

THE MMPI AND DSM-III DIAGNOSES:
AN INVESTIGATION OF
SELECTED CODETYPES

By

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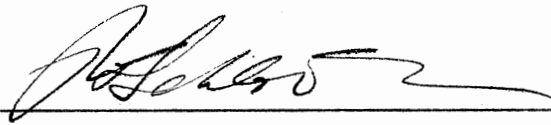
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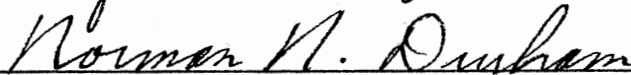
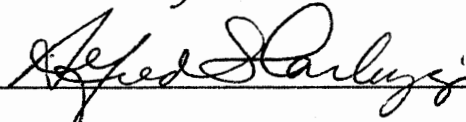
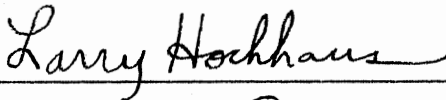
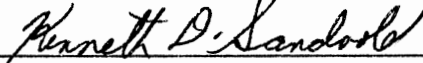
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CHAPTER I

INTRODUCTION

Since its inception nearly five decades ago, the Minnesota Multiphasic Personality Inventory (MMPI) has become perhaps the most widely used and widely researched personality inventory. The test authors, S. Hathaway and J. McKinley, desired to produce an instrument which would serve "as an objective aid in the routine psychiatric case work-up of adult patients" (Hathaway, 1965, p. 463). Today, this desire has come close to realization for the MMPI is used extensively in the psychological assessment of psychiatric populations.

Hathaway and McKinley began work on the MMPI in 1937 hoping to develop an instrument which would effectively supplant the time-consuming diagnostic interview (McKinley & Hathaway, 1943). Following preliminary research, the first MMPI scale, designed to identify hypochondriacal tendencies in psychoneurotic medical patients, was published in 1940 (McKinley & Hathaway, 1940). Subsequent to this initial study, publication of additional MMPI scales continued over the next several years. By 1946 work had been completed on the basic clinical scales and validity scale development was, for the most part, complete by 1948 (Colligan, Osborne, Swenson, & Offord, 1983).

Although it had initially been hoped that individual clinical scales would be useful for diagnostic differentiation, clinical application and resulting research in the years immediately succeeding

the publication of the initial studies indicated that this was not to be forthcoming. Rather than having a single scale elevated, it was found that psychiatric patients would more often than not have elevations on several scales. Thus, data began to amass suggesting that certain combinations of scale elevations, or "codetypes", were more commonly associated with certain diagnostic groups than with others.

With the rapid accumulation of both clinical and research data on characteristics underlying various profile configurations, it soon became apparent that users of the MMPI would benefit from an integration of these data into an easily accessible reference work. Landmark among such early works was the publication of the Atlas by Hathaway and Meehl in 1951. This Atlas consisted of a collection of 968 short case histories organized on the basis of high-point codetypes. It was intended to aid the clinician "by a kind of 'consultative' looking up of cases" (p. iii) with similar codetype patterns. In addition to case history summaries, information was included concerning such things as demographic data and psychiatric diagnoses.

Although such reference works were of some clinical usefulness, their applicability was limited because the information contained therein was not empirically determined and "the user was left to find what validity he could in relating the accounts to MMPI codes" (Hathaway, 1972, p. xiii). This need for an empirical basis in MMPI interpretation was highlighted by Paul Meehl's (1956) oft cited call for a "good cookbook" based on empirical determination rather than clinical "rules-of-thumb."

The first work to provide MMPI codetype descriptions which were actuarially (statistically) rather than theoretically or anecdotally

determined was published in 1963 by Marks and Seeman. The 1974 revision by Marks, Seeman, and Haller consisted of a reprinting of the original 1963 adult data with minor changes in codetype classification rules and provided new data on adolescent actuarial interpretation. This system developed by Marks and colleagues is now one of the most well-known and widely used of the MMPI guides to actuarial interpretation.

Marks et al. (1974) provide empirically derived descriptions for 16 of the most common adult codetypes found in their psychiatric population. For each codetype, descriptive narratives were empirically derived from case history information, mental status descriptors, and Q-sort statements. Additional actuarial information is presented concerning psychometric data and psychiatric diagnoses. With the advent of actuarial systems such as those developed by Marks et al., the practicing clinician was, for the first time, able to interpret MMPI profiles with some degree of empirical security.

That the actuarial system developed by Marks and colleagues was, and continues to be, a useful tool in MMPI codetype interpretation cannot be denied. But for the adult actuarial data, the Marks et al. (1974) system is essentially a reprint of the 1963 Marks and Seeman system and now, some twenty-five years later, the system is beginning to show signs of age. To what extent the changes in psychiatric knowledge over the last two decades have affected the utility of the Marks et al. system remains open to investigation.

One question which has arisen addresses the validity of the Marks et al. (1974) system when operating under present-day diagnostic classification standards. The current psychiatric nosology as defined by the third edition of the Diagnostic and Statistical Manual of Mental

Disorders (DSM-III; American Psychiatric Association [APA], 1980), differs greatly from the diagnostic classification system (DSM-I; APA 1952) which prevailed during the time the Marks and Seeman (1963) system was developed. The differences between these two systems of diagnostic classification are of such magnitude (Spitzer & Williams, 1980) that codetype descriptors developed under DSM-I classification may not hold true under the current DSM-III classification. Recent research has begun to investigate the applicability of traditional MMPI codetype interpretations under the presently defined DSM-III diagnostic categories (Vincent et al., 1983; Walters, 1984; Walters, 1983; Winters, Newmark, Lumry, Leach, & Weintraub, 1985; Winters, Weintraub, & Neale, 1981).

Of specific interest in several of the above studies (Walters, 1984; Walters, 1983; Winters et al., 1985; Winters, et al., 1981), has been the differentiation of schizophrenic and affective disorders by MMPI codetype. Recent studies of the differential diagnoses of schizophrenic and affective disorders (Haier, 1980; Helzer, Brockington, & Kendell, 1981; Pope & Lipinski, 1978; Taylor, Gaztanaga, & Abrams, 1974; Tsuang & Simpson, 1984) indicate that this diagnostic distinction has historically been, and continues to be, a particularly difficult one to make irrespective of the diagnostic tools applied. Although this distinction remains difficult, it is becoming an increasingly important one to make due to the development of efficacious differential chemotherapy (Pope & Lipinski, 1978).

The present study attempted to investigate the utility of the Marks et al. (1974) actuarial system of MMPI interpretation for the differential diagnoses of schizophrenic and affective disorders as

defined by the present-day diagnostic classification scheme of DSM-III. The Marks et al. (1974) MMPI codetypes selected for this study were the 2-7-8/8-7-2, 2-8/8-2, 6-8/8-6, and 8-9/9-8 codetypes. Evidence in the literature suggests that these codetypes may be of special relevance in the distinction between schizophrenic and affective disorders.

CHAPTER II

LITERATURE REVIEW

Development of MMPI Interpretation

Although the specific impetus which prompted Hathaway and McKinley to begin work on the development of the MMPI appears muddled by the intervening years, a general dissatisfaction with the assessment procedures of the day seems to have played an integral role (see Colligan et al., 1983 for a discussion of the historical development). Developed during an era when diagnosis of psychiatric patients was of paramount importance, it was hoped that patients could be easily identified and characterized by the MMPI with a "minimum use of the time consuming interview technic" (McKinley & Hathaway, 1943, p. 161).

The original clinical scales were developed by empirically determining items which differentiated between groups of normal subjects and diagnostically identified patient groups. By using this approach, the intention was to develop clinical scales which would successfully classify patients by diagnostic category. However, as noted earlier, this ease of diagnostic assignment was not to be. Most clinical MMPI profiles contain some combination of elevated scales, and the original hope for diagnostic assignment by single scale elevation proved untenable.

Although single MMPI scales proved less useful in the assignment of specific diagnostic categories than was the original intention, the

development of configural analysis added a dimension of complexity and descriptive diversity which is in a large measure responsible for the popularity of the MMPI today (Graham, 1977). The value of the MMPI in current clinical practice is primarily due to the description of personality characteristics which can be generated from the resulting profile analysis. In addition to personality descriptions, research has shown that certain diagnostic categories are often associated with specific codetype configurations. This association, however, is a good deal more complex than was the original intention of the test developers.

From the above, it is seen that the current clinical value of the MMPI lies in the research that has accumulated concerning its application. In contemporary clinical practice, the actuarial method of MMPI interpretation has come to be accepted as the standard. Although several MMPI interpretive systems currently exist (e.g., Gilberstadt & Duker, 1965; Graham, 1977; Gynther, Altman, & Sletten, 1973b; Lachar 1968, 1974; Lewandowski & Graham, 1972), the Marks et al. (1974) system is the only one which is truly actuarial and remains one of the most widely-used and widely-researched.

Classification of MMPI Codetypes

The MMPI consists of 13 scales, each of which receives a separate score. Three of the 13 scales, labeled F, L, and K, are considered "validity" scales and provide information which can assist in identifying defensive or deviant response sets as well as attempts to respond in an overly virtuous fashion. The remaining 10 scales, numbered 1-9 with the tenth scale numbered 0, are considered "clinical"

scales, and provide information regarding various psychological and characterological aspects of personality.

Scores on each of the 13 MMPI scales are converted to T-scores with a mean of 50 and a standard deviation of 10. T-scores are plotted on an MMPI profile sheet and the resulting profile is then determined. An MMPI "codetype" generally refers to the two, or in some cases three, most highly elevated scales. For example, reference to a 2-4 MMPI codetype indicates that the clinical scales of 2 and 4 were the two most highly elevated in this specific MMPI profile. Research and experience over the years have indicated that some MMPI codetypes occur with much greater frequency than do others. It is these frequently occurring codetypes which have come to form the basis for the actuarial interpretive systems.

Marks et al. Actuarial System

The Marks et al. (1974) actuarial system for adults provides actuarial data for 16 MMPI codetypes which occurred with the greatest frequency in their research. Although the original Marks and Seeman (1963) system relied on complex configural rules for profile classification, codetypes in the 1974 revision are, for the most part, based upon a simple classification scheme of the two or three most highly elevated clinical scales. Research subsequent to the initial publication (Gynther, Altman, Warbin, & Sletten, 1972; Lewandowski & Graham, 1972), and the ensuing reassessment of the original Marks and Seeman (1963) codetypes, indicated that little accuracy was lost in employing this simpler classification scheme.

For each of the 16 Marks et al. (1974) codetypes represented,

various actuarial data are reported. Information on intelligence measures, diagnoses, and codetype descriptors are presented. Descriptive narratives for each codetype were derived from several sources. For patients representative of each codetype, 108 Q-sort statements consisting of short personality descriptors were sorted by clinicians who were involved in the patient's treatment, and from that sorting significant descriptors were determined. Significant descriptors were also determined from case history data, mental status schedules, and symptoms/complaints checklists. Descriptors from the above categories which deviated significantly from the base rate (positively or negatively) were retained, and narrative summaries were composed for each codetype.

Information on the frequency of psychiatric diagnoses for each codetype is also included. Diagnostic information reported for each codetype included the frequency of occurrence of major diagnostic syndromes followed by the most frequently occurring subcategory or categories within each major syndrome. Major diagnostic syndromes included were psychoneurosis, psychosis, personality disorder, and brain syndrome.

Inspection of the diagnostic data for the 16 codetypes reveals that a majority of codetypes received a predominate major diagnosis of psychosis. For seven of the 16 codetypes, a major diagnosis of psychosis was given to at least half of the index cases. For three codetypes, psychoneurosis was diagnosed for greater than 50% of the index cases, and two codetypes received diagnoses of personality disorders in over 50% of index cases. There was not a predominate diagnosis under which at least 50% of the index cases were classified

for the remaining four codetypes.

All seven of the Marks et al. (1974) codetypes classified as psychotic received a subtype diagnosis of schizophrenia. Four of the seven codetypes, 4-6/6-4, 4-8-2/8-4-2/8-2-4, 8-6/8-6, and 9-6/6-9 received a predominate diagnosis of paranoid schizophrenia. The 8-9/9-8 codetype received a predominate diagnosis of mixed schizophrenia, the 2-7-8/8-7-2 codetype was predominately diagnosed as chronic undifferentiated schizophrenia, and the predominate diagnosis for the 8-2/2-8 codetype was schizoaffective schizophrenia.

As seen, almost half of the Marks et al. (1974) codetypes have some type of schizophrenia listed as the predominate diagnosis in the actuarial description. In considering the current applicability of the Marks et al. actuarial diagnostic data, the differences between the current and past diagnostic classification schemes become relevant.

The Diagnosis of Schizophrenia

That so many of the index patients for the original Marks and Seeman (1963) study were diagnosed as schizophrenic is not surprising when one considers the era in which this study was conducted. The period between the early 1950's and the early 1960's saw a greater percentage of psychiatric patients in certain American psychiatric institutions diagnosed as schizophrenic than at any other time in history (Beavers, 1974; Kuriansky, Deming, & Gurland, 1974).

The rise in the diagnosis of schizophrenia during that decade appears not to have resulted from an increase in the actual incidence of schizophrenia, but from the broad definition of schizophrenia which was sanctioned during that time (Kuriansky, Deming, & Gurland, 1974; Neale &

Oltmanns, 1980). In discussing the concept of schizophrenia employed during this era, Neale and Oltmanns cited what they considered to be factors which contributed to this broad definition. Principal among these factors was the inclusion of disorders which resembled schizophrenic disorders in symptomology but which were not schizophrenic in nature. Cited as examples of such disorders were neurotic, affective, and personality disorders; reactive disorders with sudden onset; and schizoaffective disorders.

Pope and Lipinski (1978) concurred that the definition of schizophrenia has historically been overly inclusive. It is the contention of Pope and Lipinski that schizophrenia has been over diagnosed in the United States while the affective disorders have been underdiagnosed. The authors maintained that many "schizophrenic" patients who are acutely psychotic are more probably suffering from a primary affective disorder, most likely of a manic type. In fact, the authors speculated that there may be as many as 100,000 persons in this country diagnosed as schizophrenic who are actually suffering from an affective disorder.

Pope and Lipinski (1978) developed their arguments from a thorough review of the literature. In reviewing phenomenologic studies of mania and depression, they found the full range of symptoms usually associated with schizophrenia present in 20% to 50% of patients who were diagnosed as manic or depressed. This similarity in symptomology for affective and schizophrenic disorders may be one factor which has led to misdiagnosis. Research by Taylor and colleagues (Taylor & Abrams, 1973; Taylor, Gaztanaga, & Abrams, 1974) has found that it is not uncommon for patients with affective illness to have received a diagnosis of

schizophrenia at some point in their lives.

In reviewing prognosis and family history research, Pope and Lipinski (1978) noted that affective symptomology is often predictive of good prognosis in "schizophrenic" disorders. Additionally, "good-prognosis schizophrenics" typically have two to three times more affective illness than schizophrenia in their family history while "poor-prognosis schizophrenics" have two to three times more familial schizophrenia than affective illness. From this, Pope and Lipinski concluded that some of these "good-prognosis schizophrenics" are actually suffering from an affective, rather than a schizophrenic, disorder.

Diagnostic Criteria and DSM-III

From the above, it appears that there has been overdiagnosis of schizophrenia at the expense of other diagnostic categories, especially the categories of the affective disorders. The need for refinement in the definition of overly broad and general diagnostic concepts has been of growing concern in the field of diagnosis and classification in recent years. The progression from the DSM-I of 1952 to the DSM-III of 1980 has been one of increasingly operationalized definitions for diagnostic categories. DSM-III represents a significant departure from its predecessors in the explicitness of diagnostic criteria (Spitzer & Williams, 1980).

Due to the many inadequacies in DSM-II (APA, 1968), researchers began to develop their own explicit criteria for diagnosis. The first of such works to be published in compiled form was the product of research by Feighner et al. (1972). This research diagnostic system

provides explicit criteria for the diagnosis of 14 psychiatric disorders and remains the most highly cited and referenced of the research diagnostic systems (Blashfield, 1982).

The Feighner et al. (1972) criteria were widely used in research and were later modified and extended in the development of the Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1978). The RDC, in turn, were further modified by Spitzer and colleagues and came to form the preliminary basis for the development of many of the diagnostic categories of DSM-III (Endicott & Spitzer, 1978; Spitzer & Williams, 1980).

The DSM-III category of Schizophrenia is one such category which has its origins in the RDC and Feighner et al. (1972) criteria (Fenton, Mosher, & Matthews, 1981; Spitzer, Andreasen, & Endicott, 1978). Compared to a DSM-II diagnosis of schizophrenia, the use of explicit diagnostic criteria in the DSM-III has significantly narrowed the inclusiveness of the current diagnosis of schizophrenia. A pattern of symptomology satisfying the DSM-II criteria for schizophrenia could, for example, receive a DSM-III diagnosis of paranoid disorder, schizoaffective disorder, an affective disorder, schizophreniform disorder, brief reactive psychosis, atypical psychosis, or schizotypal personality disorder (Spitzer et al., 1978), in addition to a diagnosis of schizophrenia.

Such results have in fact been found in actual practice (Westermeyer & Harrow, 1984). For 153 patients who had been diagnosed as schizophrenic by DSM-II criteria, it was found that 62 patients were diagnosed with schizophrenia by DSM-III criteria, 38 with major depression, 17 with manic disorders, 12 with schizoaffective disorders,

9 with schizophreniform disorders, 7 with atypical or paranoid psychotic disorders, and 8 with various other diagnoses. From these examples, it is seen that the DSM-III diagnostic criteria for schizophrenia could be said to act as a "narrow band filter", excluding category membership for a significant number of individuals who would have gained inclusion under DSM-II criteria. In application, the DSM-III criteria have been found to produce a more homogenous group of "poor-prognosis schizophrenics" when compared to groups classified according to DSM-II criteria (Westermeyer & Harrow, 1984).

Selected Marks et al. Codetypes

This narrowing of diagnostic criteria for schizophrenia (as well as for other disorders) begun by Feighner et al. (1972), and continuing with DSM-III, has prompted Haier (1980) to "wonder if schizophrenia is what it used to be, or if schizophrenia ever was what it used to be" (p. 417). Such a question seems especially appropriate in considering the actuarial data on diagnoses provided by Marks et al. (1974). To rephrase Haier, is a Marks et al. (1974) "schizophrenic" MMPI codetype what it used to be or is the current schizophrenic nosology so different as to render the Marks et al. (1974) actuarial diagnostic data no longer valid? It is this question which forms the basis of the current study.

In choosing which of the Marks et al. (1974) "schizophrenic" codetypes to investigate for present-day validity, several considerations are in order. Due to the prevalence of two-point MMPI codetype systems (e.g., Gynther et al., 1973b; Lewandowski & Graham, 1972), research using two-point codes would prove most applicable. Also in consideration, Walters (1983) notes that Scale 8 is prominent in

almost all MMPI indices, formulae, and codetypes currently used to identify schizophrenics. Due to this prominence, a focus upon the differential diagnosis of codetypes which include Scale 8 seems appropriate for an initial investigation. The Marks et al. (1974) "schizophrenic" codetypes which meet the two above criteria are the 2-8/8-2 codetype, the 8-6/6-8 codetype, and the 8-9/9-8 codetype. In addition to these three two-point codetypes, there is evidence to strongly suggest that the inclusion of the three-point 2-7-8/8-7-2 codetype as a "schizophrenic" codetype should be empirically investigated. Evidence to be cited from the literature suggests that differential diagnosis of these four codetypes may be especially important.

The Marks et al. (1974) actuarial description for the 8-6/6-8 codetype reported that of the index patients in this group, 65% were inpatients. The prominent major diagnosis was Psychosis, with 68% of patients so diagnosed. Of these psychotic patients, 54% were diagnosed as having schizophrenic psychosis. Subtypes of schizophrenia present included 36% diagnosed as paranoid, 9% as chronic undifferentiated, 5% as acute undifferentiated, and 5% as hebephrenic. These patients were described as floridly psychotic and thought disordered. Delusions, grandiosity, obsessions, and fearfulness were common. These patients were suspicious and distrustful of others, and consequently, interpersonal relationships were avoided. They were also described as irritable, anxious, resentful, and sensitive to demands. Moodiness, unpredictability, and emotional inappropriateness were noted. These patients were considered uncooperative and were said to exercise poor judgment. They reported feeling inferior, guilty, and unreal. Onset of

the disorder was short and prognosis ranged from fair to poor.

For the 20 8-9/9-8 index patients, Marks et al. (1974) reported that 85% were inpatients and that 70% received a major diagnosis of psychosis. Of the psychotic patients, 65% were diagnosed as schizophrenic. Schizophrenic subtypes diagnosed included 17% as paranoid, 22% as chronic undifferentiated, 9% as affective, 9% as acute undifferentiated, and 9% as catatonic. These patients were described as paranoid, grossly delusional, and emotionally inappropriate. Disordered thought, grandiosity, and hallucinations were common. These patients were suspicious of others, afraid of emotional involvement, and maintained a schizoid adjustment. They were described as agitated, hostile, restless, and impulsive, and they reported feelings of unreality, perplexity, and disorientation. They were also described as obsessional, ruminative, and overrideational. Onset was rapid with a shorter relative duration, prognosis ranged from good to poor, and previous episodes were common.

Marks et al. (1974) reported that of the 20 2-8/8-2 index patients, 40% were inpatients. Psychosis was diagnosed for 70% of these patients with 50% receiving a diagnosis of schizophrenia. Of the schizophrenic patients, 25% were diagnosed as affective, 20% were diagnosed as chronic undifferentiated, and 5% were diagnosed as simple. These patients were described as predominately depressed. Symptomology reported included open sadness, tearfulness, suicidal thoughts and threats, retarded stream of thought, somatization, and sleep disturbances. These patients were described as tense, high-strung, jumpy, irritable, and resentful. Avoidance of interpersonal relationships was common. Obsessional and ruminative thinking were noted and these patients were described as

forgetful. Onset was prolonged and prognosis was poor.

The 2-7-8/8-7-2 codetype also consisted of 20 index patients, 65% of whom were inpatients. A major diagnosis of psychosis was present in 58% of these cases, with 38% of the psychotic patients diagnosed as schizophrenic. The majority, 33% of the 38%, of the schizophrenic patients were diagnosed as chronic undifferentiated schizophrenics. These patients were described as depressed, with symptoms of despondency, pessimism, hopelessness, and suicidal ruminations. Difficulties in thinking and concentration were reported to be quite common. These patients were described as socially isolated and as plagued by fears and anxiety. Compulsions, obsessions, and phobias were also commonly reported. Prognosis was generally divided between fair and poor.

Although the descriptive narratives varied significantly for these four Marks et al. (1974) codetypes, each was diagnosed as a predominately "psychotic" codetype, with a primary diagnosis of schizophrenia. Examination of the descriptive narratives reveal the presence of significant depressive components for the 2-8/8-2 and 2-7-8/8-7-2 codetype. Also, while the primary diagnosis was schizophrenic for the 2-7-8/8-7-2 profile, 33% of these patients did receive a diagnosis of psychoneurosis--depressive and obsessive compulsive. Descriptors consistent with affective symptomology for the 8-9/9-8 codetype include grandiosity, agitation, restlessness, rapid onset, and the presence of previous similar symptomology.

Selected Codetypes and Other Interpretive Systems

Since the original publication of the Marks and Seeman (1963)

actuarial data, other interpretive systems have arisen. As might be expected, these other systems provide descriptors which in some cases are similar to, and in some cases different from, the Marks et al. (1974) actuarial data for a given codetype. Several of the major interpretive systems (Gilberstadt & Duker, 1965; Gynther et al., 1973b; Lachar, 1968; Lewandowski & Graham, 1972) were compared to the Marks et al. system for the four chosen codetypes.

For the 8-6/6-8 codetype, the three interpretive systems which reported diagnoses (Gilberstadt & Duker, 1965; Gynther et al., 1973b; Lachar, 1968) agreed with the Marks et al. (1974) predominate diagnosis of paranoid schizophrenia. Considerable agreement with Marks et al. for the presence of thought disorders, delusions, and hallucinations, was also found (Altman, Gynther, Warbin, & Sletten, 1972; Gilberstadt & Duker, 1965; Gynther et al., 1973b; Lewandowski & Graham, 1972). The Marks et al. findings of suspiciousness and withdrawal were also given some support (Gilberstadt & Duker, 1965; Lewandowski & Graham, 1972). In addition to the Marks et al. descriptors, these patients were also described as assaultive (Gilberstadt & Duker, 1965), hostile (Altman et al., 1972; Gynther et al., 1973b), and unfriendly (Lewandowski & Graham, 1972). Gynther and colleagues (Altman et al., 1972; Gynther et al., 1973b) reported that these patients do not believe themselves ill and do not want psychiatric help.

Descriptors across systems for the 8-9/9-8 codetype were more variable. Although all of the systems agreed with the Marks et al. (1974) major diagnosis of schizophrenia, subtype diagnoses varied considerably. Gilberstadt and Duker (1965) indicated a predominate diagnosis of schizophrenic reaction, catatonic with alternative

diagnoses of schizo-manic psychosis and paranoid schizophrenia. Schizo-affective psychosis was indicated by Lachar (1968) and a "hostile-paranoid excitement" was reported by Gynther and colleagues (Altman, Warbin, Sletten, & Gynther, 1973; Gynther et al., 1973b). Both Gilberstadt and Duker (1965) and Gynther and colleagues (Altman et al. 1973; Gynther et al., 1973b) concurred with Marks et al. on the presence of paranoid symptoms and hostility. Only Gilberstadt and Duker and Marks et al. delineate the presence of hallucinations as a significant symptom.

Marks et al. (1974) described these patients as agitated, restless, grandiose, and impulsive. Similar, and perhaps more extreme, symptomology was reported by the other systems. Gilberstadt and Duker (1965) described these patients as hyperactive, unmanageable, tense, panicky, and talkative. They also noted the difficulty in differentiating between manic states of manic-depression and excited states of schizophrenia for this codetype. Likewise, Gynther and colleagues (Altman et al., 1973; Gynther et al., 1973b) characterized patients with this codetype as overtalkative, loud voiced, and prone to labile affect with flight of ideas. Lewandowski and Graham (1972) concurred with the above, indicating that these patients were less depressed, less anxious, and more grandiose than other patients.

For the 2-8/8-2 codetype, Lachar (1968) noted that diagnoses were divided between schizophrenia, other psychosis, and psychoneurosis for these patients. However, he did indicate that the modal diagnosis for this codetype was Psychoneurotic Depressive Reaction. Although Gilberstadt and Duker (1965) did not include this codetype in their system, descriptors across the remaining systems are perhaps most

consistent for this codetype than for other codetypes. Gynther and colleagues (Gynther et al., 1973b; Warbin, Altman, Gynther, & Sletten, 1972) described these patients as depressed, withdrawn, soft spoken, and having suicidal thoughts and attempts. Lewandowski and Graham (1972) described these patients as being slow moving and sluggish with less grandiosity than other codetypes.

Because it is a three-point codetype rather than a two-point codetype, the 2-7-8/8-7-2 codetype is only reported by Gilberstadt and Duker (1965) in addition to Marks et al. (1974). Gilberstadt and Duker agree with Marks et al. in the predominant diagnosis of chronic undifferentiated schizophrenia. Concordance is also found among descriptors of depression, withdrawal, anxiety, obsessions, and difficulties in thinking and concentration.

From the synthesis of the findings of the various interpretive systems, general descriptors common to a specific codetype can be determined. The 8-6/6-8 codetype appears to describe a group of patients who were floridly psychotic and thought disordered. These patients frequently received a predominate diagnosis of paranoid schizophrenia. Delusions, hallucinations, and hostility were found in patients with this codetype. Patients with a 8-9/9-8 codetype appeared more heterogeneous. Although diagnoses varied across systems, these patients typically demonstrated some combination of affective and schizophrenic symptoms. They appeared excited, labile, and hyperactive. The presence of hallucinations, paranoia, and hostility was variable and was not consistently reported. The 2-8/8-2 codetype seems to describe patients who were predominately depressed. These patients were described as sad, withdrawn, and suicidal. Psychomotor retardation and

sluggishness were common. Depression was also commonly seen for the 2-7-8/8-7-2 patients, as well as withdrawal, obsessiveness, anxieties, fears, and difficulties in thinking.

In spite of the Marks et al. (1974) common diagnoses of schizophrenia for these four codetypes, the descriptive data from the various systems, including the Marks et al. system, reveal striking differences between the codetypes for patient descriptors. The above evidence suggests that these four codetypes may be diagnostically different. From the above, it would appear that the assertion that the 8-6/6-8 codetype suggests the presence of a schizophrenic disorder is indeed credible. That the remaining codetypes are predominately representative of schizophrenic disorders, however, seems less convincing due to the presence of affective symptomology. Rather than being predominately representative of a schizophrenic disorder, it seems plausible from the above that the 8-9/9-8 codetype may be more indicative of a bipolar disorder or a schizoaffective disorder. Similarly, the 2-8/8-2 codetype may be more representative of a major depressive disorder than of a schizophrenic disorder. Evidence also suggests that the 2-7-8/8-7-2 codetype may also be more indicative of a depressive or schizoaffective disorder than of schizophrenia.

The possibility that the Marks et al. (1974) 8-9/9-8, 2-8/8-2, and 2-7-8/8-7-2 codetypes are more representative of affective disorders than of schizophrenic disorders, as they are defined under the current nosology, is in accordance with the previously cited contentions of Pope and Lipinski (1978) and Spitzer, Andreason, and Endicott (1978) of the difficulty in the differential diagnoses of certain schizophrenic and affective disorders. The decision to include the DSM-III classification

of schizoaffective disorder as a disorder separate from the schizophrenic and affective disorders was due to this lack of consensus as to the differential diagnoses of disorders displaying both affective and schizophrenic symptomology (APA, 1980; Spitzer, Andreason, & Endicott, 1978). The Marks et al. description of these two codetypes as "schizophrenic" may be manifestations of this difficulty in differential diagnosis.

Current Codetype Research

Research assessing the validity of MMPI codetype descriptors for DSM-III diagnostic categories is limited at present. One such study (Vincent et al., 1983) examined the DSM-III diagnostic categories for MMPI codetypes. In this study 24 MMPI codetypes based upon one, two, and three high-point codetypes for 261 adult private psychiatric patients were assessed for DSM-III diagnoses. The DSM-III diagnoses were assigned by psychiatrists following review of patients' records. For the 2-8/8-2 codetype, 70% of the patients received an Axis I diagnosis of an affective disorder. Specific affective diagnoses included bipolar disorder-depressed, major depression, and dysthymia. Patients with the 2-7-8/8-7-2 codetype received Axis 1 diagnoses of an affective disorder in 63% of the cases. The affective diagnoses included bipolar disorder-depressed, bipolar disorder-mixed, major depression, and dysthymia. Diagnoses for the 8-6/6-8 or the 8-9/9-8 were not assessed.

A second study germane to the current work was conducted to investigate the characteristics of MMPI codetypes for the DSM-III categories of schizophrenia, major depression, bipolar disorder-

depressed, and bipolar disorder-manic (Winters et al., 1985). DSM-III diagnoses for psychiatric inpatients were determined following the administration of a structured interview, the Schedule for Affective Disorders and Schizophrenia (SADS; Spitzer & Endicott, 1978), and a review of case records. Patients who received a diagnoses of one of the above four disorders were retained and administered the MMPI. The MMPI profiles were then codetyped following the Marks et al. (1974) criteria or by high-point codes for those profiles not meeting the Marks et al. rules. Twenty-one codetypes were reported in this study.

For the schizophrenic disorders, the 8-6/6-8 codetype was most frequent followed by the 8-9/9-8 codetype. The 2-7-8/8-7-2 codetype was the most common codetype for the major depression group and for the bipolar depressed group. The 2-8/8-2 codetype was the second most frequent codetype for the major depression group and for the bipolar-depressed group. For the bipolar-manic group, the 8-9/9-8 codetype was the second most frequent. The 8-6/6-8 codetype was found to be highly specific to a schizophrenic diagnosis and the 9-8-4 codetype was found to be specific for the bipolar-manic group. Concordance between the Marks et al. (1974) "schizophrenic" codetypes (as defined earlier) and the DSM-III diagnosis of schizophrenia was low, as only 22.5% of those patients with "schizophrenic" codetypes were diagnosed as schizophrenic.

In reanalyzing the Winters et al. (1985) data for the MMPI codetypes pertinent to the present study, it is seen that the 2-8/8-2 codetype was present in 21% of the major depression diagnostic group, 17% of the bipolar-depressed group, 3% of the schizophrenic group, and not present in the bipolar-manic group. The 2-7-8/8-7-2 codetype was present in 40% of the major depression group, 34% of the bipolar-

depressed group, 6% of the schizophrenic group, and 3% of the bipolar manic group. The 8-6/6-8 codetype was present in 29% of the schizophrenic group, 5% of the bipolar-manic group, 3% of the major depression group and not present in the bipolar-depressed group. The 8-9/9-8 codetype was found in 32% of the bipolar-manic group, 15% of the schizophrenic group and not found in either the major depression or the bipolar-depressed group.

Similar results were found by Walters (1984) who compared psychiatric inpatients with DSM-III diagnoses of schizophreniform disorder with inpatients who received DSM-III diagnoses of schizophrenia, bipolar disorder-manic, and unipolar depression. Although no significant differences were found between the four diagnostic groups on the basis of the 6 MMPI codetypes analyzed, trends comparable to those found by Winters et al. (1985) were reported.

The differences in the Marks et al. (1974) descriptive narratives, the data from the several interpretive systems, and the results of recent studies all lend further support to the hypothesis that the actuarial diagnostic data reported for the selected Marks et al. codetypes may be of limited validity under the current DSM-III diagnostic nomenclature. The validity of the Marks et al. actuarial diagnostic data becomes most pertinent when the actuarial interpretation is used to assist in making a psychiatric diagnosis. Although the MMPI is most widely used in current practice to provide the clinician with actuarial descriptive summaries about patient profiles (Graham, 1977), it is often drawn upon, either alone or in conjunction with other tests, as an aid in classifying or diagnosing psychiatric patients.

The assignment of an accurate diagnosis is of utmost importance in

cases where differential treatment methods are required. As Pope and Lipinski (1978) have noted, the ability to correctly differentiate the affective from the schizophrenic disorders has become especially important due to the differential psychopharmacological treatment of the two disorders. The efficacy of lithium carbonate for bipolar affective disorders and the serious consequences of long-term neuroleptic maintenance make the diagnostic distinction between affective and schizophrenic disorders of paramount significance.

Traditional Psychiatric Diagnosis

Although the use of an MMPI actuarial system does provide useful information in the psychological evaluation of psychiatric patients and may aid in the differentiation of various broad diagnostic groups, the MMPI is not of itself suitable for determining a specific diagnoses under the current nosology. Until recent years, the assignment of a psychiatric diagnosis was most often accomplished through the use of a traditional diagnostic interview. Interview techniques differed considerably, were frequently unsystematic, and therefore, were often unreliable (Spitzer & Fliess, 1974).

Several sources of unreliability in clinical diagnoses have been discussed (Spitzer & Williams, 1980). One such source has been termed information variance. Information variance exists in the case where clinicians have different sources, amounts, or kinds of information. Such a case would exist if different questions were asked during diagnostic interviews. Clinicians may also differ in what they observe in, and remember from, an interview or they may attach differing import to what they do observe and remember. These sources of unreliability

have been termed observation and interpretation variance. Clinicians may also differ in the inclusion or exclusion criteria they employ in making diagnoses or in the definition of diagnostic and technical terms. This is known as criterion variance.

Structured Diagnostic Interviews

The unreliability of clinical diagnoses became particularly apparent during military induction screenings during World War II (Robins, 1985). Robins notes that it was because of this unreliability of the traditional clinical diagnostic process that the development of structured interviews began. Spitzer (1983) notes that the use of a structured diagnostic interview minimizes sources of information, observation and interpretation, and criterion variance through the use of structured procedures with specific diagnostic criteria.

It has been found that a structured procedure for clinical interviews has several advantages over the traditional free-form technique. Structured interviews generally provide the clinician with a greater amount of information that is also usually more specific. Meikle and Gerritse (1970) found a significant increase in patient descriptive information when a structured Symptom Check List was used in place of a traditional narrative history for summarizing interview information. Similar results were found for structured versus unstructured mental status exams (Weitzel, Morgan, Guyden, & Robinson, 1973). Weitzel et al. found significantly more symptoms recorded when an operationally defined mental status exam was used than when the examination was of a free-form format.

A higher frequency of reported symptoms was also found for reports

based upon a standardized questionnaire and structured interview than for a narrative report based upon a traditional interview (Climent, Plutchik, Estrada, Gaviria, & Arévalo, 1975). In this study, all 36 symptoms assessed were reported more frequently when patients were assessed by the questionnaire than when they were assessed by a traditional interview. Of special note, it was found that suicidal thoughts were reported three times more frequently when the same patients were assessed by the questionnaire than by the narrative.

In general, structured interviews are more efficient in that they allow the clinician to record more information and generally take less time than traditional interviews (Climent et al., 1975, Weitzel et al., 1973). By providing a standard procedure, structured interviews allow the clinician to be more systematic in the eliciting and recording of information (Weitzel et al., 1973). This systematic approach prevents important, but unusual, symptoms from being overlooked or ignored during interviews (Climent et al., 1975; Helzer, Clayton, Pambakian, & Woodruff, 1978). A systematic, criterion-oriented approach also guards against bias due to clinically impressive symptomology (Welner, Liss, & Robins, 1974). As an example of such bias which is particularly pertinent to the present study, Welner et al. cite the tendency to attribute hallucinations to a schizophrenic disorder when, in fact, another disorder, such as an affective disorder, may be responsible. Finally, structured interviews produce results which are more replicable than are traditional interview techniques (Climent et al., 1975).

In reviewing the history of structured interviews, Spitzer (1983) reports that although structured research interviews existed as early as the mid-1950's, the first well-known structured interview, the Present

State Examination (PSE; Wing & Giddens, 1959), was published in 1959. Since the publication of the PSE, many other structured interviews have been developed. Several of the better known and most recent of these instruments include the Schedule for Affective Disorders and Schizophrenia (SADS; Endicott & Spitzer, 1978) and the National Institute of Mental Health Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981).

Psychiatric Diagnostic Interview

In addition to the above mentioned structured interviews, the Psychiatric Diagnostic Interview (PDI; Othmer, Penick, & Powell, 1981) has been recently published. The PDI is a structured interview developed from the Feighner et al. (1972) and DSM-III criteria. It is designed to provide identification of 15 established psychiatric syndromes for adult patients. It is structured in format, provides specific questions and criteria for identification of syndromes, and was designed to be administered by clinicians or trained paraprofessionals working under appropriate supervision.

Unlike the structured interviews mentioned above which require either extensive knowledge of additional diagnostic criteria or a computer program for diagnosis, the PDI provides diagnostic criteria which are scored as the interview proceeds. Two types of diagnoses are determined, a Current and a Lifetime diagnoses, both of which are compatible with the Feighner et al. (1972) and DSM-III criteria. Interview questions consist of a simple yes/no format and procedures exist which preclude lengthy assessment of syndromes which do not meet initial criteria.

Research studies of the reliability and validity of the PDI conducted over a 7 year period are reported in the manual (Othmer, Penick, & Powell, 1981). Tests of interrater reliability of 6 judges viewing videotaped extended-format interviews of 4 patients found perfect agreement among the 6 judges for Current and Lifetime diagnoses and in the scoring of basic and additional syndromes. Tests of intrarater reliability using 4 of the 6 above judges found no differences in scoring after a 3 month interval.

Test-retest reliability of diagnoses was assessed for 38 patients over an average of 6 weeks between interviews. For the two interviews, no significant difference was found between the number of syndromes present. A significant correlation was found for total number of syndromes present over the assessments ($r = .75$) and a median test-retest agreement of 93.1% across syndromes was reported. Additionally, reported kappa coefficients of stability for Current and Lifetime Diagnoses were .93 and .85 ($p < .01$) respectively.

Validity studies indicated that the PDI was able to significantly distinguish between psychiatric and nonpsychiatric medical patients and between psychiatric inpatients and outpatients. High levels of agreement between PDI syndromes and diagnoses by a psychiatrist thoroughly familiar with the Feighner et al. (1972) criteria were also found. Total perfect and partial agreement between the psychiatrist and the PDI of 82% for Current Diagnosis and of 78% for Lifetime Diagnosis were reported. The PDI was also shown to correctly identify the syndrome group in over 94% of cases for selected criterion groups of Alcoholism, Drug Dependency, Manic-Depressive/Mania, Depression, and Schizophrenia.

Weller et al. (1985) examined the concurrent validity of the PDI and the DIS (Robins et al., 1981). The PDI and DIS are similar in structure in that both are based upon the Feighner et al. (1972) and DSM-III criteria. For 86 inpatients given both interviews in counterbalanced order, mean number of syndromes present was 2.4 for the PDI and 2.1 for the DIS with a significant correlation ($r = .68$) for number of syndromes diagnosed as present by the PDI and DIS for each patient. Median syndrome agreement was 90.5%. The PDI took an average of 60 minutes to administer compared to 81 minutes for the DIS. Additionally, as stated above, the PDI can be scored during the administration and syndromes are immediately derived, while the DIS requires either a clinician familiar with the diagnostic criteria or access to a computer program for scoring and derivation of diagnoses.

Statement of the Problem

The actuarial interpretation of MMPI profiles is the accepted standard in current clinical practice. Of the various interpretive systems currently available, the system first developed by Marks and Seeman in 1963 and its later revision (Marks et al., 1974) remains among the most widely employed. Although the Marks et al. actuarial system continues to receive extensive use in current clinical practice, there has been little research assessing its validity under the currently accepted diagnostic nosology of the DSM-III. The differences between the classification system of the DSM-I under which the original Marks and Seeman system was developed and the current classification system of the DSM-III are of such magnitude (Spitzer & Williams, 1980), that a reassessment for present-day validity is warranted.

In reviewing the 16 codetypes provided by the Marks et al. (1974) actuarial system, it is found that nearly half of these codetypes received a predominate diagnosis of schizophrenia. Considering that the Marks et al. system was developed during an era when the diagnosis of schizophrenia was broadly defined and widely employed (Beavers, 1974; Kuriansky, Deming, & Gurland, 1974), such a finding is not surprising. Recent research (Pope & Lipinski, 1978), however, contends that the diagnosis of schizophrenia has been historically overinclusive.

Pope and Lipinski (1978) argue that the overdiagnosis of schizophrenia has occurred at the expense of underdiagnosing affective disorders. Pope and Lipinski found that many patients with affective disorders demonstrated "schizophrenic" symptomology and that "good prognosis schizophrenics" have a much higher familial genetic history for affective disorders than do "poor prognosis schizophrenics." Due to the efficacy of current psychotropic interventions and the dangers inherent in inappropriate chemotherapy, Pope and Lipinski contend that the differential diagnosis of the schizophrenic and affective disorders is essential.

The current DSM-III diagnostic categories are based, in part, on the earlier diagnostic schemes of Feighner et al. (1972) and the RDC (Spitzer, Endicott, & Robins, 1978). These diagnostic schemes were attempts to operationalize and narrow diagnostic categories. The current DSM-III diagnostic criteria for schizophrenia present a significantly narrower definition of schizophrenia than was previously employed. Many disorders, several of which are affective in nature, which would have previously been diagnosed as schizophrenic are now classified otherwise (Spitzer et al., 1978; Westermeyer & Harrow, 1984).

From the above, the question arises as to the appropriateness of the actuarial diagnostic data provided by Marks et al. (1974). In reviewing the literature, this question seems especially relevant for four of the Marks et al. codetypes, 8-6/6-8, 8-9/9-8, 2-8/8-2, and 2-7-8/8-7-2. Although all four of these codetypes received a predominate diagnosis of schizophrenia, research indicates that they may be diagnostically different.

Findings from other interpretive systems support this contention of differential diagnoses (Altman et al., 1972; Altman et al., 1973; Lachar, 1968; Lewandowski & Graham, 1972; Gilberstadt & Duker, 1965; Gynther et al., 1973b; Warbin et al., 1972). These studies support the presence of a schizophrenic disorder for the 8-6/6-8 codetype. For the other two codetypes, however, the evidence suggests that the 8-9/9-8 codetype may be more representative of a bipolar disorder, the 2-8/8-2 codetype may be more representative of a major depressive disorder, and the 2-7-8/8-7-2 codetype may be representative of a depressive or schizoaffective disorder. Recent studies of MMPI codetypes for DSM-III categories agree that significant affective components exist for the 8-9/9-8, 2-8/8-2, and 2-7-8/8-7-2 codetypes (Vincent et al., 1983; Walters, 1984; Winters et al., 1985).

For differentiating diagnostic categories and assigning a clinical diagnosis, the unreliability of the traditional diagnostic interview has been discussed (Robins, 1985; Spitzer & Fliess, 1974; Spitzer & Williams, 1980). This unreliability has led to the development of structured diagnostic interviews which contain structured procedures and specific diagnostic criteria. Compared to the traditional approach, structured interview procedures have been found to elicit more

information in less time, to provide a specific symptom focus, to prevent diagnostic bias, and to be more replicable (Climent et al., 1975; Haier et al., 1978; Meikle & Gerritse, 1970; Weitzel et al., 1973; Welner, Liss, & Robins, 1974). Of the various structured interviews, the PDI, based on the criteria of Feighner et al. (1972) and the DSM-III, has been shown to be a reliable and valid instrument in the identification of clinical syndromes (Othmer, Penick, & Powell, 1981; Weller et al., 1985).

The present study attempted to test the validity of the actuarial diagnostic data provided by the Marks et al. (1974) system for the MMPI codetypes of 8-6/6-8, 8-9/9-8, 2-8/8-2, and 2-7-8/8-7-2 as they apply under the current nosology of the DSM-III. From the evidence in the literature, it was expected that the 8-6/6-8 codetype would be representative of a schizophrenic disorder, the 8-9/9-8 codetype representative of a bipolar disorder, the 2-8/8-2 codetype representative of a major depressive disorder, and the 2-7-8/8-7-2 codetype representative of a depressive or schizoaffective disorder.

Although the previously cited studies of MMPI codetypes and DSM-III diagnoses offered some support to these contentions, their design prevented a direct assessment of these questions. Whereas most of the previous studies selected patients on the basis of diagnostic categories and assessed for prevalent MMPI codetypes, the present study selected patients on the basis of MMPI codetypes and assessed for positive clinical syndromes through the use of a structured assessment instrument, the PDI. The present study also differs from its predecessors in that comparisons of the agreement between positive PDI syndromes and hospital discharge diagnoses were undertaken. Also, as an

adjunct to assessment by the PDI, differences between the selected MMPI codetypes were assessed by therapists' ratings of various mental status descriptors. These descriptors represent the original mental status items used by Marks et al. (1974) in formulating their narrative codetype descriptions.

CHAPTER III

METHOD

Subjects

MMPI profiles were collected from 144 patients at a comprehensive community mental health center in the southwestern United States. One hundred and forty one profiles were obtained from consecutive admissions to the adult inpatient unit and three profiles were obtained from the adult day treatment program. Of these 144 patients, subjects consisted of 36 patients whose MMPI profiles corresponding to Marks et al. (1974) codetypes of 2-8/8-2, 2-7-8/8-7-2, 8-6/6-8, and 8-9/9-8. There were 10 patients in each of the 2-8/8-2, 2-7-8/8-7-2, and 8-6/6-8 codetype groups. The 8-9/9-8 codetype group was comprised of 6 patients.

There were 19 females and 17 males in the subject pool. The average age was 33.4 years (range 19 to 57 years). Thirty-four of the subjects were white and two were Native Americans. The mean years of education was 11.7 years (range 8 to 16 years) and the majority of subjects (75%) were not currently employed outside of the home for differing reasons (i.e., unemployed, disabled, homemaker). Marital status was divided between married (33%), divorced (44%), and single or widowed (22%). Statistical analyses of between group differences on demographic variables are found in the Results section.

Instruments

Three instruments, the MMPI Form R, the PDI, and a Mental Status Checklist, were used in the assessment of subjects. The MMPI was administered as part of the standard hospital procedures to all new inpatients subsequent to their admission to the unit. The MMPI was administered and scored following the standard procedures set forth in the manual (Hathaway & McKinley, 1967).

The PDI (Othmer, Penick, & Powell, 1981) is a structured diagnostic interview designed to identify positive clinical syndromes for adults in clinical and research settings. The diagnostic criteria of the PDI are based upon the Feighner et al. (1972) criteria and DSM-III criteria. It is designed for use by clinicians and trained paraprofessionals operating under professional guidance.

The PDI provides diagnoses for 12 Basic Syndromes, 3 Derived Syndromes, and 3 Optional Syndromes. The Basic Syndromes include: Organic Brain Syndrome, Alcoholism, Drug Dependency, Mania, Depression, Schizophrenia, Antisocial Personality, Somatization Disorder, Anorexia Nervosa, Obsessive-Compulsive Disorder, Phobic Disorder, and Panic Disorder. The 3 Derived Syndromes include Polydrug Abuse, Schizoaffective Disorder, and Manic-Depressive Disorder. The 3 Optional Syndromes include Mental Retardation, Homosexuality, and Transsexualism. In addition, there is a final category of Undiagnosed Psychiatric Disorder.

The 15 Basic and Optional Syndromes represent the syndromes covered by the Feighner et al. (1972) criteria. These are syndromes which are considered to have sufficient clinical and diagnostic validation to be included as distinct, separate disorders. Feighner et al. noted that

although many other disorders were listed in the DSM-II, they were not included because of a lack of sufficient longitudinal and cross-sectional data for diagnostic validation. The syndromes of Mental Retardation, Homosexuality, and Transsexualism are considered Optional Syndromes because of the controversy as to their classification as mental disorders. For this reason, their assessment with the PDI is left to the discretion of the interviewer.

The Derived Syndromes each represent a combination of at least two Basic Syndromes. Polydrug Abuse is diagnosed if both Alcoholism and Drug Dependency are diagnosed as present at some time in the patient's life. Schizoaffective Disorder requires the diagnoses of Schizophrenia plus Depression and/or Mania at some point. For the diagnosis of Manic-Depressive Disorder, both Mania and Depression must be present during the patient's life. The Derived Syndromes were considered to represent distinct syndromes in their own right.

The PDI provides easily understood yes/no format questions which vary in number for each specific syndrome. Although specific questions are provided, the interviewer is provided some flexibility in modifying the exact wording of questions in order to facilitate rapport and to preclude a stilted interview style. The questions are contained in the administration booklet and recording booklets are provided in which to record patient responses while the interview is in progress.

Questions for each syndrome are divided into content areas consisting of Cardinal questions, Social Significance questions, Auxiliary questions, and Time Profile questions. The Cardinal questions inquire as to specific symptoms which must be present in order to meet the diagnostic criteria for a specific syndrome. The Social

Significance questions are designed to assess the degree of disturbance of lifestyle caused by symptomology. The Auxiliary questions assess other symptoms which may be present for a specific syndrome, and the Time Profile questions determine the age of onset and duration of symptoms.

Each of the syndromes is assessed individually in the order of presentation in the Administration Booklet beginning with questions from the Cardinal section. If the criteria for the Cardinal questions of a specific syndrome are not met, further inquiry into that syndrome is terminated and the next syndrome is assessed. For example, the first two Cardinal questions for Depression ask if the patient has ever felt unusually depressed, empty, sad, or hopeless without identified cause and if the patient has ever felt irritable or tired for a length of time without identified cause. If the patient answers in the affirmative for either of the questions, the third question assesses the length of time these symptoms persisted. The fourth question asks if these mood changes were experienced without the presence of a life-threatening medical illness. To satisfy the Cardinal criteria, the patient must admit to either of the first two questions, and the symptoms must have been present for at least one month or required hospitalization, and the fourth question must be answered in the negative.

If the Cardinal criteria for a syndrome are satisfied, the interviewer proceeds to the Social Significance questions. If Social Significance criteria are met the interviewer proceeds to the Auxiliary questions. If criteria in any section are not satisfied, the interviewer terminates inquiry into that syndrome and the next syndrome is assessed. If criteria are met in each of the Cardinal, Social

Significance, and Auxiliary sections, the syndrome is diagnosed as present. No diagnosis is made if all criteria are not satisfied. Time of administration of the PDI varies from 15 to 30 minutes for an individual with no disorder to 60 or more minutes for an individual with 2 or more disorders.

Upon completion of the interview, all syndromes diagnosed as present are recorded and the Time Profile section is filled out. Two diagnoses are determined, a Current Diagnosis and a Lifetime Diagnosis. The Current Diagnosis represents syndromes which have been present at any time in the last 2 years. The Lifetime Diagnosis represents the syndrome which most accurately reflects the syndrome manifest for the greatest portion of the individual's lifetime. Additional space is provided on the Record Booklet for narrative comments outlining the chief complaints, major symptoms, and previous treatment and responses to treatment.

The Mental Status Checklist is identical to the Mental Status Data items reported in Appendix C of Marks et al. (1974) with the exception of minor revisions. The revisions consisted of subsuming the 22 physical complaints listed in the original work under the present heading of Somatic Complaints and the deletion of two items not deemed relevant for the present study, amorality and homosexuality. The Mental Status Checklist consists of 72 total items under the six major headings; Attitude/Behavior, Feelings, Orientation, Emotional Tone, Stream of Thought, and Symptoms/Complaints.

Procedure

MMPI's were obtained from consecutive inpatient admissions for an

eight month period beginning in March and extending through August of 1988. In addition, profiles were also obtained from day treatment patients who happened to undergo testing with the MMPI during the period of time in which the study was conducted. The MMPIs were administered as part of standard hospital procedure, and consent for testing was covered by the hospital's consent for treatment agreement. The majority of MMPIs were administered by a psychiatric RN who was thoroughly familiar with the standard administration and instruction procedures. Generally, attempts were made to test patients within one week of admission. The mean number of days between admission and testing was 8.86 (range 2 to 21 days). However, MMPIs were not administered to patients who proved too psychotic or otherwise disorganized until it was judged that they had regained the ability to validly complete the testing. Also, patients who did not possess adequate reading ability or who were of limited intelligence were excluded from testing.

Test protocols were scored on a weekly basis. To ensure accuracy, each MMPI was scored by the experimenter using both the hand scoring templates provided by the test distributor and a computer scoring program written by the experimenter. Protocols which were answered in one direction (e.g., all True) and protocols with greater than 30 omissions were considered invalid (Lachar, 1974) and were not scored. The resulting profile was plotted and codetyped according to the rules set forth by Marks et al. (1974). The experimenter remained blind to patient's names during scoring and codotyping of MMPI protocols.

Profiles which satisfied the criteria for classification as an 2-8/8-2, 2-7-8/8-7-2, 6-8/8-6, or 8-9/9-8 codetype were retained for inclusion in the study. These profiles were then shuffled in order to

disguise the sequence in which they had been scored. Following shuffling, the names of the patients were recorded in such a fashion as to keep the profile and codetype hidden. These procedures were undertaken in order to keep the experimenter blind as to which specific codetype group a particular patient belonged. Although every effort was made to keep the experimenter blind to a specific patient's codetype, this was not possible for three patients (one each from the 2-7-8/8-7-2, 2-8/8-2, and 6-8/8-6 codetype groups). These patients represented three separate occasions when only one profile out of that week's collection met the criteria for inclusion and, with only one profile from which to choose, blind assessment was precluded.

After selection for inclusion in the study, the profiles were then examined for validity indicators. Although Marks et al. constructed their actuarial codetype descriptions without regard to F scale elevation, the authors recommended that profiles with F scale elevation greater than a 26 raw score (100 T score) be examined on an individual basis for validity. Examination of validity indicators becomes especially important for the 6-8/8-6 codetype group since this profile is often associated with such things as random responding and malingering (Graham, 1977; Lachar, 1974).

Inspection of the retained profiles revealed three instances of extreme elevations of F scores ($F > 120$ T) in the 6-8/8-6 codetype group. Due to the extreme nature of these F scores, these three profiles were judged invalid and thrown out. Two other 6-8/8-6 profiles strongly resembled the "sawtooth" profiles characteristic of malingering as described by Lachar (1974). These two patients failed to provide any indication of psychosis in brief screening interviews. When no evidence

of psychosis was found, the interview was terminated and these patient's charts were examined for further confirmation. Chart information for both patients supported the absence of psychotic symptoms and reported either exaggeration or fabrication of psychiatric symptoms. These patients were subsequently not included as subjects in the study.

Patients who had been identified as possible research subjects were individually approached by the experimenter concerning their participation. Each patient met individually with the experimenter who introduced himself and provided a brief explanation of the ongoing study. Patients who were amenable to participation were asked to read a copy of the informed consent form (Appendix A). Once a patient had read the consent form, he or she was asked for their understanding of what their participation would involve. Any incorrect assumptions or misperceptions were resolved prior to the patient's signature. Once a patient demonstrated adequate understanding of the present study, a member of the ward treatment team was brought into the room to witness the patient's signature. No patient who was asked to participate declined to do so. However, one patient (6-8/8-6 codetype) was excluded by the experimenter when her understanding of her participation was so colored by paranoid ideation that actual informed consent was suspect. All consent forms were retained by the hospital.

Once the patient had signed the informed consent form, the PDI interview was begun. All PDI interviews were conducted by the experimenter who was thoroughly familiar with the PDI instrument and with diagnostic interviewing in general. In an attempt to control for experimental bias, the experimenter remained blind as to each patient's hospital diagnosis and chart history going into the interview. Although

this procedure represents a departure from the standard interview situation in which the interviewer generally has knowledge of the background history and reason for admission, it was felt that the present procedure would provide stricter control of possible experimental bias.

The PDI interview was conducted and scored following the procedures outlined in the PDI manual (Othmer, Penick, & Powell, 1981). All positive syndromes which were currently manifest were recorded and formed the basis of all subsequent analysis. In most cases, the PDI was completed in less than one hour. Because of their lack of relevance to this study, the Optional Syndromes of Mental Retardation, Homosexuality, and Transsexualism were not assessed. At the conclusion of the interview, each subject was thanked for their participation and any questions which may have arisen were answered. Any questions concerning treatment issues such as diagnoses, length of stay, medications, and so on were referred to the appropriate case manager.

Upon completion of the PDI interview, the casemanager for each subject was asked to complete the Mental Status Checklist on that subject. The casemanager for each patient was assigned by the hospital staff and was responsible for overseeing all aspects of that patient's care and treatment during the patient's inpatient stay, as well as providing individual therapy for that particular patient. The six casemanagers who participated in this study were comprised of 2 psychiatric nurses, 2 social workers, and 2 master's level psychological assistants. Mean years of experience in the mental health field was 8.67 (range 3 to 12 years).

Casemanagers were asked to check each of the descriptors that was a

significant part of the selected patient's clinical picture. More than one descriptor was allowed to be checked under a major heading. In an effort to avoid the introduction of systematic bias, descriptors were presented as listed in Marks et al. (1974) and no attempt was made to provide current definitions for them. Casemanagers remained blind to both MMPI codetype and PDI diagnoses as they were completing ratings.

Subject demographic data and hospital diagnoses were collected from each patient's chart subsequent to completion of the PDI interview. It was not uncommon for each patient to have been interviewed by two or more psychiatrists and, as a result, to have been given several different diagnoses over the course of treatment. The final discharge diagnoses were accepted as the "true" hospital diagnoses since these diagnoses were arrived at through consensus of the treatment staff and recorded as the condition for which treatment was provided.

Statistical Analysis

A multivariate analysis of variance employing Wilks' criterion was used to assess for differences between groups on the continuous subject demographic variables of age and years of education. This analysis was corrected for unbalanced subjects by the use of general linear models techniques.

All categorical data were analyzed by use of the chi-square test of independence (see Appendix B for a discussion of the use of chi-square with small expected frequencies). Analyses were conducted only for those items (PDI syndromes and mental status items) which occurred with a frequency of 30% or greater for the total number (36) of subjects. Frequencies below 30% were judged to be so infrequent so as to be of

little practical value. For each significant chi-square test, Cramer's \underline{V} was also calculated. This statistic is a measure of strength of association with an upper bound of 1 and a lower bound of -1. Post hoc analysis of significant chi-square contingency tables was conducted by the use of Goodman's gamma as described by Marascuilo and McSweeney (1977). This procedure of post hoc data analysis allows the comparison of 2 x 2 contrasts in R x C contingency tables and the calculation of simultaneous confidence intervals.

In order to control for the overall error rate for multiple chi-square tests, the multistage Bonferroni procedure described by Larzelere and Mulaik (1977) was employed. Use of the multistage Bonferroni allows the experimenter to control for the familywise error rate in multiple comparisons. During the first stage of the multistage Bonferroni procedure, the overall familywise level of significance is divided by the total number of comparisons. Individual tests are then performed at this level of significance. If no tests are significant, the procedure is then terminated. If significance is found for one or more tests, then the process continues. The level of significance for the second stage is calculated as in the first stage, with the expectation that the overall familywise level of significance is divided by the remaining number of comparisons. This procedure continues until a stage is reached in which no tests are significant. By using this procedure, the probability of a Type I error is no greater than the overall familywise level originally specified.

For each of the analyses in this experiment, the overall alpha level was set at $p = .10$. An alpha level of $p = .10$ was chosen over the more traditional level of $p = .05$ for reasons which relate to both

design and practical considerations. The use of the multistage Bonferroni procedure described above results in a much more conservative overall error rate than would be obtained if the error rate were only controlled per comparison. It was felt that this degree of overall control of alpha would allow some relaxation of the traditional .05 level. Additionally, it was felt that setting the probability of a Type I error at $p = .10$ represented an adequate balance between statistical control and practical significance.

Results also consisted of the analysis of the correspondence between positive PDI psychiatric syndromes and hospital discharge diagnoses. This analysis consisted of inspection of the conditional probabilities which resulted when the positive PDI syndromes were compared to hospital diagnoses. For the sake of this analysis, it was assumed that the hospital diagnoses represented the "true" diagnoses with which to compare positive PDI syndromes.

CHAPTER IV

RESULTS

The mean MMPI profiles for each group obtained in this study can be seen in Figures 1-4. Plotted along with each of the current mean profiles is the corresponding mean profile as reported in Appendix C of Marks et al. (1974). Visual inspection reveals a high degree of similarity between the original profiles obtained by Marks et al. and those obtained in the present study.

The main data analyses were performed using the Statistical Analysis System (SAS; SAS Institute Inc., 1982). Multivariate analyses were conducted via the MANOVA option of PROC GLM. Chi square analyses were calculated thorough the PROC FREQ procedure of SAS. Post hoc comparisons of significant chi-square contingency tables were conducted using Goodman's gamma as described by Marascuilo and McSweeney (1977). The calculation of Goodman's gamma was performed via a BASIC program written by the present author. This program had been thoroughly checked against textbook examples for accuracy prior to its implementation.

A multivariate analysis of variance was conducted to analyze possible differences between MMPI profile groups on the continuous subject demographic variables of age and years of education. See Table I (following Figures 1-4) for means and standard deviations. PROC GLM was used in order to control for the unbalanced number of subjects between groups (10 subjects each in the 2-7-8/8-7-2, 2-8/8-2, and

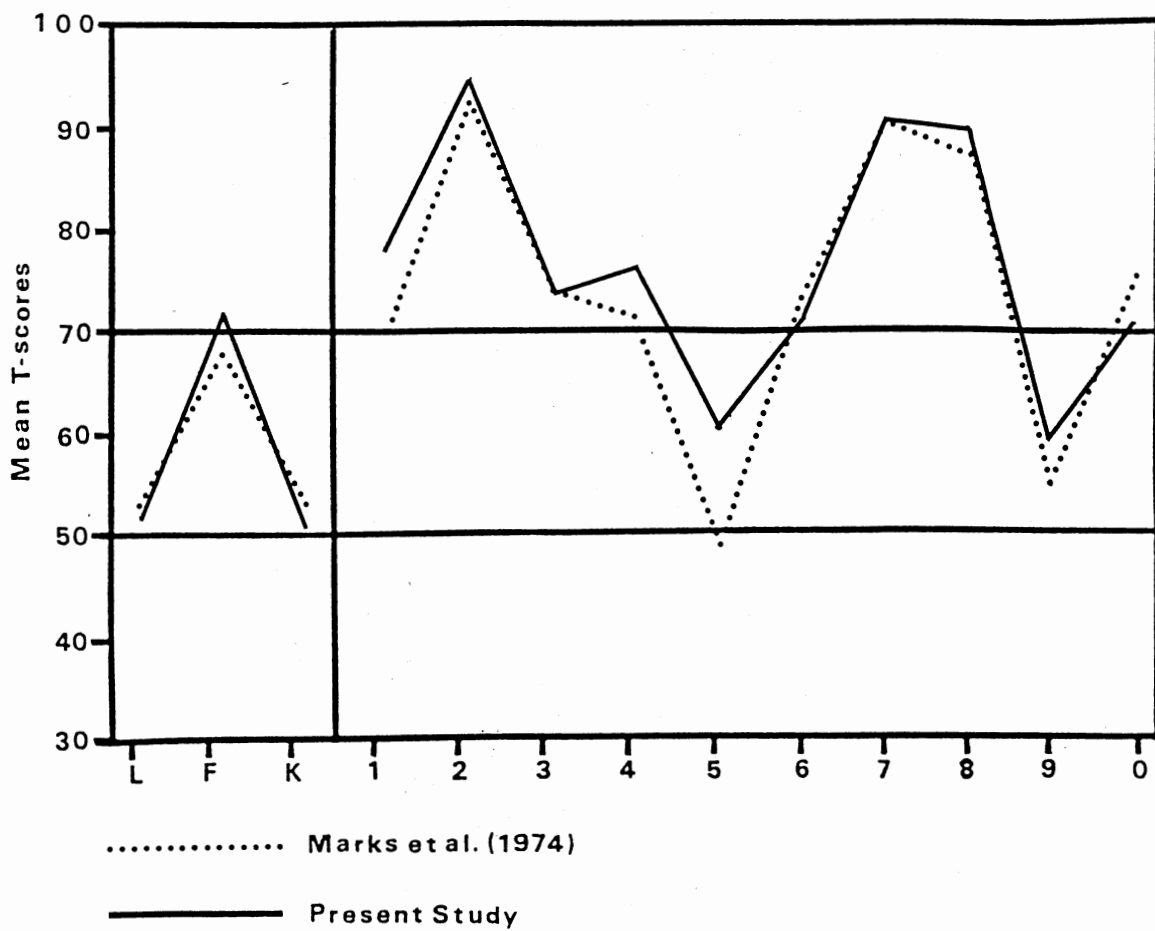


Figure 1. Mean 2-7-8/8-7-2 MMPI Profiles

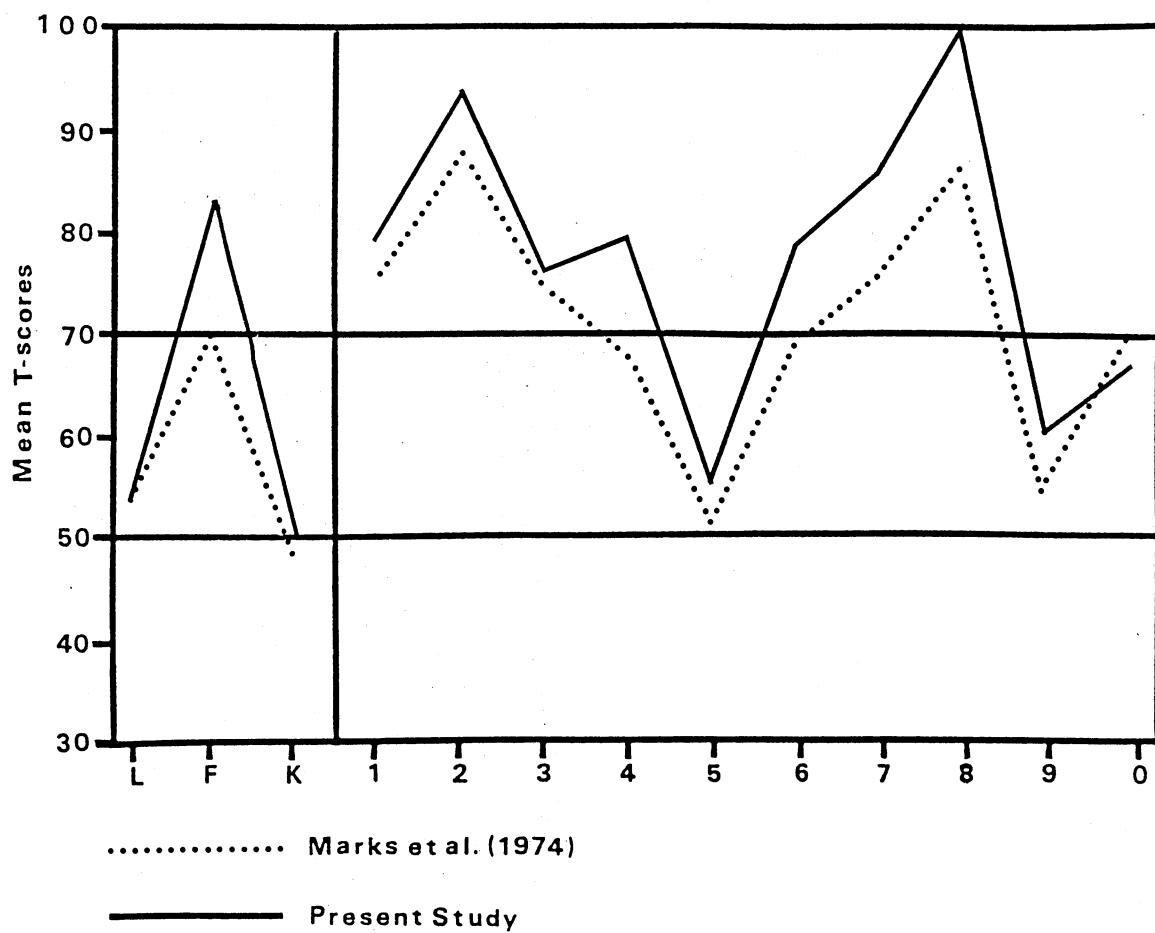


Figure 2. Mean 2-8/8-2 MMPI Profiles

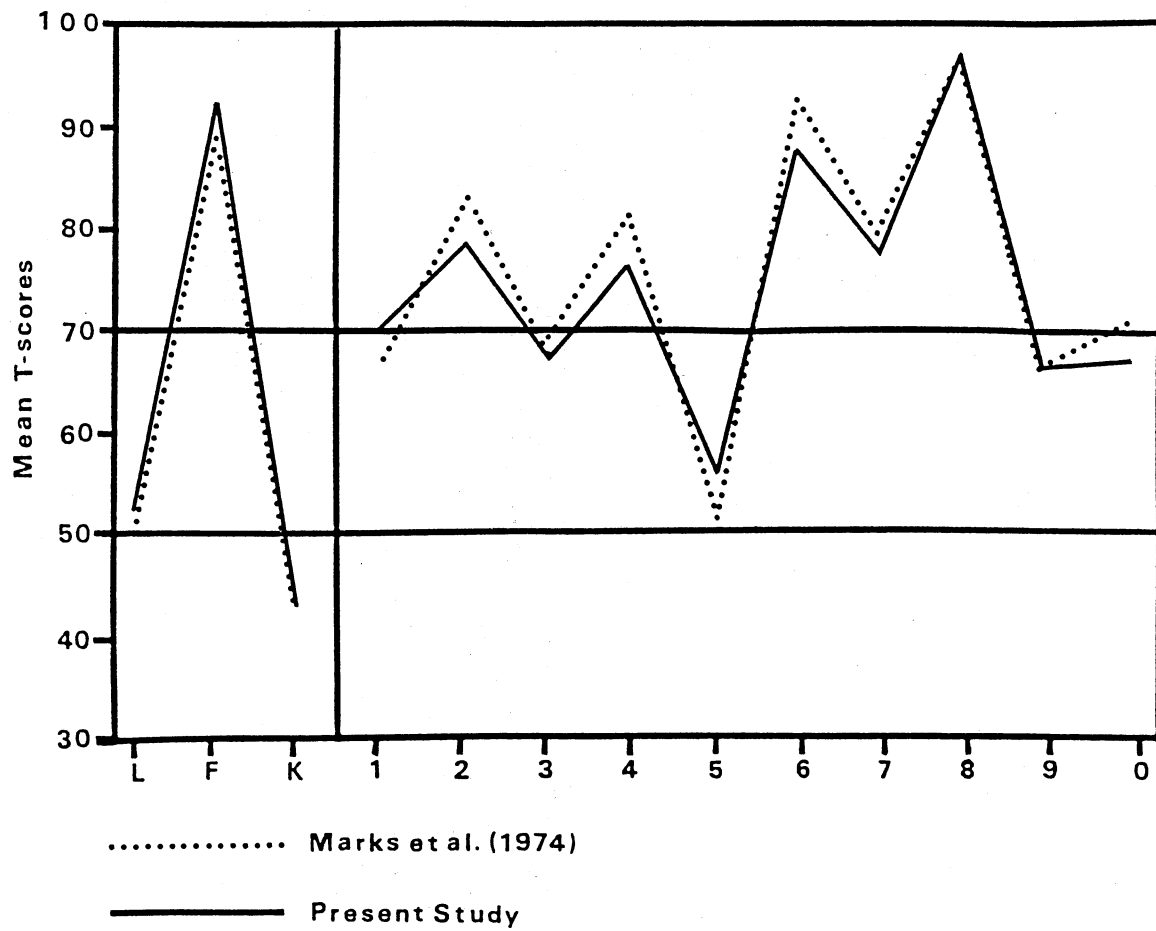


Figure 3. Mean 6-8/8-6 MMPI Profiles

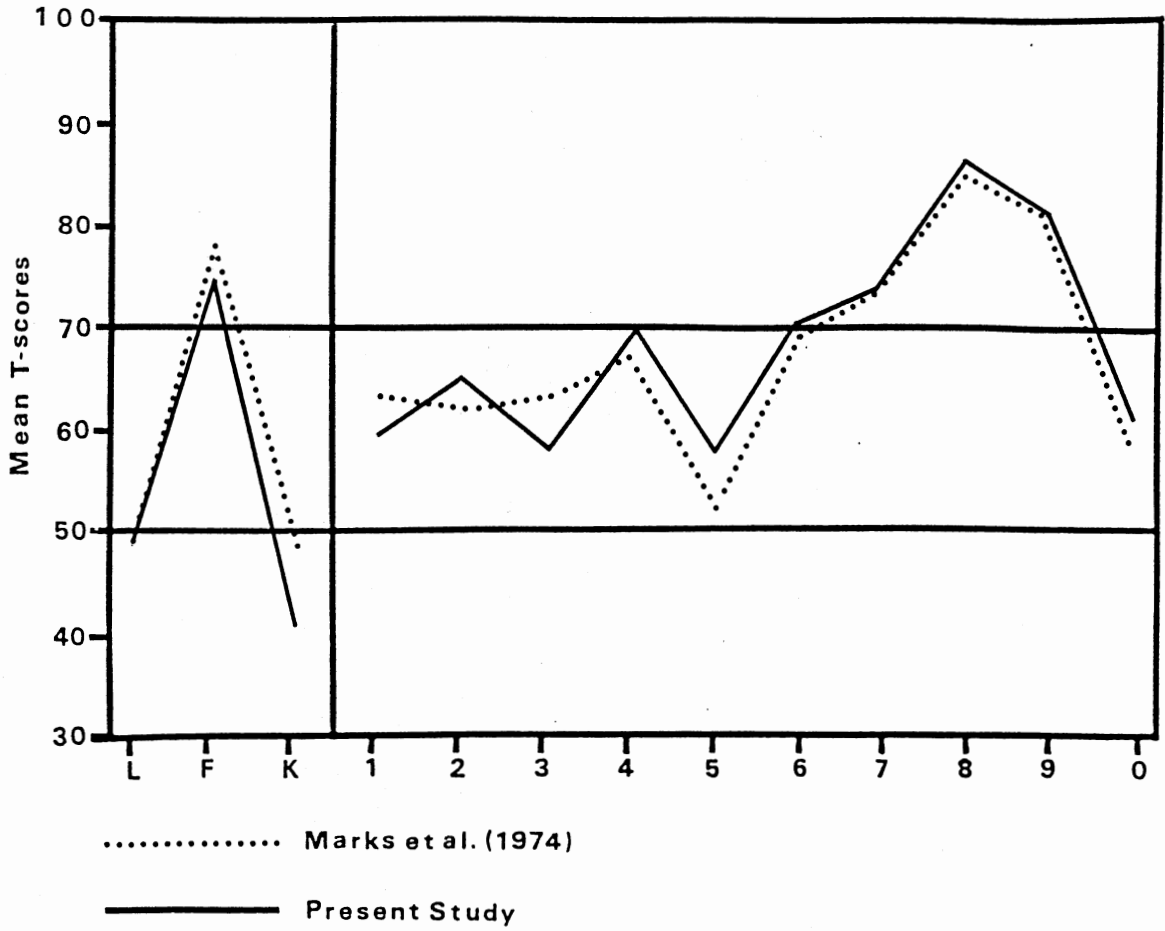


Figure 4. Mean 8-9/9-8 MMPI Profiles

TABLE I
 MEANS AND STANDARD DEVIATIONS FOR CONTINUOUS SUBJECT
 DEMOGRAPHIC VARIABLES OF AGE AND
 YEARS OF EDUCATION

Group	Age		Education	
	Mean	<u>SD</u>	Mean	<u>SD</u>
2-7-8	33.1	7.7	11.9	1.7
8-2	39.9	12.5	11.3	1.9
8-6	31.2	8.7	12.5	1.9
8-9	29.5	4.2	11.3	1.0

6-8/8-6 groups and 6 subjects in the 8-9/9-8 group). This analysis revealed no significant differences between groups on age or years of education by use of Wilks' criterion $F(6, 62) = 1.56, p = .18$.

Differences between groups on discrete subject demographic variables were analyzed by chi-square tests of independence. Variables analyzed were Sex (male, female), Race (white, nonwhite), Employment status (employed, unemployed), Marital status (divorced, not divorced), and Previous Hospitalization (prior admissions, no prior admissions). See Table II for distributions of these variables. This design resulted in 5 separate chi-square analyses of 4 x 2 contingency tables as seen in Table III.

The familywise alpha level of .10 was divided by the 5 tests, for a first stage Bonferroni alpha level of .02. None of the 5 chi-square tests were significant at this level and the Bonferroni procedure was terminated at this point. The null hypotheses of independence could not be rejected for any of the five tests.

The total number of PDI syndromes present for each group may be found in Table IV. As can be seen, only 4 syndromes (Alcohol Abuse, Drug Abuse, Depression, and Schizophrenia) are present in greater than 30% of the cases. Of these 4 syndromes, Depression and Schizophrenia represent psychiatric syndromes while Alcohol and Drug Abuse represent substance abuse syndromes.

Separate 4 x 2 chi-square analyses were conducted for the 2 groups, psychiatric and substance abuse (Table V). For each group, the first stage Bonferroni alpha level was set at .05 (familywise alpha level of .10 divided by 2 tests). No significance was found for either of the substance abuse syndromes and no further analyses were conducted for

TABLE II
 DISTRIBUTIONS OF DISCRETE SUBJECT
 DEMOGRAPHIC VARIABLES

Group	Sex		Race		Employed		Divorced		Previous Treatment	
	M %	F %	White %	Indian %	Yes %	No %	Yes %	No %	Yes %	No %
2-7-8	50	50	100	0	0	100	40	60	90	10
8-2	50	50	90	10	30	70	80	20	70	30
8-6	70	30	90	10	20	80	40	60	80	20
8-9	33	67	100	0	67	33	67	33	67	33

TABLE III
 CHI-SQUARE ANALYSES OF DISCRETE SUBJECT
 DEMOGRAPHIC VARIABLES

Variable	Group			
	2-7-8	8-2	8-6	8-9
<u>Sex</u>				
Male	5	5	3	4
Female	5	5	7	2
$\chi^2 (3) = 2.16 \quad p = .54$				
Cramer's $\underline{V} = .25$				
<u>Race</u>				
White	10	9	9	6
Indian	0	1	1	0
$\chi^2 (3) = 1.69 \quad p = .64$				
Cramer's $\underline{V} = .22$				
<u>Employed</u>				
Yes	0	3	2	4
No	10	7	8	2
$\chi^2 (3) = 9.16 \quad p = .03$				
Cramer's $\underline{V} = .50$				
<u>Divorced</u>				
Yes	4	8	4	4
No	6	2	6	2
$\chi^2 (3) = 4.68 \quad p = .20$				
Cramer's $\underline{V} = .36$				
<u>Previous Treatment</u>				
Yes	9	7	8	4
No	1	3	2	2
$\chi^2 (3) = 1.67 \quad p = .64$				
Cramer's $\underline{V} = .22$				

TABLE IV
 PERCENTAGE OF POSITIVE PDI SYNDROMES BY GROUP

PDI Syndrome	Group			
	2-7-8 %	8-2 %	8-6 %	8-9 %
Alcohol Abuse*	50	20	40	67
Drug Abuse*	40	10	50	50
Mania	0	30	0	17
Depression*	100	100	80	50
Schizophrenia*	70	40	80	17
Antisocial	10	0	0	17
Obsessive/ Compulsive	0	10	20	0
Phobia	0	10	0	17
Panic Attack	10	30	10	17

*Syndrome present in greater than 30% of all subjects

TABLE V
CHI-SQUARE ANALYSES OF PDI SYNDROMES

PDI Syndrome	Group			
	2-7-8	8-2	8-6	8-9
<u>Alcohol Abuse</u>				
Positive	5	2	4	4
Negative	5	8	6	2
$\chi^2 (3) = 3.77 \quad p = .29$				
Cramer's $\underline{V} = .32$				
<u>Drug Abuse</u>				
Positive	4	1	5	3
Negative	6	9	5	3
$\chi^2 (3) = 4.36 \quad p = .23$				
Cramer's $\underline{V} = .35$				
<u>Depression</u>				
Positive	10	10	8	3
Negative	0	0	2	3
$\chi^2 (3) = 10.08 \quad p = .02^*$				
Cramer's $\underline{V} = .53$				
<u>Schizophrenia</u>				
Positive	7	4	8	1
Negative	3	6	2	5
$\chi^2 (3) = 7.92 \quad p = .05^*$				
Cramer's $\underline{V} = .47$				

*Significant at $p < .10$ with multistage Bonferroni procedure

this category. For the psychiatric category, the null hypothesis of independence was rejected for the Depression syndrome. The second stage of the the multistage Bonferroni procedure tested the remaining syndrome of Schizophrenia at alpha equal to .10 (familywise alpha .10 divided by 1 test). The null hypothesis of independence was rejected for this positive syndrome as well. Post hoc evaluation of these significant chi-square analyses employed Goodman's gamma. Calculation of Goodman's gamma for the Depression syndrome reveals that significant differences exist between the 2-7-8/8-7-2 and 8-9/9-8 groups and between the 2-8/8-2 and 8-9/9-8 groups. In each case, there were fewer patients in the 8-9/9-8 group who received positive Depression syndromes than in either of the other groups. There was no difference between patients in other group comparisons on the number of positive Depression syndromes. For the Schizophrenia syndrome, the patients in the 8-9/9-8 group exhibited significantly less positive Schizophrenia syndromes than did patients in the 6-8/8-6 group. Other comparisons were not significantly different.

Correspondences between the positive PDI syndromes of Schizophrenia and Depression and hospital discharge diagnoses were also investigated. Because these two particular PDI syndromes cover a broad spectrum of psychotic and depressive symptomology, several DSM-III diagnoses were subsumed under each. DSM-III diagnoses judged to be concordant, in part or whole, with the PDI syndrome of Schizophrenia included:

Schizophrenia (all subtypes), Schizoaffective Disorder, Organic Delusional Syndrome, Major Depression with Psychotic Features, Bipolar Disorder with Psychotic Features, Schizophreniform Personality Disorder, and Schizotypal Personality Disorder. DSM-III diagnoses concordant with the PDI syndrome of Depression included: Major Depression, Bipolar

Disorder Mixed and Depressed, Schizoaffective Disorder, Dysthymia, and Adjustment Disorder with Mixed Emotional Features. As seen, some DSM-III diagnoses will satisfy the criteria for both PDI syndromes. For example, a DSM-III diagnosis of Major Depression with Psychotic Features could qualify for both PDI syndromes of Depression and Schizophrenia. In this case, the patient's psychotic symptoms would be endorsed under the PDI syndrome of Schizophrenia while the depressive symptoms would be endorsed under Depression.

Using the hospital diagnoses as the "actual diagnoses", the conditional probabilities between hospital diagnoses and positive PDI syndromes can be calculated. This method of analysis provides some insight into the overall agreement between the two measures, although the assumption that the hospital diagnoses represent the "correct" diagnoses may not be tenable. There were 18 patients who received a hospital diagnosis indicative of psychosis, with 14 of these receiving positive PDI syndromes of Schizophrenia. This results in a hit rate of 78%. There were 12 patients who received no diagnosis of psychosis by either method, resulting in a 67% rate of correct rejection. For depressive symptoms, 16 patients received positive hospital diagnoses. All 16 also received positive PDI syndromes of Depression, resulting in a hit rate of 100%. Although the hit rate was 100% for depression, there were 15 patients who received a positive PDI syndrome of Depression which was not supported by their hospital diagnosis. This represents a false alarm rate of 75% for this syndrome.

Inspection of frequency data for therapist endorsement of Mental Status Checklist items revealed that 43 items were endorsed in less than 30% of the cases. The remaining 29 items were subject to 4 x 2 chi-

square analyses of independence. The first stage Bonferroni alpha level was set at .003 (.10 divided by 29 tests). At this level of significance, only one item, Depression, was significant (Table VI). The second stage Bonferroni alpha level was .004 (.10 divided by 28) and no further significance was found. Post hoc analysis of the one significant item revealed that there was significantly less depression, as rated by the therapists, in the 6-8/8-6 group compared to both the 2-7-8/8-7-2 group and to the 2-8/8-2 group.

TABLE VI
 CHI-SQUARE ANALYSIS OF THERAPISTS' RATINGS OF
 DEPRESSION ON MENTAL STATUS CHECKLIST

Depression	Group			
	2-7-8	8-2	8-6	8-9
Positive	9	10	3	5
Negative	1	0	7	1
$\chi^2 (3) = 15.56 \quad p = .001*$ Cramer's $V = .66$				

*Significant at $p < .10$ with multistage Bonferroni procedure

CHAPTER V

DISCUSSION

Recent evidence suggests that the diagnostic information contained in the 1974 edition of the Marks et al. actuarial system of MMPI interpretation may no longer be valid under the current diagnostic nosology of DSM-III (APA, 1980). It has been suggested that the validity of certain Marks et al. "schizophrenic" codetypes may be particularly suspect (Walters, 1984; Winters et al., 1985; Vincent et al., 1983). Recent investigation indicates that many disorders which once were considered to be schizophrenic in nature are now subsumed under the DSM-III category of affective disorders (Pope & Lipinski, 1978; Spitzer et al., 1978; Westermeyer & Harrow, 1984). The present study investigated the validity of the diagnostic data provided by selected Marks et al. codetypes as it applies under the current diagnostic nosology of DSM-III.

Comparison of the mean MMPI profiles obtained in the present study with those obtained by Marks et al. (1974) reveals a high degree of correspondence for each of the four codetype groups. The degree of correspondence is especially good for the 2-7-8/8-7-2, the 6-8/8-6, and the 8-9/9-8 profiles. Although the correspondence between the two mean profiles for the 2-8/8-2 group is slightly less than that between the other three profile groups, it should be noted that the largest difference between the two 2-8/8-2 mean profiles is only 14 T scores

(scale 8) and is not thought to consist of any practical significance.

This high degree of correspondence argues against the idea that any differences between the current study and that of Marks et al. (1974) are simply the result of profile differences. Only those profiles which satisfied the Marks et al. selection criteria for the specific codetype were included in this study, and the correspondence between mean profiles suggests that these criteria were successfully adhered to.

The argument that differences between codetypes in the current study are due to differences in subject demographics between the four codetype groups is also not supported. Data analysis failed to find any significant differences between groups on subject demographic variables. This homogeneity of demographic variables suggests that differences between codetype groups in the present study represent differences due to MMPI codetype classification, rather than differences in subject variables across codetype groups.

The hypothesis that the 8-9/9-8 profile was representative of a bipolar disorder was not supported. In fact, significant manic symptomology was ascribed to only four patients in all the groups, and only one of these patients fell into the 8-9/9-8 codetype group. Although manic symptomology was not found in any great frequency in this codetype group, it was found that this group was significantly less depressed than the 2-7-8/8-7-2 and 2-8/8-2 codetype groups, the two most depressed groups. The PDI syndrome seen most frequently in the 8-9/9-8 codetype was Alcoholism, with 67% of the patients testing positive.

Although the hypothesis that the 8-9/9-8 profile predominately represented a bipolar diagnosis was not supported, neither was the contention by Marks et al. (1974) that this codetype was predominately

representative of a schizophrenic diagnosis. Marks et al. found 65% of their 8-9/9-8 group to be diagnosed as schizophrenic, compared to 17% with positive PDI syndromes of Schizophrenia in the current study. The current results found the 8-9/9-8 codetype group to have significantly less positive PDI syndromes for Schizophrenia than 6-8/8-6 codetype group, the group with the highest incidence of schizophrenic symptoms. Only one patient in the 8-9/9-8 codetype group was indicated by the PDI to be psychotic, compared to 8 (80%) in the 6-8/8-6 codetype group.

As expected, the 6-8/8-6 codetype group was highly representative of schizophrenic symptoms. Eighty percent of the patients in this codetype group received a positive PDI syndrome of Schizophrenia, compared to 55% in the Marks et al. (1974) 6-8/8-6 sample. There appears to be little disagreement in the existing literature that the 6-8/8-6 codetype represents patients for whom psychotic symptomology is a significant part of the clinical picture.

The results concerning the 2-7-8/8-7-2 and the 2-8/8-2 codetype groups are less clear, but do give support to the general hypothesis that these two codetypes are representative of patients who are experiencing both affective and psychotic symptomology. There was a 100% incidence of positive PDI syndromes of Depression in both groups. As stated above, these two groups had a significantly greater number of positive PDI syndromes of Depression than did the 8-9/9-8 group. In addition to being depressed, these patients also exhibited symptoms of psychosis. The 2-7-8/8-7-2 group had 70% of its patients receive positive PDI syndromes of Schizophrenia, which is a higher rate of occurrence than the 38% which was reported by Marks et al. (1974). The rates of occurrence of psychotic symptoms for the 2-8/8-2 group between

the current study and that of Marks et al. were much more similar, with rates of 40% and 50% respectively.

The finding of both depression and psychotic symptoms in these codetype groups is generally consistent with the existing literature. As previously discussed, significant depressive symptoms such as sadness, withdrawal, and helplessness have been reported as have general symptoms of psychosis (Gilberstadt & Duker, 1965; Gynther et al., 1973b; Lachar, 1968; Warbin et al., 1972). Although Marks et al. (1974) report a predominate diagnoses of psychosis for these two codetype groups, the narrative summary provided for each codetype indicates many descriptors consistent with a significant depressive component. Hypotheses as to why these depressive symptoms have been overshadowed by diagnoses of psychoses will be proposed further in this discussion.

Inspection of the conditional probabilities for the comparison of positive PDI syndromes against hospital discharge diagnoses indicates that the PDI does a good job of detecting the presence or absence of psychosis as defined and identified by the psychiatric staff. The PDI is also in complete agreement with those cases in which the psychiatric staff indicated the presence of significant depressive symptomology. The discrepancy between the two methods of assessment arises from the assessment of depressive symptoms. The findings here indicate that the PDI recognized the presence of significant depressive symptoms with far greater frequency than the discharge diagnoses indicate was the case for the psychiatric staff. Hypotheses as to why this may have occurred will also be developed.

Differences between groups were also assessed by therapists' endorsement of mental status items for each patient. For the one

significantly different item, Depression, it was found that the therapists rated the 6-8/8-6 group as significantly less depressed than either the 2-7-8/8-7-2 or the 2-8/8-2 group. Inspection of these frequencies reveals that the therapists rated depression as present for 30% of the 6-8/8-6 patients compared to 80% or greater for the other three codetype groups. This result is inconsistent with the above in which the PDI rated the 8-9/9-8 codetype group as significantly less depressed than either of the 2-7-8/8-7-2 or 2-8/8-2 groups.

Consideration of the results to this point indicates that significant discrepancies exist between the PDI assessment of depression and that of both the psychiatric staff and individual therapists. In order to offer possible explanations for these discrepancies, a more detailed look at the incidence of depression and the method of assessment is in order.

The PDI indicated a positive syndrome of Depression for 31 of the 36 patients interviewed. This results in an 86% rate of occurrence of significant depressive symptomology as rated by the PDI for this sample of patients. The discharge diagnoses of the psychiatric staff indicate the presence of significant depression in only 16 (44%) of the cases. Therapists' ratings provide endorsement of significant depressive symptomology in 27 (75%) of the patients. From this, two tendencies can be ascertained. It appears that the hospital diagnoses are indicative of significant depressive symptomology to a much lesser degree than are either the PDI assessments or therapists' ratings. Secondly, it appears that therapists are endorsing depressive symptomology in frequencies comparable to that of the PDI, but that they are endorsing them for different groups.

Several reasons could be offered as to why the incidence of depression is much less in the hospital diagnoses when compared to PDI assessment. It could be argued that the PDI simply overdiagnoses the presence of depressive symptomology. Although this argument is plausible, it is not likely for several reasons. The first of these rests within the structure of the PDI itself. In order to obtain a positive PDI syndrome of Depression, at least nine questions pertaining to specific depressive symptoms must be answered in the affirmative. Also, these questions must satisfy certain structural criteria of the PDI (i.e., certain combinations of positive symptoms must be present in a certain order). In addition to the structural controls of the PDI, the comparable rate of depression as identified by therapists' endorsements also argues against an overdiagnosis by the PDI.

If it is accepted that the PDI does not overdiagnose the presence of depression, it must follow that the hospital staff underdiagnoses the presence of depression. This tendency to underdiagnose depressive symptoms could be the product of either the method employed to make the diagnosis or of the disorders which are presenting themselves for diagnosis.

In considering the first of these possibilities, the most obvious difference between the two methods of diagnosing used in the present study is that the PDI represents a structured, standardized format while the method employed by the psychiatrists consisted of the traditional free-form diagnostic interview. As was discussed earlier, the use of a structured format has been found to provide a greater amount of diagnostic information, provide information that is more specific and descriptive, prevent unusual symptoms from being overlooked, and reduce

sources of variance (Climent et al., 1974; Meikle & Gerritse, 1970; Spitzer & Williams, 1980; Weitzel et al., 1973). The free-form interview format employed by the diagnosing psychiatrists could have provided them with less or more variable diagnostic information concerning the presence of depression than was the case for assessment with the PDI, and the depressive symptomology could have been overlooked.

A second argument that could be proposed was that the PDI was used to identify all positive clinical syndromes while the psychiatric staff had only to arrive at a clinical diagnosis and, therefore, the PDI identified syndromes which were recognized by the psychiatrists but not included in their diagnoses. It is conceivable that such may have been the case in the present study; however, the scope of this investigation does not allow for a post-hoc assessment of this hypothesis. Although the possibility exists that depressive symptoms were routinely recognized but not diagnosed, it is not very likely that this occurred. To routinely ignore significant positive depressive symptomology would represent less than optimal diagnostic practices, and would be of no conceivable gain.

As discussed previously, the criteria which must be satisfied before a positive PDI syndrome of Depression is recorded are rather rigorous, and it is unlikely that a patient would receive such if he or she were not significantly depressed. Given that many patients exhibited a significant degree of depression that was not diagnosed and it is unlikely that such depressive symptomology was noticed and ignored by the psychiatric staff, it becomes important to examine what the actual diagnoses were in those cases with probable, but undiagnosed, depression.

An examination of the 15 cases in which there was a positive PDI syndrome of Depression that was not supported by the hospital discharge diagnoses reveals that 10 of these cases received hospital diagnoses of some type of schizophrenia, 3 received substance abuse diagnoses, and 2 received a diagnosis of borderline personality disorder. From this, it appears that the majority (67%) of these cases were diagnosed by the psychiatric staff as schizophrenic.

Considering the literature cited earlier on the difficulties in the differential diagnosis of schizophrenic versus affective disorders (Pope & Lipinski, 1978; Taylor & Abrams, 1973; Taylor et al., 1974), it could be proposed that the 10 cases diagnosed as schizophrenic actually suffered from affective disorders with psychotic symptoms. This proposal becomes less tenable when the 10 cases are examined in closer detail. Of these 10 patients, 9 received a positive PDI syndrome of Schizophrenia in addition to a positive syndrome of Depression. The one patient who did not receive a positive PDI syndrome of Schizophrenia received a hospital diagnosis of schizophreniform disorder. This patient was relatively intact with the exception of bizarre somatic delusions which were not elicited by the PDI interview. Informal inspection of the case presentation and history of these 10 patients reveals a rather homogenous group of chronically psychotic patients with many previous inpatient hospitalizations, and most with previous diagnoses of schizophrenia.

It appears then, that these cases do not represent affective disorders with psychotic symptoms but, rather, represent psychotic disorders with affective symptoms. One possible reason for the underdiagnosis of depression in these schizophrenic patients may be

found in the work of Welner et al., (1974). These authors propose that clinically impressive symptomology, such as delusions or hallucinations, may tend to dominate the clinical presentation and bias the diagnostic impression. Such may have been the case for these schizophrenic patients when assessed with an unstructured clinical interview. The presence of hallucinations and other psychotic symptoms may have led to a correct diagnosis of schizophrenia while precluding a secondary diagnosis of depression. As seen in the DSM-III discussion of schizophrenia, a diagnosis of schizophrenia does not preclude a diagnosis of depressive symptoms if these symptoms are severe enough to so warrant.

Information obtained in the PDI interview revealed that many of these patients had been depressed for quite some time, with several describing life long problems with depression, while others had become depressed following an identified external event. Clinical examples of such patients include a 33 year-old female who was working on finishing her degree in nursing. She had been diagnosed with schizophrenia since her adolescence, but had periods of prolonged neuroleptic maintenance in which she was relatively symptom-free. She was admitted to the hospital with a return of auditory hallucinations which "took over" her mind. This patient reported feeling very depressed and despondent at the return of her psychotic symptoms. She related that when her schizophrenia is well controlled, she lives in constant fear that her psychosis would return.

A second example consists of a 44 year-old male with a long history of schizophrenia which he has had moderate success in controlling with medication. The patient was admitted following a suicide attempt in

which he took a number of his medications at one time. The patient had reportedly been quite despondent since the death of his wife some 2 years previously and reported a full complement of depressive symptoms since that time.

Although these exemplary patients undoubtedly do suffer from schizophrenia, it is also evident that they are currently experiencing a significant amount of depressive symptoms as well. In some cases their depression appears related to external event, while in many it appears directly related to their experience of psychotic symptoms. For such cases, it is likely that previous diagnoses of schizophrenia and current psychotic symptomology lead to a biased final diagnosis in which the patient's current depressive condition is not given equal recognition. While it does not necessarily follow, it could be the case that since the depression is not diagnosed, it is not treated.

Clinically impressive symptoms may not only lead to bias in psychiatric diagnoses, but may bias the perceptions of individual therapists as well. The idea of clinical bias may offer one possible explanation for the discrepant perception of depression between 6-8/8-6 and 8-9/9-8 codetype groups as measured by therapists' ratings. As was reported, the PDI assessment found the 8-9/9-8 group to be significantly less depressed than two most depressed groups (2-7-8/8-7-2 and 2-8/8-2), while the therapists' assessment found the 6-8/8-6 group to be significantly less depressed than than same two most depressed groups. It is possible that the psychotic symptoms manifested by the 6-8/8-6 patients overshadowed their depressive symptomology in the eyes of their therapists in the same manner that the depressive symptomology of the 2-7-8/8-7-2 and 2-8/8-2 patients were overlooked by the diagnosing

psychiatrists.

The possibility that depressive symptoms may be overlooked when there is the presence of psychosis has significant treatment implications when one considers the ubiquity of depression in the current sample. With the exception of the 8-9/9-8 codetype group, significant depression was judged to present in 80% or greater of the codetype groups. The level of depression necessary to receive a positive PDI syndrome of Depression is of such magnitude that it is highly likely that some measure of treatment for depression is in order. If such patients do not receive such treatment because they are solely treated for psychosis, then it can be said that such treatment is incomplete.

The limitations of the present study should be considered in any interpretation or generalization of the results. Although the number of subjects per group was greater than the five subjects used by Marks et al. (1974) and comparable to other MMPI investigations (cf. Gilberstadt & Duker, 1965; Kelly & King, 1979), it could be argued that more definitive results could perhaps be obtained with a greater number of subjects. It should be kept in mind that the results of the present study are derived from an inpatient population in a predominately rural section of the southwestern United States and may not apply to populations which differ in significant ways.

The results of the present study indicate that the contention by Marks et al. (1974) and others in the literature that the 6-8/8-6 codetype group is indicative of patients with a schizophrenic diagnosis is probably correct. The Marks et al. predominate diagnosis of schizophrenia for the 8-9/9-8 codetype group was not supported in the

present study nor was support given to the proposal existing in the literature that this group was representative of a bipolar disorder of the manic type. In fact, the 8-9/9-8 codetype group was the least "psychiatric" of all the groups, receiving the greatest number of positive PDI syndromes for Alcoholism. Data for the 2-7-8/8-7-2 and the 2-8/8-2 codetype groups indicate that these groups represent individuals who suffer a combination of both affective and psychotic symptoms. It was also found that the depressive symptoms of these individuals may often be overlooked in diagnosis and, perhaps, also in treatment.

From these findings, it appears that the present-day validity of the diagnostic information contained in the Marks et al. (1974) actuarial system of MMPI interpretation remains adequate for some codetypes, has some partial validity for others, and may lack validity altogether for others. Further research is needed to more thoroughly investigate these questions of present-day validity. In addition to further studies of diagnostic validity, further studies investigating the prevalence and scope of depressive symptoms in other 2-7-8/8-7-2 and 2-8/8-2 codetype groups are suggested. The results of the present study, the existing literature, and the descriptive narratives of Marks et al. (1974) all suggest that depression is a significant component found in these two codetypes. However, it appears that the degree of depression present may go unrecognized due to the coexistence of psychosis. Additional research could more closely investigate the question of bias induced by clinically impressive symptomology. Questions as to whether other MMPI codetypes demonstrate similar patterns, whether the same pattern is seen for these two codetypes in different treatment settings, and whether other clinical symptoms or

behavior (e.g., antisocial traits) are clinically "impressive" in the sense that they introduce bias into diagnostic formulations are open to empirical investigation.

Summary

The validity of the diagnostic information provided by the Marks et al. (1974) actuarial system of MMPI interpretation under the current diagnostic nosology of DSM-III has been questioned. There is evidence to suggest that many of the Marks et al. codetypes which are given a primary diagnosis of schizophrenia may, in fact, represent nonschizophrenic disorders as defined by the DSM-III. The present study investigated the validity of the Marks et al. diagnostic information for the 2-7-8/8-7-2, 2-8/8-2, 6-8/8-6, and 8-9/9-8 MMPI codetype groups for psychiatric inpatients.

The contention by Marks et al. (1974) and the extant literature that the 6-8/8-6 codetype group was primarily representative of psychotic patients with schizophrenic symptoms was supported. Investigation of the 8-9/9-8 codetype group did not support a primary diagnosis of schizophrenia as proposed by Marks et al. nor was the hypothesis that the 8-9/9-8 codetype group was representative of a bipolar disorder given support. There was partial support given to the Marks et al. diagnosis of psychosis for the 2-7-8/8-7-2 and 2-8/8-2 codetype groups; however, it was also found that patients in these codetype groups suffer from significant depressive symptomology in addition to psychotic symptoms.

The results also revealed that traditional psychiatric diagnoses indicated the presence of significant depressive symptomology to a much

lesser degree than was found for either a structured diagnostic interview or for therapists' ratings of patients' symptoms. Although therapists' concurred with the diagnostic interview on the overall frequency of depressive symptoms, disagreement existed as to which patients demonstrated depression. It was hypothesized that the presence of clinically impressive psychotic symptoms led to a diagnosis which was biased toward the psychotic symptoms at the expense of the depressive ones.

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APPENDIXES

APPENDIX A

SUBJECT CONSENT FORM

Consent Form

Date _____

Name _____

I hereby voluntarily consent to participate in this study conducted by Richard N. Gowdy (Investigator), Oklahoma State University. I understand this study has been approved by the Human Subjects Committee of the Psychology Department, Oklahoma State University and by the review committee of

I understand that my participation is completely voluntary, and I may chose to decline to participate in this study with no adverse consequences as to my treatment and care at this facility. I further understand that I may withdraw from participation at any time.

I also understand that complete anonymity will be maintained, in that all information obtained from me will be identified by a code number rather than my name. I understand and agree that this anonymous data may be used for publication in scientific journals or presentation at professional conferences.

I further understand that information gained from this study may prove beneficial in my treatment, but realize that I will receive no compensation for participation. Although no adverse circumstances are expected, I may take any complaints regarding my participation to my primary therapist or attending physician. By signing this form I have not waived any of my legal rights or released the participating institutions from liability for negligence.

I have read this form and understand its contents.

Participant _____

Witness _____

APPENDIX B

THE USE OF THE CHI SQUARE STATISTIC

The Use of the Chi-Square Statistic

Because some current controversy exists in the literature as to restrictions required in the use the chi-square statistic, a brief exposition of the use of the chi-square will be undertaken here. As an initial point of explanation, many of the studies cited below included discussions of both the chi-square tests for goodness of fit and for tests of independence. Since the present study was only concerned with the latter, references to the former will be omitted for the sake of expedition.

In their now classic 1949 article "The Use and Misuse of the Chi-Square Test" Lewis and Burke delineated the nine most common errors found in the literature concerning the use of the chi-square statistic. Reaction to this article was strong and immediate, prompting replies from three authors (Edwards, 1950; Pastore, 1950; Peters, 1950) along with a rejoinder from Lewis and Burke (1950) in the the following year. That this article had an initial impact is evident and, as will be seen, issues brought forth by this article are still the subject of current debate.

While a majority of the problems in the application of the chi-square statistic discussed resulted from improper experimenter manipulation (Lewis & Burke, 1950), at least one of the issues raised was primarily based upon properties of the statistic itself. This issue concerned the minimum value of the expected (or theoretical) cell frequencies required for proper application of the chi-square statistic.

Lewis and Burke stated that a major weakness found in psychological research employing the chi-square resulted from "a strong tendency to use excessively small theoretical frequencies" (p. 454).

The authors went on to define "excessively small" as expected frequencies of less than 10 when degrees of freedom (df) fall below 4 or 5. And although they allowed that some statisticians used 5 as a minimum expected frequency, they stated that they believed this value to be too low. Since the publication of this article, standard convention has been to honor these limits of 5 and 10 as minimum criteria for expected frequencies. Most standard textbooks call for 10 as a minimum expected frequency for 1 df and 5 for greater df (e.g., Kirk, 1978) while some require minimum expected frequencies as high as 20 (Kendall, 1952).

Among the first to investigate the requirements of minimum expected frequencies was Edwards (1950) in his reply to Lewis and Burke. Edwards proposed that expected frequencies as low as 5 in a 2 x 2 contingency table did not constitute a "misuse" of chi-square statistic as proposed. Reviewing a study cited by Lewis and Burke as well as other examples, Edwards concluded that the degree of "approximate accuracy" for the chi-square test was indeed satisfactory for expected frequencies of less than 5 in some cases. He did recommend that researchers using expected frequencies of such magnitude set alpha less than or equal to .05, use the correction for continuity, and calculate exact probabilities for borderline cases. In their rejoinder to Edwards, Lewis and Burke (1950) agreed that it might some day be supported that small expected frequencies are adequate; however, they stated they would adopt a "wait-and-see" attitude until this research was forthcoming.

It was not until some 20 years later that such experimental support was forthcoming. With the advent of sufficient computer technology, it became possible to conduct Monte Carlo investigations of traditional restrictions in the use of the chi-square statistic. An early Monte Carlo study was conducted by Roscoe and Byars (1971) to empirically investigate this question of minimum expected frequencies. These authors investigated chi-square tests of independence for contingency tables ranging in size from 2×2 to 5×5 with various equal and unequal sample sizes and departures from uniformity of distribution. They found that chi-square tests with greater than 1 df proved robust with respect to Type I errors in most cases. At .05 alpha, acceptable approximations were obtained when the average expected frequencies (n/k , where n equals the sample size and k equals number of cells) were as low as 2 for uniform distributions, at least 4 for moderate departures from uniform, and at 6 or greater for extremely skewed distributions. Tests with 1 df required average expected frequencies of 7.5 or greater. Additionally, it was found that this robustness was not greatly influenced when samples were unequal.

Studies investigating small expected frequencies (Camilli & Hopkins, 1978) and small sample sizes (Camilli & Hopkins, 1979) for 2×2 contingency tables gave support to the above findings. It was found that Type I error probability remained accurate for expected frequencies as low as 1 or 2 when N was 20 or greater for cases when marginal frequencies were equal or unequal and/or when fixed or random. In tests of small sample sizes, it was found that accuracy remained at .05 alpha when N was greater than or equal to 8. Furthermore, it was found (Bradley, Bradley, McGrath, & Cutcomb, 1979) that for various departures

from uniformity and differing sample sizes found commonly in practice, alpha will not exceed .06 when alpha is maintained at .05 for most cases of R x C contingency tables regardless of the number and size of small expected frequencies.

In addition to the issue of the size of expected frequencies, one other consideration in the use of the chi-square deserves brief mention here. In Edward's (1950) admonitions to users of chi-square, he advises the use of Yates correction for continuity. Although Yates correction is used with some regularity in standard practice, there is considerable evidence arguing against the appropriateness of its use. Conover (1974) found that Yates correction is not merely a correction for continuity, but provides a different test than chi-square when marginal totals are not fixed and also poorly estimates desired probabilities. The robustness for Type I errors discussed above (Bradley et al., 1979; Roscoe & Byars, 1971) was determined without correction for continuity. In addition, it is argued that Yates correction results in very conservative probability estimates (Camilli & Hopkins, 1978; Delucchi, 1983) when either or both marginal frequencies are random.

In summary, it appears that chi-square tests of independence remain robust with respect to Type I error rates for most applications in behavioral research. It would also appear that Yates correction for continuity should be used only in cases in which marginal totals are fixed (a condition rare in most applications) or when strong conservatism is desired. For the purposes of this study, chi-square tests of independence without Yates correction for continuity appeared most appropriate.

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