totally different from mechanisms expressed by non-schizophrenics but rather a reliance by schizophrenics on certain mechanisms to a much greater degree than relied upon by normals. Such mechanisms could include: (a) fantasy life; (b) overt irrational behavior; (c) overuse of motivations,
normally seldom used. Sullivan believed that a "disaster to self-esteem" could be found in every case history of a schizophrenic (Arieti, 1974). Perhaps his greatest contribution was his belief that schizophrenia could be treated psychotherapeutically.

Lidz (1973) postulated that schizophrenic reactions occurred in patients from maladaptive families where one or both parents were narcissistic and placed their needs above those of the child. Lidz (1973) believed that modern psychiatry's fixation on discovering specific brain anomalies or specific types of thinking problems is misleading. He believed that schizophrenics are capable of abstract thinking but do not do so under various circumstances that are meaningful to them.

The development and expression of schizophrenic thought disorder is fundamental to the ideas of Lidz. Cognitive egocentricity is the key concept used by Lidz to explain the development of schizophrenic thought disorder. Children and adolescents normally demonstrate cognitive eccentricity, which is the belief that events in the environment center around them and that what others do and say involves them. The schizophrenic patient regresses to this type of thinking which leads to the reemergence of magical thinking, and to failure to differentiate words from what they signify, self from object and what occurs inside self from what occurs outside of self.
For various reasons, the schizophrenic fails to solve normal developmental tasks of adolescence, especially giving up cognitive egocentricity. The tasks of achieving autonomy is overwhelming and the patient is caught in parental double binds with unsolvable dilemmas. This situation results in patients manifesting egocentrically overinclusive thinking, believing that events refer to and are influenced by their wishes (Lidz, 1973).

Lidz (1973) is an interesting theorist in that, like Bleuler (1950), he focused on thought disorder as a fundamental symptom of schizophrenia. There is a distinctly psychodynamic flavor in his theory since developmental issues are deemed most important to manifestation of schizophrenic symptomatology. The influence of Sullivan is also recognized in that interpersonal difficulties and regression of cognitive functions in the face of stress and anxiety are seen as crucial to the development of schizophrenia (Lidz, 1973).

Arieti (1974) believed that schizophrenics originally developed extreme states of anxiety which produced a vulnerability to a psychotic break throughout their lifetimes. As the developmental tasks become increasingly more difficult and threatening, the patient's defenses prove to be inadequate and fail. The basic motivation for a break with reality is to alter reality so it is less frightening. Arieti (1974) believed that the mechanisms
used by schizophrenic patients to change reality are part of the repertoire of all human beings and that non-schizophrenics commonly use such mechanisms, especially in errors of concept formation and understanding. The crucial difference is that for non-schizophrenics these errors are the exception rather than a rule of mental functioning, while with schizophrenics, they become a way of life.

For Arieti (1974), cognition is the foundation of human existence. All human action is driven at some level by cognition. He built on the works of Goldstein (1939, 1943a) which described schizophrenic thinking as concrete. Goldstein was influenced by his work with brain damaged patients and Arieti believed that Goldstein's description of concrete thinking reflected too strongly this influence. Arieti (1974) coined the term "active concretization." He differentiated it from concrete thinking demonstrated in brain damaged patients by stating that schizophrenics are capable of abstract thinking but not of sustaining it because the abstract is too anxiety provoking or too disintegrating. He states that "we may actually interpret the whole schizophrenic cognitive transformation from a general point of view as a process of active concretization" (Arieti, 1974, p. 218). The influence of developmental psychology and the psychodynamic ideas of Freud are not lost on Arieti (1974)
as he seeks to further explain schizophrenic cognition. Regression to earlier levels of cognitive function is a concept that has already been endorsed by other theorists described in this study. Arieti (1974) contributed the term "progressive teleologic regression". This term is defined as a tendency for schizophrenics to function at a lower level of cognitive maturity if the age appropriate level of functioning cannot adequately tolerate the self image threatening anxiety of a particular situation. Arieti (1974) stresses that cognitive transformation described as progressive teleologic regression is not an absolute rule but a tendency to think in this fashion. This is more than a minor semantic difference, and helps to explain why there is such extreme variability within each schizophrenic patient's cognitive performance.

In summary, Arieti has contributed to the field of schizophrenia with his rich descriptions of his patients. He has synthesized the works of those before him and emphasizes the role of anxiety that is of a self-threatening nature in producing a tendency for schizophrenics to change the reality by regressing in cognitive functioning until some measure of relief is obtained from the anxiety.

The purpose of the preceding review of general schizophrenic theory has been to provide the reader with an historical perspective of the developmental trends,
issues and conflicts of schizophrenic theory. Early writings about schizophrenia were purely descriptive, with the main goal of organizing various symptoms into clusters that separated them from other common mental and behavioral disorders such as; alcoholic delirium, toxic delirium, epilepsy and various organic diseases and insults. Over history, one can observe a gradual increase in the ability of these observers and theorists to accurately describe and group such symptoms.

The contributions of Kraepelin (1919) and Bleuler (1950) have been emphasized strongly in this review due to their major and still evident influence in the study of schizophrenia. Kraepelin's schizophrenia was basically defined not only with obvious schizophrenic symptoms but involving an insidious onset and poor prognosis. This type of schizophrenia today is considered chronic or process schizophrenia. Bleuler's influence has been pervasive in the diagnosis of schizophrenia. The major diagnostic marker in Bleulerian psychiatry has been the establishment of a thought disorder. The idea that this type of thinking disorder could be manifested by a large group of individuals previously not categorized as schizophrenic, had the effect of broadly expanding the types and numbers of individuals diagnosed as schizophrenic. The expanded criteria for schizophrenia increased the heterogeneity within the diagnostic classification of schizophrenia and
undoubtedly increased the number of false positive schizophrenic diagnoses.

Freud and Jung represent theorists whose influence in the field of psychiatry was so profound that although their major focus was not on schizophrenia, they did produce substantial contributions to the field. Both authors attempted to integrate schizophrenia into already existing general theories of psychopathology. They both contributed to the field of knowledge with unique dynamic interpretation of various symptoms and phenomena demonstrated in schizophrenia but did not focus on thinking disorders.

When examining the theories and writings of Sullivan, Lidz and Arieti, one can observe a gradual increase in the influence of the environment in shaping schizophrenic difficulties. These authors explain, with increasing sophistication, the development and function of disordered thinking in schizophrenia. One can also observe an increasing specialization in their theories, with Sullivan beginning that trend and Lidz and Arieti focusing almost their entire professional lives to the study of schizophrenia.

A major task of this writer has been to make decisions about what material to include in this review and how to most accurately organize such material to provide readers with a map to lead them through the almost
bewildering array of information available on the subject. Having justified the inclusion of the authors previously mentioned in this review, attention will now be directed towards examining the next major trend in psychiatry which affects the relationship between schizophrenia and thought disorder.

The role of brain dysfunction in schizophrenia has been suspected since Kraepelin (1919) and Bleuler (1950) first delineated the syndrome. Kraepelin (1919) included the concept of brain lesions, as described by Alzheimer (1897), in his description of dementia praecox. Various symptoms such as abnormal pupillary responses, reflex abnormalities, tics, ataxis and fits suggested neurological involvement at some level in the schizophrenic syndromes (Seidman, 1983). Most major theorists considered the possibility of an underlying organic process involved in schizophrenia and specifically in the major symptom of thought disorder. These theorists lacked the technology to adequately investigate this hypothesis and therefore were only able to speculate as to its effects on schizophrenic symptomatology.

The situation changed with two major chemical breakthroughs that began in the 1940's and exploded onto the scene in the 1950's. It was clearly demonstrated that schizophrenic-like symptoms could be evoked in humans through the use of psychomimetic drugs such as
amphetamines. In the early 1950's, the efficacy of antipsychotic medications was demonstrated and had a profound impact on the whole field of psychiatry and especially on the study and treatment of schizophrenia. It suddenly became possible to reduce the impact of the most debilitating symptoms of schizophrenia. Many thousands of patients who were essentially untreatable suddenly demonstrated remarkable changes in their behavior and ability to think clearly. There are numerous studies which demonstrate the positive effect of antipsychotic medications. For example, Wahba, Donlon and Meadow (1981) demonstrated the efficacy of these drugs with a double-blind study of acute schizophrenics. Bellak (1979) provides thoughtful comment on the impact of antipsychotic medication on the severity of symptoms observed in modern mental hospitals. He describes the relative infrequency of severely regressed and bizarre behaviors such as trichotillomania (pulling out one's hair and eating it). It was also common for patients to eat foreign objects or need to be tube fed (Bellak, 1979). In this writer's five years working as a psychologist in a state hospital, such behaviors are rarely, if ever, observed.

Of far greater impact to the study of schizophrenia is that antipsychotic medication together with an emphasis on community psychiatry vastly reduced the population in state hospitals and returned many patients to their
community. National Institute of Mental Health figures show a nearly 75% decline in state hospital population from a peak of 559,000 in 1955 to 140,355 in 1979 (Rednich and Witkin, 1983).

It is well beyond the scope of this work to review the vast and complicated studies involving biochemical, neurological and other approaches which have attempted to isolate brain lesions or other physical causes of schizophrenia and schizophrenic thought disorder. This issue has been raised because it increased the prominence of the medical model of diagnosis and treatment of schizophrenia which adhered to the concept of schizophrenia as a brain disease to be treated primarily with antipsychotic medication. The medical model has been highly compatible with Bleulerian psychiatry of identifying symptom clusters, the most prominent being the formal thought disorder. The problem with this approach is that the diagnosis and treatment of schizophrenia tended to ignore other personality variables and tended to over-diagnose schizophrenia (Pope and Lupinski, 1978; Donlon, 1979).

The advancements in technology and science in general and the trend towards specificity in scientific research spawned attempts by numerous researchers to isolate specific variables inherent in schizophrenic thought disorders. The next section of this literature review will present some of these attempts to acquaint the reader with
the general thrust of modern research into thought disorder and schizophrenia.

Chapman and Chapman (1975) indicate that there are "over a dozen or so" major competing theories of schizophrenic cognition and literally "many hundreds" of well controlled studies to test these theories. They define formal thought disorder as "...the ways in which deviant thought differs in form or structure from that of normal people" (Chapman and Chapman, 1975, p. 42). Two major areas of interest to clinicians have been the content of schizophrenic thought and the form of that thought. Early theorists such as Freud, Jung, Sullivan and Arieti concentrated on content and its dynamic or symbolic significance to the individual patient. More recent investigators and theorists have focused on the aberration of form rather than content. Chapman and Chapman (1975) emphasize that the nature of schizophrenic thought is very important since it is the primary symptom of schizophrenia and the major criteria for diagnosis. They recognize the unreliability of clinical diagnosis for schizophrenia and suggest that clinicians need to be able to describe and objectively measure thought disorder before objective criteria for diagnosis of schizophrenia can be established. The heterogeneity of symptoms of schizophrenia has long been recognized and suggests to these authors that at least two, possibly more, disorders
are subsumed under the schizophrenia category. They point out that progress in psychopathology has been a series of successful discoveries of causes of disorders first identified through symptom clusters (Chapman and Chapman, 1975). A final contribution of these authors involves the distinction between positive and negative symptoms of thought disorders. Chapman and Chapman (1975) state:

An hypothesis of a negative symptom of thought disorder is a statement that there is a deficit in ability. Examples of such hypotheses are that schizophrenics are deficient in ability. An hypothesis of a positive symptom is a statement that some specific kind of thinking replaces normal thinking. It is a statement of what a patient does, rather than what he fails to do. An example might be that schizophrenics respond to proverbs with inappropriately literal interpretations, or that they free-associate excessively, or that they have delusions. (p. 43)

Positive and negative symptoms of thought disorder are usually found together in schizophrenia even though the positive symptoms are usually most noticeable. The authors set a standard for designs in schizophrenic thinking disorder research by indicating that since schizophrenics are deficient in almost every behavior that requires a voluntary response, meaningful measurement of a deficit must always be in terms of a differential deficit (Chapman and Chapman, 1975).

Two areas of differential deficit that have been addressed in numerous studies are the tendency of schizophrenics to demonstrate either concrete thinking or
overinclusive thinking. Arieti (1974) and Goldstein (1946) have already been discussed as to their respective beliefs concerning the concreteness of schizophrenic thought. The basic idea behind this concept is that when an individual has a concrete attitude, speech and behavior are determined by the attention being focused on a particular part of a situation and because of the inability to perceive common properties, all items appear unique. With an abstract attitude, one is able to perceive a situation as a whole and see items as members of a group rather than individually unique. Goldstein and Scheerer, (1941) completed studies using a sorting test, appropriately named the Goldstein-Scheerer Sorting Test. Their results suggested that schizophrenics have difficulties with figure-ground perception. With concrete thinking, the individual is unable to differentiate between the essentials and non-essentials of what is perceived; therefore, the ability to abstract is lost (Reed, 1970).

Cameron (1946) originally proposed the idea that the basic deficit in schizophrenic thinking was a tendency to be overinclusive. Schizophrenics were tested on various measures of logic and sorting tasks and found to demonstrate tendencies to have: (a) a lower amount of causal links between thoughts; (b) imprecise approximations using incorrect substitute words; (c) personal interpretations of themes running concurrently.
with more reality based themes; (d) overinclusion or the inability to maintain boundaries of a problem. Payne (1966) has undertaken several studies of overinclusiveness and reports that it is found in only fifty percent of acute schizophrenics and rarely found in chronic schizophrenics.

The literature has produced inconclusive results with only some schizophrenics demonstrating overinclusive thinking as reported by Payne (1966). Studies of concrete thinking have been severely criticized by Chapman and Chapman (1975, 1978, 1979) for their lack of demonstrating a differential deficit when comparing schizophrenics with normals.

Several authors, Broadbent (1958), Yates (1966), and McGhee (1966) have suggested that the basic mechanism involved in schizophrenic thinking is a failure of the filter mechanism that helps to process incoming information. The distractability of the schizophrenic patient could be explained by this failure and result in increased information input, accompanying slowing of information processing of the excessive information, and loss of information from short term memory. Reed (1970), in an excellent synthesis of research and theories of schizophrenic thinking, accepts the filter dysfunction theory. The underselectability of the filter mechanism allows both relevant and irrelevant information to enter
the brain which results in some irrelevant information being processed at the expense of relevant information which is then lost from the memory. Thought and verbal output, the end product, would then be disordered due to access of irrelevant information supplanting relevant information in the memory banks. Reed (1970) indicates that this process would best explain the many competing theories of schizophrenic thinking.

A final issue to be considered in the area of schizophrenic thought disorder is whether there is such an entity as schizophrenic thinking. At first glance this question may appear absurd considering the focus of this project has been to define the central importance of thought disorder to the diagnosis of schizophrenia. The vast amount of research and theories devoted to describing and explaining such a phenomenon would also seem to point out the absurdity of such a question. Harrow and Quinlan (1977) emphasize that some studies involving creativity and studies involving manic patients have demonstrated that some or many non-schizophrenics may have considerable thought pathology (Andreason and Powers, 1975; Carlson and Goodwin, 1973; McConoghy, 1961; Taylor and Abrams, 1975; Wild, Singer and Rosman et al, 1965). Since disordered thinking has been demonstrated in non-schizophrenics one may argue that doubts should be cast on the whole concept of disordered thinking as a primary diagnostic marker of
schizophrenia. Empirically, doubts would arise about traditional methods of using thought pathology to differentiate schizophrenics from non-schizophrenics. Theoretically, questions arise as to whether the construct of thought disorder should be viewed as a separate entity unique to schizophrenia, or rather it should be viewed as a concept involving a high degree of disordered thinking, but with disordered thinking viewed on a continuum with normal thinking (Harrow and Quinlan, 1977). In a study involving 200 subjects, including 55 schizophrenics, the above mentioned issues were tested. The results suggested that disordered thinking is not unique to schizophrenia, although it is common in active phases of acute schizophrenia and is a major disruptive symptom. Acutely ill non-schizophrenics also show evidence of varying levels of thought disorder. The presence or absence of a thought disorder is still considered useful in separating schizophrenics from non-schizophrenics but it is not a perfectly accurate method (Harrow and Quinlan, 1977). Further results of Harrow and Quinlan's study revealed that mild levels of thought disorder are present in many types of psychopathology but severe thought pathology is more frequent in schizophrenics. Acute disturbance of all kinds increase the tendency to think in a disordered fashion. Schizophrenics tend to demonstrate greater levels of thought disorder when acutely upset, both in early and
late stages of onset and recovery, than do non-schizophrenics.

To this point, the review of the literature has provided an historical perspective of the development of the concept of schizophrenia and the emergence of the symptom of thought disorder as the primary indicator of a diagnosis of schizophrenia. The preeminence of the biological and medical model of schizophrenia was discussed and related to current diagnostic practice. A sample of contemporary research of specific cognitive deficits possibly involved in disordered thinking was presented. Finally, the issue of whether thought disorder is unique to schizophrenia and whether there is such a discreet entity as the thought disorder was discussed.

Diagnosis of Schizophrenia

The official nomenclature utilized to diagnose mental disorders, including schizophrenia has recently changed. The Diagnostic and Statistical Manual of Mental Disorders, Second Edition (DSM-II), American Psychiatric Association (APA) (1968) was utilized until the recent development of the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) APA (1980). Implementation of DSM-III has been inconsistently applied, especially in public mental hospitals where the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-
CM) (1978) is often used for diagnostic purposes. The ICD-9-CM is essentially Axis I of the DSM-III and has been commonly used to diagnose for insurance purposes.

The initial work on DSM-III was begun in 1974 and the finished manual went into effect in 1980. Its development reflected current research and involved feedback from clinicians around the country who were given initial drafts to work with. There were six major goals of DSM-III relating to the diagnosis of schizophrenia: a) to improve reliability, b) to reflect recent research, c) to relate diagnosis more closely to treatment and prognosis, d) to minimize the stigma of labeling, e) to achieve clinical acceptability in this country while reducing diagnostic differences with the Europeans and f) to allow the expression of diagnostic uncertainty. One effect of these goals is that the concept of schizophrenia as defined in DSM-II (APA 1968) has been narrowed considerably. As a result many patients diagnosed as schizophrenic in DSM-II would now be diagnosed as having either: a) Paranoid Disorder, b) Schizoaffective Disorder, c) Schizophreniform Disorder, d) Brief Reactive Psychosis, e) Atypical Psychosis, or f) Schizotypal Personality Disorder (Spitzer, Andreason and Endicott, 1978). A major change in DSM-III is a return to the consideration of duration and course of schizophrenia as a significant factor in diagnosis. As discussed earlier in this review, traditional diagnosis of
schizophrenia has focused on the phenomenology of symptoms, especially thought disorder, in the Bleulerian tradition. DSM-III requires a six month duration of illness, including prodromal and residual symptoms, for a diagnosis of schizophrenia to be made. This change reflects the original Kraepelinian concept of schizophrenia. Schizophrenic-like symptoms of less than six months duration have been called Schizophrenoform Disorders in DSM-III.

The importance of pathognomic symptoms, especially thought disorder, has been reduced in DSM-III to reflect more current research findings that indicate that the presence of a thought disorder cannot reliably distinguish between schizophrenics and other diagnostic categories, especially affective disorders (Carpenter and Strauss, 1974; Koehler and Seminario, 1978; Pope and Lupinski, 1979; Donlon, 1979).

The structure of DSM-III is significantly different than any preceding official diagnostic category. Rather than focusing on presenting symptoms and using a secondary diagnosis to reflect other variables relevant to diagnosis, DSM-III employs a five axis format. The first three axes constitute the official diagnostic assessment.

Axis I: Clinical symptoms
Conditions not attributed to a mental disorder that are a focus of attention or treatment (V codes)
Additional codes
Axis II: Personality disorders
   Specific development disorders

Axis III: Physical disorders and conditions

Axis IV: Severity of psychosocial stressors

Axis V: Highest level of adaptive functioning in the past year

Axes IV and V are available for use in clinical and research settings and provide information supplementing the official DSM-III diagnosis in Axes I, II, and III.

DSM-III represents an attempt to reflect not only presenting symptoms, but the individual basic personality style and environmental situation and may be a step forward in the field of diagnosis.

Criticism has been presented that DSM-III is nothing more than an arbitrary set of rules with no real construct validity, especially concerning schizophrenia (Fenton, Moshier and Mathews, 1981). This present study, and others using DSM-III reflect the beginning of efforts to resolve the conflict over construct validity of DSM-III.

Summary

This chapter has attempted to trace the development of the concept of schizophrenia from loosely defined symptoms to present diagnostic nomenclature. The emphasis has been on disordered thinking and its relationship to the diagnosis of schizophrenia. The influence of thought
disorder on the diagnosis of schizophrenia has varied over time. The early theories focused on description of thought disorder and viewed it as pathognomonic to the diagnosis of schizophrenia. Emphasis was basically on psychodynamic interpretations of symptoms of schizophrenia and especially on disordered thought. The advent of the medical model and improved scientific techniques increased the tendency to specialize and to search for specific mechanisms that were involved in schizophrenic thought disorder. The results of such efforts have been inconclusive and suggested to some researchers that disordered thinking may not be unique to schizophrenia but may manifest itself in other diagnostic categories. The tendency to over-diagnose schizophrenia due to the confusion over the relationship of thought disorders to schizophrenia was recognized by this writer and other authors.
CHAPTER III

METHOD

Population and Sample

Population

The population for this study was defined as all patients admitted to the four admission units of Kalamazoo Regional Psychiatric Hospital (KRPH) between December 1, 1982 and June 30, 1983. Generally, these subjects can be described as men and women of average intelligence, ranging in age from 18-65. The subjects represented all social classes and educational levels, however, the population at KRPH is skewed towards the lower social and educational classes due to the high percentage (49.8%) of chronic (more than one admission) patients served in that facility. The population is heterogeneous in nature as KRPH serves as a final "safety net" for the private and public mental health system and, as such, accepts patients from many referral sources with a wide variety of problems.

The research site, Kalamazoo Regional Psychiatric Hospital (KRPH) is a 630 bed state mental hospital serving 15 counties in south and mid-western Michigan. KRPH serves referral sources such as; police officers, jail personnel,
Ypsilanti Forensic Center, private physicians and hospitals, community mental health case workers, and family members of the prospective patients. A high percentage (95%) of the patients are involuntarily committed and overtly do not desire treatment in a hospital setting. In general, KRPH serves those individuals who have been screened by their county mental health workers to insure that no other, less restrictive options are appropriate and available. Such individuals are generally extremely disturbed, failures from other treatment programs, or have demonstrated a long term history of KRPH treatment.

Treatment at KRPH is multidisciplinary in nature with; psychiatrists, psychologists, psychiatric nurses, social workers, activity therapists, teachers, and nursing aids providing a broad range of services. Staffing and treatment options are at a level which permits KRPH to be fully accredited by state and federal agencies.

Sample

All subjects entering KRPH through normal admission procedures were candidates for this study. Subjects were selected from the four admission units of KRPH which process the vast majority of patients admitted to the hospital. Patients' participation in this study was completely voluntary and all patients were apprised of
this fact upon first contact by the researcher.

Patients were excluded from the study for several reasons. The largest number of patients were excluded due to their unwillingness to participate in this study. Many patients were excluded due to their extremely disorganized, confused or hostile symptoms which would have prevented them from successfully completing both tests even if they were willing to attempt such a task. Often a strict distinction between those patients who were unwilling or unable to complete the tests was difficult to make. Patients were also excluded if they failed to read accurately the directions to the criteria instruments or if they indicated that they couldn't read at the eighth grade level. Exclusion also occurred if patients were retarded or brain damaged. Exclusion criteria of a reading level below eighth grade and intelligence below an IQ level of 80 is suggested by the authors of the criteria instruments and was found to be appropriate in this study.

The sample produced by this procedure consisted of 88 subjects; 30 females and 58 males, which closely approximates the population's female to male ratio. The mean age of the female subjects was 38.6 years, the male subjects' mean age was 32.0 years and the subjects' overall mean age was 34.0 years. The mean age of the sample closely approximates the populations' mean age of 36.0 years. The mean number of days between admission at
Criteria Instruments

The Whitaker Index of Schizophrenic Thinking (WIST)

Whitaker (1980, p. 7) defines schizophrenic thinking by stating: "All manifestations of schizophrenic thinking reflect an extreme inability to think logically and wittingly at the level of one's intellectual capacity." Whitaker (1980) further defines thinking as schizophrenic if it is all of the following:

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

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

3. Unwitting. The individual lacks awareness, deliberate intention, or control in relation to a given instance of thinking. (p. 7)

Whitaker (1973) has developed the Whitaker Index of Schizophrenic Thinking (WIST) to objectively measure disordered thinking as defined above.

The WIST (Whitaker, 1973) is a multiple choice test that can be completed by most subjects in less than 15 minutes. The test was designed to objectively measure
schizophrenic thinking. The WIST is also designed to require the subjects to use current ability to think logically rather than recall the conclusions of past reasoning. Whitaker (1980) believes this feature makes it more likely that subjects will demonstrate their actual thinking impairment. In addition, all WIST items incorporate appealing or autistically gratifying wrong answers. This feature of autistic appeal in incorrect WIST answers demands that a subject inhibit or actively reject wrong answers in order to arrive at the correct answer to each item.

The WIST consists of 25 multiple choice items distributed among three subtests: Similarities, Word Pairs and New Inventions. The Similarities and Word Pairs subtests contain nine items each and the New Inventions subtest contains seven items. Each item presents a stimulus word, phrase or sentence with five alternate answers. The answers are arranged randomly to prevent systematic bias according to position preference. To the right of each alternate answer is a box in which the subject is directed to put a check mark by the correct answer. Weighted scores are assigned to delineate characteristic schizophrenic thinking errors. One point is assessed for a loose association, two points for a reference association, three points for a clang association and four points for a nonsense association.
The WIST Index score, which is the sum of the weighted scores for each subtest and the time required to complete the test, indicates the level of impaired or schizophrenic thinking. A unique feature of the WIST is its two form format. Forms A and B are structurally identical but differ significantly in content. Form A contains words that are inherently anxiety laden while Form B contains only neutral words. Whitaker (1980) believes that anxiety laden words are more likely to elicit schizophrenic thinking from subjects due to the stress and internal meanings assigned to such words by those subjects. Form A has been shown to be slightly superior to Form B in identifying schizophrenics from non-schizophrenics so Form A was selected for this study (Whitaker, 1973; Evens and Dinning, 1980).

Given proper administration procedure, the WIST Form A has been reported to discriminate between schizophrenics and non-schizophrenics at an 80% level of accuracy (Whitaker, 1980). Newmark et al (1978) found that the WIST correctly identified 63% of schizophrenics and 86% of non-schizophrenics in a hospital setting.

In standardization studies Whitaker found that a cut-off level of 20 for the Form A Index score was the most efficient discriminator of schizophrenic from non-schizophrenic individuals, at an 80% level of efficiency. The Form A score used by itself discriminates at a 74%
efficiency and Form A time by itself discriminates at a 75% efficiency. Form B Index of 17 correctly identified schizophrenics from non-schizophrenics at a 76% rate; the Form B score discriminates at 71% and Form B time at 72%. Whitaker (1980) also reports a probability estimate that an Index value in a given range comes from a subject who is rated as schizophrenic. Subjects with an Index score between 0 and 14 have a 21% chance of being rated schizophrenic on Form A and 24% chance on Form B. The middle Index range of 15-24 is associated with probabilities of 45% and 53% for Forms A and B respectively. The highest Index range, 25 and above, is associated with an 88% probability that the subject will be rated schizophrenic.

Determining validity for an instrument designed to measure schizophrenic thinking is not an easy task, given the complex nature of schizophrenia, human cognition and the failure to reach significant agreement among mental health professionals as to the utility and validity of the schizophrenic syndrome. During early stages of development, validity was established using pathognomonic verbalization scores with the Holtzman Inkblot Technique (HIT). The results of Whitaker's (1973) study suggested that the Rorschach and HIT are sufficiently reliable to deserve some use as criteria in the development of a test of schizophrenic thinking. Another early validation study

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used four experienced psychologists to blindly rate verbalizations on the Rorschach and Weschler Adult Intelligence Scale for mild, moderate or severe degree of schizophrenic thought disorder. The WIST scores of the subjects had a low, but significant, correlation with the criteria judgments. Using an equally weighted combination of Rorschach and Holtzman Inkblot Technique scores as a criteria, the WIST yielded an $r$ of 0.48. Another step in validation by Whitaker of the WIST involved a study using cut-off scores on the Rorschach of 50, to diagnose schizophrenic reaction and a WIST error score cut-off of 6. Using the Rorschach scores as a criterion by itself the postdictive accuracy of the WIST was 82% for a sample of 45 patients. Analysis of this result showed that the percentages of cases in the four categories of comparison were as follows: true positives, 11%; false positives, 11%; true negatives, 71%; false negatives, 7% (Whitaker, 1980). Concurrent with, and following these studies, Whitaker made revisions of the WIST to improve its validity. Both Forms were then administered to 25 experienced psychiatrists and psychologists. They chose the correct answers and rated the degree of illogicality of every alternative. On the basis of these ratings, further revisions were made and the procedure was repeated with a second larger group of psychiatrists and psychologists. Finally the WIST Forms were revised once.
again to conform more closely to the consensus of the second group of raters in a way that adhered to the theoretical rationale of the WIST. Thus, a kind of consensual validation of the WIST was developed, consistent with the conceptual definition of schizophrenic thinking (Whitaker, 1980).

To summarize the development of validity for the WIST, Whitaker has: formulated a conceptual definition of schizophrenic thinking, developed an initial version of the WIST, compared it with pathognomonic verbalizations on the Rorschach and HIT, made revisions, recompared with combined Rorschach and HIT scores, revised the WIST once again and finally developed consensual validity using highly experienced raters to help him develop the present version of the WIST.

Since the development of the present WIST Forms, studies have been completed that found the WIST positively related to the level of rule learning performance in schizophrenics (Bourne et al, 1977). Phillips, Phillips and Shearn (1980) tested the relationship of five tests of schizophrenic thinking and found the WIST to be moderately related to the other tests and also found that a combination of the WIST and two other tests provided the two highest "hit rates" for schizophrenics independently identified. Evens and Dinning (1980) used Form A error score compared with the MMPI, Beck Depression Inventory
(BDI) and State Anxiety Scale (SAS). The results supported the convergent and discriminate validity of the Form A WIST with significant correlations on MMPI scales: F (.39), Sc (.38), and Pa (.29) but not with depression (BDI) or anxiety (SAS).

The intra-test reliability estimates have been calculated for each Form using the raw, i.e. unweighted scores. An early version of Form A had a reliability coefficient of .77, as estimated by Kuder-Richardson Formula 20. The intra-test reliabilities of the present WIST Forms were also calculated with raw scores. Hoyt reliability coefficients of approximately .80 were obtained for each form (Whitaker, 1980).

The Millon Clinical Multi-Axial Inventory (MCMI)

The MCMI is a 175 item, true-false inventory, specifically designed for a clinical population. The terminology used enables it to be understood by subjects with at least an eighth grade reading level and completed by most subjects in 30 minutes or less (Millon, 1982). The MCMI was devised directly out of a theory of personality and psychopathology (Millon, 1969, 1981). The advantages of such an instrument is that it can suggest specific patient diagnoses, dynamics and testable hypotheses about social history and current behavior (Millon, 1982). An important feature of the MCMI is its conceptual and
diagnostic parallels with the current DSM-III diagnostic categories.

The MCMI has 20 different scales; scales (1-8) measure the basic personality patterns, scales (S, C, P) indicate a greater level of severity in that structure. Scales (A, H, N, D, B, T) represent moderately severe clinical syndromes while scales (SS, CC, PP) represent psychotic disorders.

The construction of the MCMI was an ongoing process involving three sequential components proposed by Loevinger (1957); substantive, structural and external. The first validation stage labelled by Millon (1982) theoretical-substantive, examines the extent that the content of the test is derived from an explicit theoretical background. The second stage, labelled internal-structural, refers to the model to which the instrument's items are expected to conform. For the MCMI, those items which were retained maximized scale homogeneity, displayed some overlap with other theoretically congruent scales, and showed satisfactory levels of endorsement and stability over time. The third stage, called by Millon, external-criterion validation, includes only those items that have met the first two criteria. It is essentially the relationship between each test scale and other non-scale measures of that trait. The validation task in this stage involves this correlation of
results obtained on the test with relevant clinical behaviors (Millon, 1982).

The administration of the MCMI follows the common procedures for self-report inventories. Millon (1982, p.7) recommends that patients who are "unduly fatigued, are in pain or apprehensive, or are in an active confusional state, such as found during an acute psychotic break, chronic brain disorder, intoxication or marked sedation, should not be given the MCMI". Such guidelines were followed in this study, not only because they were suggested by the test author but because experience quickly dictated that acutely active psychotic patients could not provide accurate information nor finish the test.

The MCMI is computer scored and interpreted for increased accuracy, reliability and elimination of any interpreter bias.

The norms for the MCMI are based on several non-clinical groups and numerous samples of clinical patients. One hundred and eight hospitals and outpatient centers and thirty-nine private practitioners provided test protocols. In 1981, MCMI data from 43,218 patients were reviewed to evaluate various aspects of the test. Approximately 84% of the samples were outpatients and 16% were inpatients.

Base-rate scores are used on the MCMI instead of the traditional transformation of raw scores into standard
scores. This was done because standard scores assume normalizing of distribution but personality type or clinical syndromes are not normally distributed in patient population. Also, the purpose of a clinical instrument is to identify if a patient is a member of a particular diagnostic category, not to locate the relative position of a patient on a frequency distribution. On the MCMI, raw scores have been transformed into base-rate scores, using personality and syndrome prevalence data and by using cutting lines to maximize correct diagnostic classifications (Millon, 1982).

The test-retest reliability was presented for two clinical populations: one group of 59 tested twice with an average test interval of one week, and a second group of 86 patients tested twice with an average test interval of five weeks. The reliability coefficients for the first group were in the mid-eighties for the different scales. The second group had reliability coefficients somewhat lower but this may reflect greater contamination of treatment effects. The personality pattern scales had the highest reliability coefficients; in the mid-eighties, while the clinical syndromes were lower, in the mid-sixties. This situation is understandable in that basic personality traits are less likely to be affected by treatment than the clinical syndromes which would be expected to be influenced more by treatment. This relative
difference in influence by treatment would contribute to the lower reliabilities of the clinical scales. Internal consistency is reflected in a median Kuder-Richardson Formula 20 of .88 with a range from .58 to .95 (Millon, 1982).

Validity data is reported extensively in the MCMI manual. Data is presented for the structural component of validity under the categories of: item overlap, scale intercorrelations and factor analyses. External validity data is presented in the form of correlations between the MCMI clinical scale and scales of other comparable diagnostic inventories.

The structural component of validity refers to test's relationship to its underlying theoretical model; relationships among the scales of a test should follow a pattern that corresponds to the structural feature of the test's theory. The MCMI scales overlap, intercorrelate and cluster in many different ways, the majority of which are consistent with its theoretical model (Millon, 1982).

Millon (1982) states that the correlation between the MCMI and other comparable scales is less important that the correlation between it and relevant clinical behaviors. However, extensive data is reported on the convergent validity of the MCMI when compared to three other diagnostic inventories: the MMPI basic and Wiggins content scales of the WAIS (Wiggins, 1966) and the
Psychological Screening Inventory (PSI) (Layton, 1973), and the Symptom Distress Checklist (SCL-90) (Derogatis et al, 1973). The data is too extensive to report in this study, but, in general, correlations reported suggest that the MCMI has adequate convergent validity (Millon, 1982).

The MCMI is a relatively new instrument which awaits the test of time and scrutiny from the psychological community before it will be accepted and widely used. The information presented in the MCMI manual and the theoretical background presented in Millon's previous publications strongly suggests to this writer that this instrument's use can be adequately justified for this study.

The MCMI is based on a theory of psychopathology developed by Millon (1969, 1981). A brief description of this theory will help the reader understand the diagnostic criteria and method crucial to this study.

Millon (1981) refers to his theory as a biosocial-learning theory. Learned coping patterns are viewed as forms of instrumental learning or ways of getting positive reinforcement and avoiding negative reinforcements. These strategies reflect what kinds of reinforcements people learn to seek or avoid (pleasure, pain), where they try to obtain them (self, others), and how people learn to seek or avoid them (active, passive). Eight basic patterns emerge under this format to which Millon added three
severe variants (Millon, 1981). Four categories result from whether individuals seek reinforcement from within or look to others. Dependent personalities seek out others for such reinforcement. Independent personalities have learned to rely on themselves for reinforcement. Ambivalent personalities remain uncertain whether to look to themselves or others for reinforcement. A final category has a diminished capacity to experience pleasure. This group is subdivided; one group lacks the capacity to feel pain and another that is hypersensitive to pain. Both subgroups are called detached and are characterized by being unable to experience rewards from themselves or others and a tendency to become isolated and self alienated. Methods for achieving these basic goals are viewed in terms of the active-passive dimension. Active individuals plan strategies, manipulate their environment in their attempt to gain pleasure and avoid pain. The main feature of the active style is the attempt to exert control over the circumstances and the environment. The passive style is best characterized by few or no attempts at manipulating the environment but rather a resigned attitude to let fate and external events dictate life. Millon (1969) used these polarities to derive a four-by-two matrix combining the dependent, independent, ambivalent and detached styles with active-passive dimension. This approach produced eight basic personality
patterns to which Millon (1981) added three severe disorders for a total of eleven theory-derived personality patterns.

The following is a list of the eleven basic personality patterns and their DSM-III compatible diagnoses:

1. Passive-dependent—DSM-III dependent disorder
2. Active-dependent—DSM-III Histrionic disorder
3. Passive-independent—DSM-III narcissistic disorder
4. Active-independent—DSM-III anti-social disorder
5. Passive-ambivalent—DSM-III compulsive disorder
6. Active-ambivalent—DSM-III passive-aggressive disorder
7. Passive-detached—DSM-III schizoid disorder
8. Active-detached—DSM-III avoidant disorder
9. Cycloid personality — DSM-III borderline personality disorder
10. Paranoid personality—DSM-III paranoid disorder

Millon's (1969) concept of schizophrenia predates the tendency of DSM-III to restrict the diagnosis of schizophrenia to individuals who have a life long pattern of decompensation and detachment from the environment. Millon (1969) believes that schizophrenia has been a diagnostic category in which too many patients have been included. He views schizophrenia as a severely
decompensated variation of the basic detached personality patterns. Severely decompensated individuals with basic personality patterns that are dependent, ambivalent or independent should be labelled as cyclophrenic or paraphrenic. It should be noted here that the terms cyclophrenic and paraphrenic have not been carried over in DSM-III.

The major focus of Millon (1969, 1981) is on basic personality structure and style. Each personality pattern can decompensate into various severe psychopathologies. Schizophrenia itself isn't viewed as a discreet entity but rather a decompensated variation of the basic personality pattern, most likely observed in the detached personality patterns (Millon, 1981).

Diagnostic Conditions

Three diagnostic conditions were used in this study. The standard hospital diagnostic procedure at KRPH involves the use of the ICD-9-CM criteria as a guide for the clinician to follow in making a diagnostic judgment. All diagnoses are the result of two interviews with different psychiatrists and a final review by the medical director and medical staff. The multi-disciplinary treatment team has some input into the diagnosis of individual patients but, in practice, this influence is minimal. This diagnostic procedure is typical for state
run institutions in Michigan and suffers from the problems of unreliability documented earlier in this study.

It is significant to this study that the ICD-9-CM guidelines focus on the symptom picture of the patient rather than the multi-axis approach of the currently accepted DSM-III guidelines. ICD-9-CM is still the official diagnostic manual for state hospitals in Michigan. A shift to DSM-III is anticipated in the near future.

The second diagnostic condition employed in this study involves the use of a psychological test. Diagnoses arrived at under this condition were generated from the MCMI previously described in this chapter. The patients respond to true-false questions about their symptoms, problems and characteristic style of dealing with the world. The responses of each patient are compared with responses of other patients and interpreted in the DSM-III multi-axis format by computer.

The third diagnostic condition in this study also involves the use of a psychological test, the Whitaker Index of Schizophrenic Thinking (WIST). Neither Whitaker (1980) nor others familiar with the WIST claim that a diagnosis of schizophrenia could or should be made on the basis of the WIST alone. This instrument was chosen for this study because it purports to objectively measure
disordered thinking which is a universally recognized symptom of schizophrenia.

In summary, this study makes use of three different methods of diagnosis: clinical judgement, the MCMI and the WIST to measure degree of thought disorder. Each condition was chosen for a specific reason. The psychiatric interview using clinical judgement is the current diagnostic procedure at the research site and directly affects the future of many patients. This method has weaknesses, but presently is a reality for severely disturbed individuals admitted to KRPH and other state hospitals in Michigan. Diagnosis by psychological test using the MCMI was chosen because it represents a theoretical based, DSM-III compatible diagnostic instrument which may well be a major clinical tool for the next decade. The WIST was chosen because it objectively measured disordered thinking which is probably the only symptom that is consistently identified with schizophrenia by the theorists previously described.

Procedure

The original design of the study proposed to administer both tests within seven days of hospitalization to reduce the effects of treatment on a patient's performance. Experience with this approach quickly revealed that an unacceptable high proportion of patients
would be excluded from this study due to either their uncooperative attitude or symptomatology so severe that they were unable to complete the psychological testing. Therefore, the patients were tested as soon as the unit psychologists (in consultation with the treatment team) determined that the patients were capable and willing to reliably complete both the WIST and the MCMI. The criteria instruments were administered consecutively with all patients in order to reduce the amount of occasion variance that might occur if each test was administered separately.

The procedure for administration of the WIST and the MCMI was simple and standardized. Each patient identified as being capable of completing the testing was approached by this researcher, other KRPH psychologists or a supervised psychology intern and asked to participate in the study. Subjects were made aware that participation was voluntary, results of psychological testing would not be used to keep them hospitalized, and that they could request feedback about their performance on the tests.

Statistical Hypotheses

The original research question postulated that a relationship exists between the degree of thought disorder and the diagnosis of schizophrenia. It was also hypothesized that a relationship exists between the use of
clinical judgement and psychological tests in the diagnosis of schizophrenia. The following hypotheses are developed to test these basic research questions and are presented here in the null form.

Hypothesis One.

There will be no relationship between the WIST error and time scores and the MCMI psychotic scale scores: psychotic thinking (SS), psychotic depression (CC) and psychotic delusions (PP).

Hypothesis Two.

There will be no difference between the mean WIST scores of schizophrenics and non-schizophrenics as diagnosed by the MCMI.

Hypothesis Three.

There will be no relationship between the diagnosis of schizophrenia generated by clinical judgement (hospital method) and psychological tests (MCMI).

Statistical Analysis

All data were entered onto a master data sheet. The data were entered directly from the master data sheet into the Western Michigan University computer system. The BMDP8D computer program calculated the Pearson product
moment correlation coefficient between the WIST error and time scores and three MCMI scales of psychotic thinking, (SS), (CC) and (PP) (Hopkins and Glass, 1978; Nunally, 1970).

The Pearson product moment correlation coefficients were corrected for attenuation by measurement error as suggested by Nunally, (1978).

The means and standard deviations for the WIST error, time and index scores were calculated using the BMDP2D computer program. Due to the low number of schizophrenics identified by the MCMI, it was not possible to test for significant differences between schizophrenic and non-schizophrenic performance on the WIST. Since Spitzer, Andreason and Endicott (1978) predicted that many patients formerly diagnosed as schizophrenic would receive other psychotic diagnoses such as, schizophreniform or acute paranoid disorder, these patients were grouped in a psychotic group and their WIST performance was compared with the WIST performance of four other major diagnostic groups identified by the MCMI; affective, neurotic, substance abuse and unspecified groups. The mean WIST error, time and index scores were compared using analysis of variance as performed by the BMDP2V program. A probability level of P<0.05 was established to test for statistic significance in accordance with commonly acceptable research procedures.
The data gathered to test for the degree of relationship between diagnostic methods can be considered nominal since the major focus is on the relative frequency of subjects' placement in the schizophrenic or non-schizophrenic category under the two diagnostic methods. The chi-square test of association was performed to test the degree of association between the two variables (diagnostic conditions). Since the expected values in two cells were less than five, the use of the chi-square technique could be questioned. The Fishers exact test was performed to test the relationship between the diagnosis of schizophrenia under both conditions as described by Maxwell (1961).

The independent variables of sex, age and number of days in the hospital prior to testing were analyzed to determine possible effects of these variables on the WIST performance. Correlational analysis was performed between independent variables and WIST error, time and index scores. An analysis of variance was computed between MCMI diagnostic groups, sex and WIST error scores, with a level of significance established at the P<0.05 level.
CHAPTER IV

RESULTS

The purpose of this chapter is to present the statistical results obtained from testing the three null hypotheses described in chapter three. Descriptive statistics, not directly related to the three statistical hypotheses, will also be presented in this chapter. The results of the data analyses, hypothesis testing and additional analyses will also be discussed in terms of their meaning and implications for the general research questions.

The Data and Their Analyses

Hypothesis One

There will be no relationship between the WIST error and time scores and the MCMI psychotic scale scores, psychotic thinking (SS), psychotic depression (CC) and psychotic delusions (PP).

In order to test this hypothesis, a Pearson product moment correlational analysis was conducted comparing the WIST Error and Time scores with the base-rate scores on the three psychotic scales of the MCMI; psychotic thinking (SS), psychotic depression (CC) and psychotic delusion (PP). Table 1 shows the results of this analysis.
Table 1
Pearson Product-Moment Correlation Coefficients Between the WIST Error and Time Scores and the (SS), (CC) and (PP) scales of the MCMI

<table>
<thead>
<tr>
<th></th>
<th>Errors</th>
<th>Time</th>
<th>SS</th>
<th>CC</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Errors</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>0.42</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS</td>
<td>0.36*</td>
<td>0.20</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC</td>
<td>0.31*</td>
<td>0.02</td>
<td>0.77</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>PP</td>
<td>0.11</td>
<td>0.07</td>
<td>0.48</td>
<td>0.22</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*P<.05

The results show the degree of correlation between the WIST Error scores and the psychotic thinking (SS) scale is 0.36, which is the highest correlation discovered between the two instruments. The correlations between the WIST Error scores and the psychotic depression (CC) scale, and the psychotic delusion (PP) are 0.31 and 0.11, respectively. The correlations between the WIST time scores and the (SS), (CC) and (PP) scales are 0.16, 0.02 and 0.07, respectively.

As indicated in Table 1, the correlation between the WIST error score and the MCMI (SS) and (CC) scales were found to be significant. All other correlations were found to be not significant at the P<0.05 level. Therefore, the null hypothesis may not be rejected.
The instrument attenuation Kuder-Richardson 20 for the MCI, Pearson product-moment correlation coefficient, WIST error, correlation coefficient, and scale index allow more construct measured by the hypothesis.

Where scores of diagnostically significant subjects are diagnosed.

Seventeen acute patients of true score...
The effects of the measurement error on both instruments can be estimated using the correction for attenuation technique as described by Nunally (1978). The Kuder-Richardson (KR-20) reliability coefficient of .88 for the MCMI and .77 for the WIST were used to correct the Pearson product moment correlation coefficients found to be significant at the $P<0.05$ level. The results of the corrections for attenuation of the correlation between the WIST error score and the MCMI (SS) scale increased the correlation coefficient from .36 to .44. The correlation coefficient between WIST error scores and the MCMI (CC) scale increased from .31 to .37. This correction also allows more accurate statements to be made concerning the construct of psychotic thinking which is purportedly measured by the three scales discussed.

**Hypothesis Two**

There will be no difference between the mean WIST scores of schizophrenics and non-schizophrenics as diagnosed by the MCMI.

As revealed in Table 2, the MCMI diagnosed only one subject as schizophrenic. Five other subjects were diagnosed as either schizophreniform or schizoaffective. Seventeen other subjects received a primary diagnosis of acute paranoid disorder. Due to the extremely low number of true schizophrenic diagnoses, it was not possible to
test the null hypothesis as stated. The performance, on the WIST, of subjects in the broader diagnostic category of psychosis will be discussed under the additional analyses section of this chapter.

Table 2

<table>
<thead>
<tr>
<th>Groups</th>
<th>DSM-III Axis I Diagnostic Number</th>
<th>DSM-III Axis I Diagnostic Name</th>
<th>Frequency</th>
<th>Percent of Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotic</td>
<td>295.30</td>
<td>Schizophrenia</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>295.40</td>
<td>Schizophreniform</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>295.70</td>
<td>Schizoaffective</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>298.30</td>
<td>Acute Paranoid Disorder</td>
<td>17</td>
<td>19.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>23</td>
<td>26.1</td>
</tr>
<tr>
<td>Affective</td>
<td>296.33</td>
<td>Major Depression</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>296.42</td>
<td>Bi-Polar Disorder</td>
<td>7</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>296.64</td>
<td>Bi-Polar Disorder</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>12</td>
<td>13.6</td>
</tr>
<tr>
<td>Neurotic</td>
<td>300.02</td>
<td>Generalized Anxiety Disorder</td>
<td>9</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>300.40</td>
<td>Dysthmic Disorder</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>300.81</td>
<td>Somatization Disorder</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>15</td>
<td>17.0</td>
</tr>
<tr>
<td>Substance</td>
<td>305.02</td>
<td>Alcohol Abuse</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Abuse</td>
<td>305.62</td>
<td>Cocaine</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>305.91</td>
<td>Intoxication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other or mixed, Unspecified</td>
<td></td>
<td>7</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Substance abuse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>10</td>
<td>11.4</td>
</tr>
<tr>
<td>Unspecified</td>
<td>No DSM-III Number</td>
<td></td>
<td>28</td>
<td>31.9</td>
</tr>
</tbody>
</table>

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Hypothesis Three

There will be no relationship between the diagnosis of schizophrenia generated by clinical judgement (hospital method) and psychological tests (MCMI).

The MCMI produced one schizophrenic diagnosis but five other subjects were diagnosed as having schizophrenic-type disorders and were included in the schizophrenic category for purposes of analysis. Table 3 presents the comparison of schizophrenic vs non-schizophrenic diagnoses generated using the hospital diagnoses and the diagnoses generated by the MCMI.

Table 3
Diagnostic Agreement of MCMI and Hospital Diagnoses of Schizophrenia

<table>
<thead>
<tr>
<th></th>
<th>Schizophrenic</th>
<th>Non-Schizophrenic</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCMI Diagnosis</td>
<td>6</td>
<td>82</td>
</tr>
<tr>
<td>Hospital Diagnosis</td>
<td>54</td>
<td>34</td>
</tr>
<tr>
<td>Diagnostic Agreement</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

The number of subjects diagnosed as schizophrenic by the hospital diagnostic procedure was 54 or 61.4% of the sample. The number of subjects diagnosed as schizophrenic by the MCMI was six or 6.8% of the sample. Furthermore, agreement of a diagnosis of schizophrenia occurred in only
two cases out of the entire sample, or 2.3%. Agreement on a non-schizophrenic diagnosis was achieved in 30 cases or 34% of the sample. Fifty-two subjects were diagnosed as schizophrenic by the hospital diagnostic method but not by the MCMI for a percentage of 59.1. The MCMI diagnosed four subjects as schizophrenic that were diagnosed as non-schizophrenic by the hospital method.

A chi-square test of association was performed to test whether the differences between the two diagnostic methods differ systematically or whether the differences reported are a result of sampling error. The results of the chi-square test do not allow rejection of the null hypothesis at an acceptable level of probability, P<0.05. Since the expected proportions calculated for two cells in the contingency table are less than five, a Fishers exact fit test was also performed. The results of this test reveal a probability level of P<.1526 and do not allow rejection of the null hypothesis at a P<0.05 level. Thus, the null hypothesis can not be rejected under either method at a P<0.05 level of significance. No systematic relationship exists between the two diagnostic conditions employed to diagnose schizophrenia.

Since it was predicted by Spitzer, Andreason and Endicott (1978) that many patients diagnosed as schizophrenic under DSM-III conditions would receive the diagnosis of acute paranoid disorder under DSM-III, those
subjects in this study were included in a psychotic group to test whether a relationship existed between the hospital diagnosis of psychotic conditions and the MCMI diagnosis of psychotic conditions. Table 4 presents the frequencies of diagnosis on the psychotic vs non-psychotic dimension for both diagnostic conditions.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>Psychotic</th>
<th>Non-Psychotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCMI Diagnosis</td>
<td>22</td>
<td>66</td>
</tr>
<tr>
<td>Hospital Diagnosis</td>
<td>57</td>
<td>31</td>
</tr>
<tr>
<td>Diagnostic Agreement</td>
<td>11</td>
<td>20</td>
</tr>
</tbody>
</table>

The agreement rate increased when the subjects were grouped into psychotic or non-psychotic groups. Eleven subjects were diagnosed as psychotic under both diagnostic conditions, a percentage of 12.5. Twenty subjects were diagnosed as non-psychotic under both conditions, a percentage of 22.7. Forty-six subjects were diagnosed as psychotic by the hospital method but not by the MCMI, a percentage of 52.3. Eleven subjects were diagnosed as psychotic by the MCMI but not by the hospital method, a percentage of 12.5. A chi-square test of association was
again performed and the results indicate that no significant relationship exists between the diagnosis of psychosis under the hospital and MCMI diagnostic methods at a P<0.05 level of significance.

Whether the diagnosis of schizophrenia or a broad diagnosis of psychosis is used, Hypothesis Three cannot be rejected as no relationship is evident between diagnostic methods.

Additional Analyses

As previously discussed, Hypothesis Two could not be tested due to an unacceptably low number of schizophrenics diagnoses as schizophrenic by the MCMI. It was possible, however, to group diagnoses by five major diagnostic groups: psychotic disorders, which include all schizophrenic, schizoaffective, schizophreniform and acute paranoid disorders, affective disorders, neurotic disorders, substance abuse disorders, and unspecified disorders. Those patients who received an unspecified diagnosis on the MCMI did not report symptoms that resulted in a base-rate score of greater than 75 on any of the clinical scales.

These groupings of diagnostic categories are consistent with DSM-III general categories and allow this writer to test whether WIST performance for these five groups is different at a significance level of P<0.05.
Table 5 reveals that the sample of 88 subjects had a mean of 6.25 for the Error scores, 10.17 for Time scores and 16.795 for the Index scores. The psychotic and affective groups had nearly identical means of 9.435 and 9.417, respectively. The variability within each group was also nearly identical for the Error scores, with psychotics having a standard deviation of 10.732 and affectives a standard deviation of 10.850. The mean time scores for psychotics was 11.304 and 10.500 for the affective group. The psychotic group had a higher standard deviation, 7.449, than the affective group, which had a standard of 4.167. The mean Index score, which is a combination of the Error score and the Time score, was 20.739 for the psychotic group, and 19.917 for the affective group. The standard deviations for the psychotic and affective group Index scores were 16.518 and 11.882, respectively.

The mean Error scores for the other three groups; neurotic, substance abuse and unspecified, were 7.333, 3.300, and 3.929. The mean Time scores for these groups were 8.733, 8.400 and 10.500. The mean Index scores for these groups were 16.067, 11.700 and 14.429. The standard deviations for the Index scores of these groups were 8.345, 5.697 and 7.632.

The next statistical procedure employed was to test for statistical significance of the mean scores for Error,
Time and Index for the five groups. Standard analysis of variance was used to test for significance at the P<0.05 level. The results of this analysis are shown in Table 5.

### Table 5

<table>
<thead>
<tr>
<th></th>
<th>MCMI Groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychotic Affective</td>
<td>Neurotic Abuse</td>
<td>Subst. Unspec.</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Score Mean</td>
<td>11.304</td>
<td>10.500</td>
<td>8.733</td>
<td>8.400</td>
<td>10.500</td>
<td>10.120</td>
</tr>
<tr>
<td></td>
<td>7.449</td>
<td>4.167</td>
<td>1.870</td>
<td>1.713</td>
<td>3.703</td>
<td>4.740</td>
</tr>
<tr>
<td>Index Score Mean</td>
<td>20.739</td>
<td>19.917</td>
<td>16.067</td>
<td>11.700</td>
<td>14.429</td>
<td>16.795</td>
</tr>
<tr>
<td>Number of Subjects</td>
<td>23</td>
<td>12</td>
<td>15</td>
<td>10</td>
<td>28</td>
<td>88</td>
</tr>
</tbody>
</table>

The results of the analysis of variance do not support the hypothesis that a difference exists between MCMI diagnostic groups in terms of their WIST performance at a P<0.05 level of significance. However, the difference between group means for the WIST error score is significant at a probability level of P<0.0843. Table 6 presents the results of the analysis of variance.

Since the results of analysis of variance suggest differences between MCMI diagnostic groups on the WIST Error score at a P<0.0843 level of significance, further analyses were required to determine where these
differences exist. It could be predicted that the difference between groups would occur because the psychotic group, including schizophrenics, would have a mean Error score that is greater than the other four MCMI groups. This idea was tested by contrasting the mean of the psychotic groups with the four other MCMI groups as suggested by Neter and Wasserman (1974). The results of this analysis did not produce evidence to conclude that mean errors of the psychotic group are greater than the four other MCMI groups. Pair wise contrasts were calculated for all five MCMI groups. Table 7 presents the results of these calculations. The critical value using Modified Fisher Significant Difference with $= 0.10$ was $t (.10/2; 82) = 1.66$.

Table 6
Analysis of Variance for Dependent Variable-Error

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>F</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>141.42643</td>
<td>1</td>
<td>141.42643</td>
<td>145.85</td>
<td>0.00</td>
</tr>
<tr>
<td>MCMI Code</td>
<td>8.26584</td>
<td>4</td>
<td>2.06646</td>
<td>2.13</td>
<td>0.0843*</td>
</tr>
<tr>
<td>Sex</td>
<td>2.24042</td>
<td>1</td>
<td>2.24042</td>
<td>2.31</td>
<td>0.1323</td>
</tr>
<tr>
<td>Error</td>
<td>79.51274</td>
<td>82</td>
<td>0.96967</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. n=88

*p<0.10

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Three contrasts were significant at the P<0.10 level, three others approached significance. In general this pattern suggests that the basic differences in WIST Error performance are between the MCMI substance abuse and unspecified groups when compared with the three groups with clinical diagnoses; psychotics, affectives and neurotics. The substance abuse and unspecified groups appear to be making fewer WIST errors than the other three MCMI groups.

Table 7
Pairwise Contrasts for the Five MCMI Diagnostic Groups

<table>
<thead>
<tr>
<th></th>
<th>Psychotic</th>
<th>Affective</th>
<th>Neurotic</th>
<th>Substance Abuse</th>
<th>Unspecified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affective</td>
<td>-0.166</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurotic</td>
<td>-0.305</td>
<td>-0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance abuse</td>
<td>1.660</td>
<td>1.473</td>
<td>1.736*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td>1.986*</td>
<td>1.478</td>
<td>1.930*</td>
<td>-.405</td>
<td></td>
</tr>
</tbody>
</table>

Note. n = 88 Critical value = 1.66
*P<0.10

Since there was no relationship evident between the diagnosis of schizophrenia or psychosis under the two diagnostic conditions, an attempt was made to discover if any systematic relationship existed between the diagnosis of schizophrenia under the hospital condition and any of
the five major diagnostic groups generated by the MCMI. The question to be considered here is: Do patients diagnosed as schizophrenic by the hospital method, but not by the MCMI fall into other diagnostic groups with a predictable pattern? Table 8 indicates where the patients diagnosed as schizophrenic or non-schizophrenic by the hospital method fall under the five MCMI categories.

Table 8

<table>
<thead>
<tr>
<th>Hospital Diagnosis of Schizophrenic or Non-Schizophrenic Compared to MCMI Diagnosed Major Groups</th>
<th>MCMI Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychotic</td>
</tr>
<tr>
<td>Schizophrenic</td>
<td>12</td>
</tr>
<tr>
<td>Non Schizophrenic</td>
<td>11</td>
</tr>
</tbody>
</table>

These data in Table 8 were analyzed with the chi-square test and found to be not significant. No pattern emerged to suggest a systematic relationship between the hospital diagnosis of schizophrenia and any of the major groups generated by the MCMI.

The difference in performance on the WIST by sex was analyzed. Table 9 presents the means and standard deviation on the WIST Error, Time and Index Scores by sex.

The mean Error score for females was 5.467 and for males, 7.224 with standard deviations approximately equal. The mean Time scores for females and males were
approximately equal at 10.433 and 10.034 with standard deviations of 6.400 for females and 3.661 for males. The mean Index scores for females was 15.900 and 17.259 for males. The standard deviations were 13.314 for females and 10.359 for males.

Table 9
WIST Error, Time and Index Means and Standard Deviations

<table>
<thead>
<tr>
<th>Sex</th>
<th>Statistic</th>
<th>Error</th>
<th>Time</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>Mean</td>
<td>5.467</td>
<td>10.433</td>
<td>15.900</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>8.452</td>
<td>6.400</td>
<td>13.314</td>
</tr>
<tr>
<td>Males</td>
<td>Mean</td>
<td>7.224</td>
<td>10.034</td>
<td>17.259</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>8.732</td>
<td>3.661</td>
<td>10.359</td>
</tr>
</tbody>
</table>

Analysis of variance was computed to determine if the difference in the WIST mean Error score between females and males was significant at the P<0.05 level. Results of the analysis of variance indicate the difference was not significant.

The relationship between age of the subjects and their performance on the WIST was analyzed by computing the Pearson product moment correlation coefficients for Error, Time and Index scores and subject age. A correlation coefficient of 0.54 was discovered for females on the WIST Error score. This relationship is significant
at the P<0.05 level. No other significant relationships were suggested when comparing age and WIST performance for Time and Index for females. There were no significant relationships between age and males on any WIST scores.

The relationship between number of days in the hospital at the time of testing and diagnostic groups on WIST Error, Time and Index scores was examined. A strong relationship was discovered between number of days in the hospital and the performance on the WIST Error and Index scores of the affective MCMI group. The Pearson correlation coefficients for this group were calculated to be -0.87 for the Error score and -0.90 for the Index score. These are significant at the P<0.05 level. No other significant relationships were discovered between number of days in the hospital and performance on the WIST by the four other diagnostic groups.

The relationship between the WIST Error, Time and Index scores and the hospital diagnostic groups comprised of schizophrenic or non-schizophrenic subjects was analyzed and tested for significance using analysis of variance. No significant relationship of any kind could be found between the hospital diagnosis of schizophrenia and the subjects' performance on the WIST.

Finally, while the entire focus of this project has been on the various relationships between the WIST and the MCMI Axis I diagnosis, it should be remembered that the
MCMI also produced Axis II diagnosis for each subject. Data for Axis II personality disorders is presented in Table 10.

Table 10

<table>
<thead>
<tr>
<th>DSM-III Number</th>
<th>DSM-III Name</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>301.00</td>
<td>Paranoid</td>
<td>7</td>
<td>8.0</td>
</tr>
<tr>
<td>301.20</td>
<td>Schizoid</td>
<td>5</td>
<td>5.7</td>
</tr>
<tr>
<td>301.22</td>
<td>Schizotypal</td>
<td>7</td>
<td>8.0</td>
</tr>
<tr>
<td>301.40</td>
<td>Compulsive</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>301.50</td>
<td>Histrionic</td>
<td>6</td>
<td>6.8</td>
</tr>
<tr>
<td>301.60</td>
<td>Dependent</td>
<td>12</td>
<td>13.6</td>
</tr>
<tr>
<td>301.70</td>
<td>Antisocial</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>301.81</td>
<td>Narcissistic</td>
<td>5</td>
<td>5.7</td>
</tr>
<tr>
<td>301.82</td>
<td>Avoidant</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>301.83</td>
<td>Borderline</td>
<td>20</td>
<td>22.7</td>
</tr>
<tr>
<td>301.89</td>
<td>Atypical or Mixed</td>
<td>15</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88</td>
<td>100.0</td>
</tr>
</tbody>
</table>

n = 88

The personality disorder detected with the greatest frequency was Borderline Personality Disorder with 20 subjects out of the sample falling into this category for 22.7% of the total sample. Fifteen subjects received Axis II diagnosis of Atypical or Mixed Personality Disorder.
which could include any combination of all other personality disorders. These subjects comprised 17.0% of the sample. Twelve subjects were diagnosed as Dependent Personality disorders, a 13.6% rate. These three groups comprised 53.4% of the sample with the remaining subjects rather evenly distributed between eight Axis II diagnostic categories.

Discussion

The results of this study will be discussed first in terms of the performance of the two tests and how they relate to each other. This issue is central to research Hypothesis One. Both tests claim to measure thought disorder with that function being specific to the WIST and three of the MCMI scales (psychotic thinking, psychotic depression, and psychotic delusions). Establishing some level of convergent validity by demonstrating a relationship between these different measures of thought disorder is important to this study. Since so many possible ways exist to conceptualize thought disorder, agreement between both instruments at least suggests that concept of thought disorder can be measured and is more than just a theoretical construct.

The results of analysis of data relevant to Hypothesis One will be discussed in terms of how they relate to similar studies using the WIST. Specific
findings and recommendations for use of the WIST and the MCMI will be presented.

The results of the statistical analyses involved with testing Hypothesis One did not permit rejection at a significant P<0.05 level. However, significant positive relationships do exist between patients' performance on the WIST and their performance on the MCMI scales (SS) and (CC).

Although no studies were found comparing the WIST and the MCMI, both tests have been compared to the MMPI and this well known psychological test can serve as a common reference point. The MCMI and the MMPI are both self-report, true-false, personality inventories designed to measure numerous personality and psychopathological traits. Millon (1982) reports correlations between the MCMI and the MMPI for all scales of both inventories. The correlations between the MCMI (SS) psychotic thinking and (CC) psychotic depression scales and the MMPI (Sc) schizophrenia scale were reported as .61 and .52 respectively. The MMPI-Wiggins psychoticism scale and the (SS) scale of the MCMI correlated at a .62 level. The MMPI-Wiggins psychoticism scale and the (CC) scale of the MCMI achieved a .60 level of correlation. Correlations between the MMPI (F) frequency scale and the MCMI (SS) and (CC) scales were reported as .39 and .44 respectively (Millon, 1982). The correlations between the MMPI (F) and
(Sc) scales and the MCMI (SS) and (CC) scales suggest that these measures are not identical but do measure similar traits. Therefore, the results of the WIST-MCMI correlations generated in this study may be compared with WIST-MMPI correlations in other studies.

Klinger, Johnson and Williams (1977) used the WIST Error scores to test whether a positive relationship existed between the WIST Error scores and the MMPI scale for schizophrenia (Sc). The results of their study indicated that a correlation of 0.11 between the two measures was non-significant at the P<0.05 level. Based on these results, Klinger et al. (1977) raised concerns about the convergent validity of the WIST when error scores alone are used as a measure of schizophrenic thinking. The results of the present study would contradict Klinger et al. (1977) since the WIST Error scores did demonstrate significant convergent validity with MCMI scale of psychotic thinking, and psychotic depression. Other studies have reported contradictory findings when WIST Error scores are correlated with the MMPI scales. Fishkin, Lavello and Pishkin (1977) reported significant correlations on the F and Ma scales of the MMPI while not finding a significant correlation with the (Sc) scale. Evans and Dinning (1980), reported significant (P<0.05) correlations with the MMPI scales F (.39), Hs (.28), Pa (.29), Pt (.36) and Sc (.38). Phillips, Phillips and
Shearn (1980), in a study comparing the performance of the WIST with four other objective tests of cognitive abilities found "moderate intertest correlations" between the WIST and the Gorhams Proverb Test and the WAIS (p.87). In general, the research comparing the WIST with other tests has been conflicting, but with more studies suggesting moderate convergent validity with the Sc and F scales of the MPMI and other tests which objectively measure cognitive abilities. The results of the present study would support the contention of the majority of studies which demonstrate moderate convergent validity for the WIST Error score and other tests which measure disordered thinking.

Several issues involving the use of the WIST as an objective measure of schizophrenic thinking and as a useful clinical tool, are raised by the results of this study. Whitaker (1980) presents several methods of scoring the WIST in his manual. He is in favor of using the Index score which is a combination of Errors and Time scores and also involves the use of additional scores from the inquiry stage. This writer did not use the inquiry scoring as a pilot study using the WIST indicated that only the most severely disturbed subjects could not correct their errors and that most subjects' errors scores did not change as a result of an inquiry phase. Furthermore, the addition of an inquiry phase introduced potentially
difficult and contaminating problems when different examiners were employed, depending on the skill and motivation of the examiner. A review of the literature employing the WIST found other researchers did not employ the inquiry phase in these studies. The value of an inquiry as a clinical tool is not disputed but in terms of research, this technique is generally not employed and may present more problems than it's worth.

Whitaker (1980) presents information that suggests that the WIST Index score is the most useful way to utilize the WIST. The present study could find little merit in Whitaker's (1980) claim.

The only significant relationship demonstrated by the WIST Time or Index scores occurred when the factor of number of days between admission and testing and the MCMI diagnosed affective were analyzed. No other significant relationships were discovered between the WIST Time or Index scores and any other variable in this study. The WIST Error score, which was significantly related to several variables in this study, appears to be the most useful measure of disordered thinking and the most efficient method of scoring and interpreting the WIST.

The WIST administration involves relatively little time, the clinician might be well advised to record the time and conduct an inquiry if the intent is to glean as much information as possible from the test. However, if
the WIST is to be used as a brief screening device, or is used in a group setting, where individual timing is difficult, results from this study suggest that little information would be lost if times were not recorded and Error scores alone were employed.

The issue of exactly what the WIST measures is certainly open for discussion based on the literature and the results of this study. The WIST was reported to measure generalized cognitive deficits rather than deficits specific to schizophrenic thinking in several studies; (Klinger, et al., 1977; Simpson, Bourne, Justensen and Rhodes, 1979; Dobson and Neufield, 1980; Knight, Epstein and Zielong, 1980; and Phillips, Phillips and Shearn, 1983).

The degree of positive correlation between the WIST Error scores and the psychotic thinking scale of the MCMI established in this study does not solve the controversy involving the definition of schizophrenic thinking or whether the WIST and the MCMI are measuring exactly similar thinking disorders. However, several useful conclusions can be drawn from the empirically established relationship between these measures. First, schizophrenic thinking as defined by Whitaker (1980) covaries with psychotic thinking as defined by Millon (1982). Psychotic thinking may be conceptualized as a broad category of thinking within which schizophrenic thinking falls. The
relationship is far from a perfect one, however. Secondly, efforts to establish a single differential deficit specific to thought disorder among schizophrenics have been largely unsuccessful. The WIST which was designed for such a task, probably best measures psychotic thinking in a broader sense rather than disordered thinking specific to schizophrenia. Such measurement is useful and valid and does not negate the value of the WIST as a clinical or research tool.

Finally, the use of the WIST is best confined to a screening instrument designed to objectively measure the level of thought disorder evident in individuals who may or may not be schizophrenic. Such measurement can be most efficiently accomplished using the WIST Error score rather than the Index score comprised of Errors and Time. The time factor was not found to be related to the MCMI scores or other variables in this study. This approach to WIST scoring would permit group administration and improve the efficiency and utility of the instrument.

Since the MCMI did not diagnose enough schizophrenics to test Hypothesis Two as stated, the MCMI was used to divide the subjects in this study into diagnostic groups to evaluate further whether thought disorder, as defined by the WIST scores, could be used to differentiate major diagnostic groups. The basic question evaluated by this procedure is whether the level of thought disorder between
diagnostic groups is significantly different as measured by the WIST.

The statistical analysis of data relevant to this question did not allow rejection of the null hypothesis at a P<0.05 level of significance, although it could be rejected at a P<.0843 of significance for the WIST Error score. Interpretation of these results is difficult for several reasons. Although it has been established that a degree of convergent validity exists between the WIST Error score and the (SS) psychotic thinking scale of the MCMI, the performance of the MCMI in terms of diagnosis must be questioned. Table 2 in the results section reveals that of 88 patients administered the MCMI, only six received a diagnosis in the broad schizophrenic category which included one paranoid schizophrenic, two schizoaffectives and three schizophreniforms while 17 others received diagnoses that could be defined as psychotic.

Hospital records indicate that 71% of the patients hospitalized in 1981-82 were diagnosed as schizophrenic by hospital staff and that 61% of the patients in this study were diagnosed as schizophrenic by the same procedure. Given that these diagnoses may not be reliable, and may tend to view schizophrenia in the broad Bleulerian sense described earlier in this study, it could be predicted that a DSM-III based, computer-scored test would diagnose fewer schizophrenics. However, the fact that only six
patients were diagnosed as schizophrenic on the MCMI with the type of sample employed in this study suggests that problems exist with this method of establishing diagnoses. A review of Millon's (1982) manual for the MCMI reveals that adequate convergent validity has been established with other tests that are routinely employed to measure psychopathology in a broad range of clinical samples. Several possible explanations for the extremely low frequency of schizophrenic diagnoses on the MCMI can be considered. Part of the discrepancy between the expected and actual results on the MCMI can be explained by the tightening of criteria for schizophrenia in DSM-III. Spitzer, Andreason and Endicott (1978) suggest that patients formerly diagnosed as schizophrenic may receive other diagnoses of a psychotic nature, such as schizophreniform or acute paranoid disorder under DSM-III criteria. Table 2 indicates that the trend may have occurred with the sample in this study since five of the schizophrenic diagnoses were actually either schizophreniform or schizoaffective. The dispersal of schizophrenic diagnoses into other related catagories is partial explanation for extremely low incidence of schizophrenic diagnoses by the MCMI.

Harrow and Miller (1980) suggest that a major problem with schizophrenic individuals involves an impaired perspective of the idiosyncrasy of their own behavior.
These authors reached several interesting conclusions regarding impaired perspective and schizophrenia: a) Some impaired perspective is common to all types of patients when judging their own behavior; b) Schizophrenics have a greater tendency to demonstrate impaired perspective than do non-schizophrenics; c) Loss of perspective about one's verbalizations is related to a tendency to produce disordered speech; d) The loss of perspective is greater when evaluating one's own speech and behavior than when evaluating the speech and behavior of others; e) Impaired perspective concerning broad conceptual standards may be an important component in schizophrenia and other disorders where disordered speech and behavior are demonstrated.

If it can be accepted that schizophrenics, indeed psychotics, in general, have a diminished ability to accurately perceive their own problems, then it is very possible that this impaired perspective will become evident on self-report inventories, such as the MCMI. These individuals would have a tendency to under-report problems, especially ones that were related to psychosis or schizophrenia. If problems related to psychosis or schizophrenia are under-reported on the MCMI, then it is unlikely that a valid diagnosis of schizophrenia could be established by that instrument. The large number of unspecified Axis I diagnoses may be a reflection of the
tendency of schizophrenic individuals to under-report their symptoms.

Another possible reason why so few schizophrenics were diagnosed by the MCMI is related to the impaired perspective problem. The individual may pay more attention to unpleasant feelings or anxieties and report these symptoms more intensely than those symptoms of disordered thinking of which they are least likely to be aware. The result would be an increase in the number of diagnoses of neurotic, or affective disorders.

Another possible reason for the MCMI's apparent under-reporting of schizophrenic diagnoses may well be the test itself. Millon (1969, 1981, 1982) clearly focuses on Axis II diagnoses and views symptoms as rather transitory reflections of the basic personality patterns. This emphasis on basic personality rather than symptoms may be theoretically sound but could result in less attention to, and measurement of, Axis I symptoms.

A final reason for the extremely low number of schizophrenics reported by the MCMI could be that there were only six schizophrenics in the sample of eighty-eight subjects at KRPH. This is clearly not the case as many of the subjects in this study have long histories of diagnoses of schizophrenia and would meet all other known criteria for that disorder.

To compensate for the MCMI's low level of...
schizophrenic diagnoses, patients with psychotic disorders were grouped together to form a psychotic group and their performance on the WIST Error score was compared to that of affectives, neurotics, substance abusers and those patients receiving an unspecified diagnosis. While the results of this comparison were not significant at the $P<0.05$ level, significance at the $P<.0843$ level suggests the possibility of some differences.

The results of the pairwise contrasts of the five MCMI groups' WIST Error score means produced significant $P<0.10$ differences between the unspecified and substance abuse groups and the psychotic, affective and neurotic groups. The differences in WIST performance are generally divided between subjects who received clinical diagnoses, (psychotic, affective and neurotic) and those who reported substance abuse problems or didn't report enough problems to receive a MCMI diagnosis, (unspecified group). These differences are statistically weak, due to the variability of subjects' performance, and questions regarding the performance of the MCMI as a diagnostic tool. It is logical to assume that patients diagnosed with psychotic disorders or affective disorders would perform in a similar fashion since Pope and Lupinski (1978) and Donlon (1979) noted similarities between schizophrenic and affective psychosis. The neurotic group had a lower mean WIST Error score than the psychotic and affective groups.
but this difference wasn't significant. The broad category of neurotic disorders may have included patients who reported symptoms of anxiety or dysthymia but were actually schizophrenic. This situation might explain the lack of significant differences between the neurotic group and the affective and psychotic groups. Substance abusers and patients who are accurately reporting few symptoms could logically be expected to demonstrate disordered thinking at a lower level than patients who are reporting more severe psychological problems. It would appear that grouping patients in broad diagnostic categories introduces great variability within groups which may obscure any true differences in levels of thought disorder as measured by the WIST Error score.

Given the limitations of the MCMI previously described what can be said about the relationship between thought disorder as measured by the WIST and diagnosis as measured by the MCMI? There does appear to be a weak relationship between diagnosis and thought disorder for the psychotic, affective and neurotic groups when compared with the substance abuse and unspecified groups. The level of relationship and the overall weaknesses of both instruments in terms of their intended functions in this study does not allow this writer to conclude that that establishment of a thought disorder is a valid criterion for diagnosis of schizophrenia. Patients from all
diagnostic classes can demonstrate disordered thinking. Disordered thinking is not unique to schizophrenia and cannot be considered to be a valid or reliable way of diagnosing schizophrenia. Undoubtedly, disordered thinking is part of the syndrome of schizophrenia but attempts to study it as a unitary phenomenon will produce conflicting and contradictory results as evidenced by the literature discussed in this study and by the results of the study itself.

The poor reliability of psychiatric interview diagnoses has been documented in this study. The hypothesized problems of the MCMI when used to diagnose schizophrenia have been discussed in this chapter. Hypothesis Three was an attempt to more clearly compare diagnostic procedures and analyze what relationship exists between them as they were employed in this study. The diagnostic procedures in this study start with the same basic categories for Axis I symptoms. However, the ICD-9-CM categories, used by the hospital, while very similar to DSM-III Axis I categories, encourage clinicians to use their own belief systems and introduces significant bias into the diagnostic process. Pressure is placed on psychiatrists to "find" schizophrenia in highly disturbed patients so they can be committed and receive treatment. Judges, prosecutors, attorneys and the public, in general, recognize the term schizophrenia as a serious mental
disorder and the patient is much more likely to be committed to a public mental hospital with a diagnosis of schizophrenia than with a character disorder diagnosis. It should also be noted that half of the sample had been to the hospital before and received a diagnosis at that time. Once a patient has a diagnosis of schizophrenia, it is likely to be with them for life. The end result of these various forces is that schizophrenia is overdiagnosed with the hospital diagnostic procedure. This conclusion is consistent with findings that American psychiatrists diagnose schizophrenia at a much higher rate than do their European counterparts.

The probability that the MCMI underdiagnoses schizophrenia has already been discussed by this writer. Given the error in opposite directions for the diagnosis of schizophrenia by the two methods in this study, the degree of relationship between these two methods could be predicted to be low. The results of the statistical procedures used to test for a relationship between diagnoses, as described in Hypothesis Three revealed that no relationship of any kind could be detected for either the diagnosis of schizophrenia or the broader category of psychosis. Clearly a problem exists in terms of accurate diagnosis of schizophrenia. This isn't surprising when one considers the conflicting theories, research results and diagnostic belief systems related to schizophrenia.
The relationship of disordered thinking to the diagnosis of schizophrenia can be compared using the two diagnostic methods in this study. The diagnostic procedure of using the MCMI and WIST did show some degree of relationship between the level of thought disorder and the general diagnostic categories. It was not possible to test for the relationship between schizophrenia and thought disorder due to the extremely low number of schizophrenics identified by the MCMI. As discouraging as this performance is, it wins, by default, over the hospital method of diagnosis. When the relationship between a diagnosis of schizophrenia by hospital methods and WIST Error scores was analyzed, no relationship of any kind could be discovered. The hospital method appears to be the greater of two evils in terms of its relationship to thinking disorders. If a diagnostic method has low reliability, this problem will also affect the validity of diagnoses and cloud any possible relationship with the variable of disordered thinking.

The examination of the independent variables of age, sex and number of days in the hospital produced some interesting results which need clarification.

The relationship between sex and WIST Errors scores was not significant but when age and sex were analyzed, a relationship between WIST performance, females and age was discovered. This relationship was a positive one and
suggests that age and WIST Error scores covary for females. No such relationship was discovered for males. Lewine (1981) presents a review of studies of sex differences for schizophrenics which provides some interesting findings that may relate to the age-sex results of this study. The onset of schizophrenia in men is earlier than that for women. This trend is documented from: Bleuler (1950); Kraepelin (1919); Landis and Page (1938); McCabe (1975) and numerous other authors (Lewine, 1981).

The average age of women in this sample was 38.6 years while the average age of the men was 32.0 years. Lewine (1981) also presents a summary of his review of the literature and finds that a general picture of poor premorbid adjustment, early onset, typical schizophrenia in men, and good premorbid adjustment, late onset and atypical schizophrenia in women. Seeman (1981) presents interesting biological explanations for sex differences in schizophrenia. The man's early onset is viewed as increased vulnerability to schizophrenia which could be influenced by several factors. Intrauterine stress, fetal androgens and hemispheric specialization in males may increase vulnerability to schizophrenia. Estrogens may play a protective role by inhibiting transmission of dopamine, especially in adolescence while cyclic estrogen may sensitize dopamine nerve cells and may be associated
with later onset of schizophrenia in women. The expression of thought disorders may be related to age in females because of the tendency for later onset of the entire schizophrenic syndrome. The finding in this study of a relationship between sex, age and WIST performance lends support to the issues raised by Lewine (1981) and Seeman (1981), and certainly warrants further research in the area of sex differences in schizophrenia.

A powerful inverse relationship between days in the hospital and WIST Error score performance for the MCMI diagnosed affective group was discovered. The results lend support to the claim that a major difference between psychosis found in schizophrenia and psychosis found in affective disorders is that in affective disorders the psychosis remits more quickly. This may be a function of the effectiveness of lithium as a treatment or of the general positive prognosis associated with affective disorders when compared to schizophrenic disorders. Pope and Lupinski (1978) present impressive evidence to suggest that schizophrenic symptoms, including disordered thinking are found in many cases of affective disorders. These authors also indicate that 53% of the patients diagnosed as schizophrenic in 11 American mental hospitals received diagnoses other than schizophrenia when included in various research projects. It is likely that many such "hospital schizophrenics" would be reclassified as having
affective disorders. Evidence from the present study concerning schizophrenics and affectives is that performances on an objective measure of thought disorders are remarkably similar in terms of degree of thought disorder, but different in terms of how long disordered thinking lasts. The controversy over the uniqueness of disordered thinking to schizophrenia is best exemplified by the problems differentiating disordered thinking in schizophrenics and affectives.

Finally, the results of the Axis II diagnoses for this sample need to be discussed. Each subject in this study received an Axis II diagnosis and Table 10 summarizes those results. An in depth analysis of the relationship of these diagnoses to schizophrenia or thought disorder is beyond the scope of this study; however, several issues are pertinent to the results already presented here.

The focus of this study has been on symptoms, specifically the symptom of thought disorder. The literature was reviewed and it presented a trend of first organizing a wide range of symptoms into groups to differentiate various mental disorders. The concept of symptom clusters as pathognomic to mental disorders, especially schizophrenia was moderated by theorists like Freud, Sullivan and Arieti, to mention only a few, who recognized the uniqueness of the individual. The individual's basic personality style was viewed as a
contributing factor in terms of schizophrenic symptomatology including disordered thinking. This trend to recognize the individual's uniqueness was again suppressed with the resurgence of the medical model which views schizophrenia as a disease with specific biological precursors. It now appears that the individual is again recognized as important with the advent of DSM-III and its multi-axis format. The preeminence of Millon (1969, 1981, 1982) and his view of psychopathology which emphasizes the basic personality patterns and views symptoms as relatively transitory extensions of the personality, also suggests that human uniqueness is once again of importance. The mixed results of this study suggest that the symptom of disordered thinking is related to schizophrenia and psychosis but also to other forms of psychopathology. Thought disorder is not unique to schizophrenia and is not a reliable or valid method of differential diagnosis. By recalling that all subjects in this study had their own personality pattern as reflected by their Axis II diagnoses, we may learn more about the cluster of symptoms defined as schizophrenia. Certainly this study has demonstrated that diagnosis of schizophrenia by symptoms, including thought disorder has not been reliable. The next decade's research using the multi-axis format of DSM-III may well provide new and valuable insights into thought disorders diagnosis and schizophrenia.
CHAPTER V

SUMMARY

Summary and Conclusions

The purpose of this research was to examine the relationship between thought disorder and the diagnosis of schizophrenia. Thought disorder has long been recognized as a fundamental symptom of schizophrenia. The definition of thought disorder and its degree of importance in the schizophrenic syndromes have been, and continue to be sources of disagreement among experts in the field. The entire concept of schizophrenia has been conceptualized in many ways ranging from a discreet disease entity, to a myth of modern psychiatry. Modern research has produced conflicting conclusions regarding schizophrenia and thought disorder. Researchers have tried to identify specific differential thinking deficits that are unique to schizophrenia. These attempts have generally been unsuccessful.

Large numbers of individuals are presently suffering from schizophrenic symptoms and are being involuntarily hospitalized and treated with powerful medications. Treatment has always been based on the assumption that the disease or problem can be accurately diagnosed. Diagnosis has always been made based on identification and
measurement of symptoms.

This study has attempted to test whether the degree of thought disorder, identified as the major symptom of schizophrenia, is related to the diagnosis of schizophrenia. In order to test this general research question the Whitaker Index of Schizophrenic Thinking (WIST) Whitaker (1980) was employed to measure the degree of thought disorder. The problem of accurate diagnosis of schizophrenia has plagued research on schizophrenia. The Millon Clinical Multiaxial Inventory (MCMI) Millon (1982) was employed in an attempt at achieving reliable and valid diagnosis.

The sample for this study was drawn from Kalamazoo Regional Psychiatric Hospital (KRPH), a large state run mental hospital. Subjects were selected from the four admission units at KRPH between January 1983 and June 1983. A total number of 88 patients, 58 males and 30 females were included in this study. All patients entering the admission units were evaluated for their ability and willingness to participate in this study. Patients were excluded if they were judged too psychotic or agitated to meaningfully complete the two criteria instruments. Since participation was voluntary, many patients refused to be involved in this study. Patients were also excluded if they were brain damaged, retarded or unable to read at the eighth grade level. The criteria instruments, the WIST and
the MCMI were administered consecutively to all subjects. The WIST was scored by this writer according to procedures delineated by Whitaker (1980). The MCMI was scored by computer and each patient was diagnosed by the computer. Diagnoses generated by the clinical judgement of the hospital psychiatrists were recorded also.

Three statistical hypotheses were developed and presented in null form.

Hypothesis One stated that, "there will be no relationship between the WIST Error and Time scores and the MCMI psychotic scale scores; psychotic thinking (SS), psychotic depression (CC) and psychotic delusions (PP)."

Significant P<0.05 positive correlations were discovered between the WIST Error scores and the MCMI (SS) (0.36) and (CC) (0.31) scale scores, all other relationships were not significant. Thus, the null hypothesis could not be rejected. These results suggest that a modest relationship exists between the construct of schizophrenic thinking as defined by Whitaker (1980) and psychotic thinking and psychotic depression as defined by Millon (1982). Both tests are different in their design and method of measurement so the correlations discovered, modest as they are, suggest that there is validity to the construct of thought disorder and that it can be objectively measured.
Hypothesis Two stated, "there will be no differences between the mean WIST scores of schizophrenics and non-schizophrenics as diagnosed by the MCMI."

The MCMI did not diagnose enough schizophrenics to meaningfully test this hypothesis. Patients were grouped into five general diagnostic classes: psychotic, affective, neurotic, substance abuse and unspecified disorders, to test whether a difference existed in their WIST scores. Analysis of variance indicated a difference between groups at a probability level of $P<0.843$. A general pattern emerged where the psychotic, affective and neurotic groups scored significantly $P<0.10$ higher on the WIST Error score than the substance abuse and unspecified groups. The differences are difficult to interpret due to the high probability of sampling error accepted. However, the WIST appears to be successful in differentiating clinical diagnoses from those patients with drug and alcohol problems and those patients with low self-reports of symptoms.

Hypothesis Three stated, "there will be no relationship between the diagnosis of schizophrenia generated by clinical judgement (hospital method) and psychological tests (MCMI)."

The low frequency of schizophrenic diagnoses produced by the MCMI, six, can be contrasted with 54 subjects diagnosed as schizophrenic by clinical judgement.
Agreement on the diagnosis of schizophrenia was reached on only two patients out of the sample of 88. Agreement on non-schizophrenics was reached on 30 patients. Apparently it is much easier to tell when individuals aren't schizophrenic than to diagnose them as schizophrenic. No systematic relationship was discovered between the two diagnostic methods so the null hypothesis could not be rejected. No systematic relationship was identified between the ability of the two diagnostic methods to identify patients on the psychotic or non-psychotic dimension.

The independent variables of age, sex and number of days in the hospital were analyzed with the following results. A significant $P<0.05$ positive correlation (0.54) was identified between age and WIST Error scores for females. This may relate to the identified later onset of schizophrenia in women. A strong negative correlation ($-.87$ and $-.90$) was discovered between the diagnosis of affective disorder, number of days in the hospital and WIST Error and Index scores. Disordered thinking in affectives appears to decrease the longer they stay in the hospital. This finding is consistent with research that indicates that the major difference between affective psychosis and schizophrenic psychosis is that affectives improve more rapidly.

The MCMI diagnoses were more highly related to the
objective measure of disordered thinking than were the hospital diagnoses. The frequencies of Axis II diagnoses were reported to suggest that the concept of diagnosis by symptoms may be an inadequate method of accurately describing human beings.

The WIST appears to be an objective instrument that measures psychotic thinking or general cognitive impairment rather than schizophrenic thinking as claimed by Whitaker (1980). The WIST Error score is the most useful way to employ the WIST as the Time and Index scores demonstrated minimal relationships with the variables in this study.

The performance of the MCMI was a disappointment. This instrument has been useful to this writer clinically and seems to accurately describe Axis II personality characteristics. However, the fact that only one schizophrenic and five schizophrenic-related patients were identified out of a sample that includes many schizophrenics by any other standard, suggests that the MCMI may have failed to identify schizophrenics accurately. This may be because of impaired perspective of severely disturbed patients on a self-report inventory. Test design problems or diagnostic criteria employed in the computer program used to derive diagnoses may be at fault. Further research with the MCMI and severely disturbed samples is necessary to resolve the issue.
Recommendations

Since this project will certainly come under scrutiny from educators and clinicians, this writer reserves first opportunity for its evaluation. The wisdom of hindsight allows for several changes in this project if it were to be attempted again. A major problem with this study was the heterogeneity of the sample. Efforts to reduce the sample heterogeneity could include several changes in methodology. The present study collected data from four different admission units to provide a representative sample of the hospital population. A better strategy might have been to collect data from one unit where this writer had more control over data collection and greater clinical awareness of when subjects were ready to be tested. This would also serve to eliminate sex as a variable as only males would be tested. This would be a trade off in that only generalizations to males could be made, but heterogeneity would be reduced. Tighter time restrictions, such as originally proposed in this study, could reduce the treatment effects of the hospital on the sample and therefore reduce heterogeneity.

Problems with diagnostic reliability were a major factor in this study. The weaknesses of both diagnostic methods have already been detailed. While useful information was generated by using the MCMI for diagnosis, this writer would not use it for this purpose again. The
use of a multi-member rating team and one of several possible diagnostic rating scales such as, The New Haven Schizophrenia Index, Feighner Criteria or Research Diagnostic Criteria might provide more reliable and valid diagnoses for schizophrenia. The logistical problems involved in gathering and training a rating team to function at the research site precluded use of such rating scales for this study. The heterogeneity of the subjects at the research site and the variable and unpredictable nature of schizophrenic symptom expression suggests that large samples of subjects may be necessary to clearly delineate the relationship between thought disorder and schizophrenia. A sample size of 88 is not small for an individual student researcher; however, this sample size may well be increased tenfold to more clearly answer the research questions.

Finally, some comments on the nature of schizophrenia from the perspective of one who has spent two years researching, preparing and completing this project. For five years this writer has worked closely with many individuals labelled as schizophrenic in a hospital setting. These individuals share many common characteristics that are loosely clustered together and called schizophrenia. What is most striking however, is the differences in these individuals rather than their commonalities. These differences are reflected in terms of
individual strengths, weaknesses, interests and characteristic ways of dealing with their environment. Some individuals improve and go on to function relatively well in society. Others regress and need to spend their lives in a hospital. Still others end their own lives because they can not escape the misery of their symptoms.

The concept of schizophrenia as a single disease process or a unitary phenomenon is not creditable to this writer. The recent return to the Kraepelinian concept of schizophrenia which involves poor premorbid adjustment, early onset and poor prognosis appears most valid and clinically useful. DSM-III conceptualizes schizophrenia in such a fashion. The inclusion of the multi-axis format for diagnosis is also useful because it allows the clinician to evaluate the basic personality style and environmental influences of each individual. Symptoms, including thought disorder, are important but they should be viewed in the context of each unique individual's total personality and life situation.
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