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Comparisons between the Millon Behavioral Health Inventory and the MMPI on the Assessment of Pain Patients

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COMPARISONS BETWEEN THE MILLON BEHAVIORAL HEALTH INVENTORY AND THE MMPI IN THE ASSESSMENT OF PAIN PATIENTS

by

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VITA

The author, Dianne Lee-Riordan, is the daughter of Robert L. Lee and Louise (Cirignano) Lee. She was born on October 4, 1958, in Winchester, Massachusetts.

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CHAPTER I

INTRODUCTION

In recent years the nature of chronic pain has increasingly been understood as a multidimensional phenomenon. The most obvious of these is the physical dimension, i.e., the presence of physical stimuli and differences in sensory physiology. Both researchers and health professionals are becoming more aware of the psychological dimensions of pain -- the cognitive and affective factors that affect the individual's experience of pain. The changes in interpersonal relationships which may precede or follow a chronic pain complaint constitute a third dimension of any chronic pain problem.

To appreciate its psychological and interpersonal dimensions, pain must be understood as a subjective experience. Pain is defined by an individual, for whom the amount and quality of the pain is determined by various factors. Such factors may include the meaning of pain for the individual, past experiences with pain, the current interpersonal consequences of suffering, financial and social consequences of disability, and predisposing personality traits.

In his original version of Pain and Pleasure, Thomas Szasz (1957) noted that there was a paucity of psychoanalytic writing on the phenomenon of pain. In the literature which does exist in psychiatry, psychology, and medicine, there is a strong tendency to differentiate between "physical" and "mental" pain. One effect of this differentiation is that the understanding and treatment of physical pain has been relegated to the field of medicine. On the other hand, the term "mental" pain has been used to refer to experiences which range from grief and suffering to the so-called "psychogenic" pain (p. 53). The latter term refers to pain experiences in which either no physiological basis for pain can be determined or when the degree of pain is greater than what would be expected given the physiological basis which has been determined. In contrast to the general tendency, Szasz conceptualizes pain as a single entity and as a subjective experience. He applied object-relations theory to explain how the meaning of pain changes as the ego develops in infancy and in childhood.

It is important to initially specify the nature of the problem - chronic pain - which is the focus of this research. Pain has been categorized into several different types and the various types of pain are associated with very different experiences. Pain varies in intensity, quality, duration, and meaning (Sternbach, Wolf, Murphy, & Akeson, 1973a). Chronic pain is that which has lasted at least six months, in contrast

to acute pain. Chronic pain may be periodic (e.g., migraine headaches), progressive (e.g., pain associated with malignancies), or intractable and benign (e.g., low-back pain). Patients with chronic low-back pain tend to experience the pain as present most of the time, with varying intensity, and indicative of a benign condition. Low-back pain is of particular concern because this is the most common pain complaint. A recent national survey indicated that 45% of patients who are treated in multidisciplinary pain clinics present with complaints of back and/or hip pain. (Hickling, Sisin, & Holtz, 1985). All of the fore-mentioned types of pain are to be distinguished from experimentally-induced pain, which may be produced in a laboratory setting and clearly differs in terms of etiology and maintenance (Turk, Meichenbaum, & Genest, 1983).

As Engell (1959) noted, there have been convincing demonstrations that pain may develop as a purely psychic phenomenon. In 1895, Breuer and Freud published detailed case histories in which pain appeared to be a psychogenic manisfestation. Pain was a common and primary complaint of many of Freud's patients. These patients, who often expressed other somatic symptoms, were believed by Freud to be experiencing hysterical conversions. For these patients, the pain (or other conversion sympton) was understood as a means of reducing anxiety. This tendency to identify certain pain patients (who did not have any known physical etiology for

pain) as conversion hysterics has been maintained. As will be discussed subsequently, a particular MMPI profile has been associated with the dynamics of "conversion hysteria." This understanding of pain is oversimplified if it leads us to conclude that the only mechanism by which pain may be substituted for anxiety is via the conversion symptom. There are various ways in which pain and anxiety are inter-related.

Rangell (1953) presents a psychodynamic view of the mechanisms underlying the production of pain. He claims that the schema presented may be applied to any other psychogenic symptom, or to psychogenic symptom formation in general. His categorization of different pain mechanisms extends from pain due to "situational stress" with "acute or chronic situational maladjustment" (p.24) to pain which is associated with psychotic states.

Among Rangell's categories are those which have been cited by other authors as descriptive of patients with chronic pain. These are: (1) pain associated with chronic situational maladjustment, (2) pain as a symptom of conversion hysteria, (3) pain reported in hypochondriasis, and (4) pain which occurs in psychotic states. Although Rangell's discussion is only a sketchy outline of the mechanisms involved, it is among the most comprehensive in the psychodynamic literature.

The category labelled "acute or chronic situational maladjustment" includes individuals who are basically well-adjusted and who are exposed to unusually stressful

circumstances (such as war) which provoke neurotic reactions. These individuals are believed by Rangell to exhibit the least psychopathology relative to all pain patients. For example, he refers to short-lived hysterical symptoms in individuals who are not hysterical personality types. Sudden or unusual events can be met with a hysterical-like sensory symptom of pain without the fixed pattern of true hysteria. In this category are also included many of the nonspecific aches and pains experienced by the general population, associated with the anxieties of everyday life. Certain cases of chronic back pain would be included in this category , e.g., those individuals for whom situational stressors lead to relatively enduring tension, chronic low-level anxiety, and thereby to enduring pain.

Rangell's second category involves the mechanism of pain in conversion hysteria. When pain is a symptom of conversion hysteria, it fulfills the basic function of conversion symptoms, i.e., a resolution of the neurotic conflict. In conversion hysteria, the neurotic conflict has been resolved by somatization, or "materialization" (p.27). Pain results from a compromise between the wish and the defense, which constitute the neurotic conflict. In hysteria, the wish is more strongly represented in the symptom than is

the defense. The pain (or other symptom) is a symbolic expression of the repressed instinctual wish.

The individual's association of pain with the instinctual conflict may be based on an obvious link, but is not necessarily so. As an example of an obvious link, a pain may result from identification with a loved person, who is believed to experience a similar pain.

Rangell stresses the need to recognize that the choice of pain as a symptom may be determined by the presence of a physical disease. The disease is used and elaborated upon for conversion purposes. For example, in an individual who is experiencing a physical disorder related to the back, the back may become the focus for a an hysterical conversion . This conversion then exaggerates and maintains the symptom of pain.

Complaints of the pains which occur in hypochondriasis tend to be generalized, atypical, and chronic. Symptoms include various organ systems. Rangell delineates the primary features as: attention and interest are turned inward; there is pre-occupation with the self; and object-relationships are superficial (i.e. the good and bad features of the object are not integrated). He views these features as indicative of narcissistic fixation. The hypochondriac experiences "painful sensations" throughout the body and these pains are usually

described in detail. Often, according to Rangell, these painful sensations are perceptions of normal physiological processes, such as peristaltic movement or pulse beat. The hypochondriac is keenly atuned to inner perception of any kind. He tends to have an exaggerated response to perceptions within his body.

Rangell notes that hypochondriasis tends to be a characteristic attribute of other psychopathological states, rather than an isolated entity. It is sometimes difficult to distinguish between hypochondriacal sensations and delusions. For this reason, Rangell considers hypochondriasis to be a transitional state between neurosis and psychosis.

Rangell's final category is that of the mechanisn of psychogenic pain in psychotic states. In psychotic depression, hostile feelings toward others (external objects) are turned toward the self (or the introjected object-representation). "Pain and displeasure intended for the object are inflicted on the introjected object within the self" (p.31).

Painful feelings and other "strange" sensations may occur when there are disturbances in the self-representation, specifically of the body image. Similarly, a lack of pain and lack of feeling may follow disturbances in the self-representation. This may evoke the psychotic-like feeling

that part of the body does not belong, as in estrangement syndromes.

Fordyce (1976) made a significant contribution to our understanding of both the development and maintenance of chronic pain by emphasizing the role of (operant) learning factors. He pointed out that behavioral manifestations of pain can be sources of communication and can be affected by environmental contingencies. Fordyce described "pain behaviors" as a means by which patients communicate their experiences of pain. Among the pain behaviors which Fordyce elucidated are: 1) verbal complaints of pain, 2) paraverbal sounds such as moans or sighs, 3) nonverbal signs, such as limping, and facial expressions such as grimacing, 4) resting or reclining, and 5) use of medication, or seeking medical attention.

Some of the reinforcers that have been known to maintain chronic pain include: 1) direct, positive reinforcement such as concern or attention from a spouse or a health professional, or rest, 2) avoidance of responsibilities such as employment or maintaining a household, and 3) lack of positive reinforcement for normal activity. Cognitive factors may also play a role in maintaining pain behaviors; for example, expectations about receiving financial compensation.

As pointed out by Turk & Flor (1987), the health care

system often inadvertently reinforces pain behaviors such as those listed above. Patients may seek out health professionals who will legitimize the physical basis of their problems. Unfortunately, the result may be that medication is prescribed and/or rest is recommended. This leads to increased dependence on meds and to increased inactivity, which leads to further seeking of medical attention.

Turk & Flor (1987) point out some of the limitations of the pain behavior construct. It must not be overgeneralized to the perception that all pain behaviors are nothing more than attention-seeking tactics. Unfortunately, there is a tendency among physicians to make this overgeneralization and thereby fall back upon a dualistic approach to the assessment of pain.

A simple stimulus-response relationship between pain behaviors and their reinforcers is also an oversimplification. As noted by Turk & Flor, often it is the patient's cognitive appraisal of the situation that affects his behavior and may be as important as the actual behavior. For example, the patient may avoid certain activities primarily as a function of anxiety and anticipation of pain, rather than an actual pain-activity relationship.

In recent years, there has been an increased interest in the psychological assessment of chronic pain patients. The

primary instrument currently in use in hospitals and pain clinics is the MMPI, which is followed by a variety of other health-oriented inventories and pain questionnaires. Among these other inventories is the Millon Behavioral Health Inventory, which was recently developed and has quickly gained popularity in pain clinics.

The purpose of this investigation is to explore the relationships between the Millon Behavioral Health Inventory and the MMPI in the assessment of patients experiencing chronic low-back pain. Subjects were patients who had been admitted to outpatient pain clinics at two Chicago-area hospitals. All subjects completed both the MMPI and the MBHI and participated in a one-hour interview with a clinical psychologist.

CHAPTER II

REVIEW OF RELATED LITERATURE

As health professionals have developed a greater appreciation of the psychological dimensions of chronic pain, interest in psychological assessment and treatment has also increased. A wide range of psychological assessment instruments is available in hospitals and pain clinics. According to a recent national survey of pain clinics (Hickling, Sison, & Holtz, 1985), the most commonly used tools are the clinical interview and the MMPI, followed by a variety of questionnaires specific to problems associated with pain. The frequent use of the MMPI derives from its ability to diagnose a range of psychopathology as well as the abundance of research literature in which the MMPI has been used with pain patients. Most of the research has investigated the MMPI's ability to distinguish between functional and organic causes of pain, predict response to treatment, and reveal subgroups of pain patients. Each of these issues will be reviewed in the following pages; however, the presence of

subgroups of pain patients is of particular importance to the proposed study.

The introduction of the Millon Behavioral Health Inventory (MBHI) in 1979 created the potential of assessing not only the coping styles of patients with chronic pain, but also their likelihood of responding to standard medical treatment. The potential of the MBHI as a tool for psychologists working with pain patients (and medical patients in general) is significant and unique. However, there is a lack of research evidence as to its reliability and validity. Research in which the MBHI has been used with pain patients will be reviewed subsequent to a review of the MMPI literature regarding this population. The review of the literature regarding the use of each of these inventories (with pain patients) will make their comparison more meaningful and will delineate the ways in which they may be compared.

Use of the MMPI with Pain Patients

Sternbach, Wolf, Murphy, and Akeson (1973a; 1973b) conducted systematic research into the clinical assessment of low-back pain patients and emphasized the frequency of depression among these patients. They used the MMPI to explore the relationship between chronic pain and depression. In an early study, Sternbach et al. (1973a) looked at average

MMPI profiles for 68 patients at a low-back clinic. Sternbach studied the average profile for men, average for women, average for patients with medical findings related to the pain complaint, and an average for patients with no medical findings. As he had expected, he discovered elevations (T > or = 70) on scales 1 and 3 for each average profile. These elevations were expected since hypochondriacal and hysterical traits were believed "common to most, if not all, psychosomatic disorders" (p. 52).

Contrary to expectations, Sternbach also found a significant elevation on scale 2 (T = 70). He concluded that the results of the first three scales of the MMPI of pain patients (chronic or acute) do not form the "psychosomatic V" (or conversion-V) of conversion hysteria.

The conversion-V pattern had been expected of pain patients since the work of Freud and Breuer on conversion hysteria. Theoretically, this pattern appeared because the symptoms bind the affect. In other words, use of hypochondriacal and hysterical defenses (focus on somatic complaints and denial of painful affect) resulted in minimal experience of depressive affect. Hence, scale 2 is lower than scales 1 and 3. Sternbach concluded that the symptoms do not "bind the affect." He further concluded that "these patients,

on the average, are clearly depressed, and their illness may be aptly termed a psychophysiological musculo-skeletal reaction with depression" (p.53).

Sternbach's clinical observations (1968) were consistent with his research findings regarding patients with chronic pain. He noted that pain patients with no or minimal medical findings often appear clinically depressed. He found depression to be particularly common among chronic low-back pain patients. Symptoms of depression included depressed mood, sleep disturbance, change in appetite, and decline in libido. Yet, as Sternbach noted, low-back pain patients often ascribe these symptoms specifically to their pain. Chronic pain patients deny that there is anything wrong except the physical cause of their pain. They view their emotional state as solely a consequence of their physical condition. Too frequently, health care professionals then ignore the fact that the patient is depressed. Instead of diagnosing the depression, they attempt to determine and to remedy the "underlying cause" of the pain.

Sternbach noted that the psychodynamic studies of Engel (1959), Rangell (1953), and Szasz (1957) gave priority to the affect. However, the psychodynamic authors focused upon anxiety as the primary affect which is inter-related with the experience of pain. They did not elaborate on the mechanism

whereby pain patients become depressed or that by which depressed individuals develop chronic pain. Sternbach suggests that depression may predispose one to develop chronic pain or it may be that depression occurs in reaction to the acute pain condition which does not subside.

The need to distinguish between patients with acute pain and those with chronic pain in terms of their clinical presentation was also emphasized by Sternbach. Sternbach, Wolf, Murphy, & Akeson (1973b) compared MMPI profiles of patients with acute low-back pain to those of patients with chronic low-back pain and found significant group differences on scales 1, 2, and 3. The average T scores of patients with chronic pain were approximately 10 points higher than those of the acute pain patients. The mean profile of the acute group shows a tendency toward the psychosomatic-V (described previously), i.e., there is a less elevated V, with T scores on scales Hs and Hy greater than or equal to 65, and T scores on scale D less than 60. According to Sternbach, these findings indicate that, for the acute pain patients, the somatic preoccupation shown in the elevation of scales Hs and Hy serves to "bind the affect" so that the depression is "not apparent."

In patients with chronic pain, Sternbach proposes, there is a collapse of the defense mechanisms, with much greater

somatic concern and depression. Therefore, in the average profile of these patients, the psychosomatic-V is not present. The average profile of these patients indicates that they are clinically depressed, in spite of the fact that these patients often deny depression and focus on their symptoms of pain.

Sternbach's research findings were corroborated by later studies. Cox, Chapman, & Black (1978) found that the MMPI could discriminate acute pain from chronic pain patients in terms of group differences. Scales Hs, D, and Hy were the only scales which contributed to these differences.

A pervasive problem in personality assessment of patients with chronic pain is that personality correlates which are identified may be either consequents of chronic pain or antecedents such as psychological predispositions. A majority of the studies which have looked at average MMPI profiles for groups of chronic pain patients have indicated marked elevations on the three scales which constitute the neurotic triad -- Hs, D, and Hy (Gentry, Shows, & Thomas, 1974; Maruta, Swanson, & Swenson, 1976; Sternbach et al., 1973a and 1973b). Many authors have interpreted these findings as an indication that chronic pain patients are characterized by particular neurotic personality traits and that these traits predispose the individual toward developing a chronic pain problem subsequent to an acute pain condition.

Watson (1982) notes, however, that the interpretation of elevated MMPI scores in the neurotic triad is ambiguous in the population of chronic pain patients. He presents three possible explanations for elevated scores. One possibility is that the pain is caused by pre-existing neurotic tendencies. These patients express a tendency to somaticize when in distress, as evidenced by the elevated Hs scale. They tend to express psychological conflicts as physical symptoms, as a consequence of their excessive use of denial and repression. (These dynamics were interpreted by Sternbach in 1974 as indicative of conversion hysteria among chronic pain patients.) Watson notes that this tendency toward somatization may reflect the existence of a "premorbid personality" as suggested by previous researchers.

Caldwell and Chase (1977) expand upon the possibility of a premorbid personality among chronic pain patients. They theorize that these patients represent those acute patients who have a particularly intense fear of pain, whether physical or psychological in origin. These patients are reinforced by a reduction of their fear. This fear-reduction reinforces a range of behavior, such as reduced physical activity and avoidance of work to avoid reccurrence of pain. The mechanism of fear-reduction also reinforces certain interpersonal behaviors which allow avoidance of emotional distress, with

its subsequent intensification of subjective pain. This pattern is essentially hysterical in character: the loss of physical functioning with the avoidance of psychological conflict.

Some evidence supports the argument that neurotic personality characteristics (as assessed by the MMPI) lead to chronic disability. Phillips (1964) found that higher neurotic triad scores were associated with a longer delay before returning to work among a group of pain patients. Wiltse and Rocchio (1975) found that lower Hs and Hy scores among patients awaiting surgery for a pain condition were associated with a greater likelihood of returning to work, returning to normal activities and functioning without analgesics following surgery.

Watson noted that a second possible interpretation for the elevated MMPI scores on the neurotic triad is that these scores reflect personality traits that result from the experience of chronic pain. Sternbach (1974) has been a major proponent of this interpretation. He argued that the differences between MMPI profiles of acute versus chronic pain patients suggest that neurotic symptomatology increases over time. However, these differences must be based on data obtained in a longitudinal study, in order to support Sternbach's reasoning. Such data has not yet been published.

The third interpretation suggested by Watson is that the MMPI profiles of chronic pain patients do not necessarily reflect neurotic symptomatology, however caused. He contends that all patients with chronic health problems have elevated neurotic triad scores. As Watson notes, each MMPI scale consists of several factors. High scores on a particular scale may have various meanings depending upon the particular items endorsed. Therefore, item analysis should help determine how the patient is describing herself using the MMPI.

Watson compared the responses of three groups -- chronic pain patients, a general medical control group, and a normal college control group -- on the neurotic triad scales. The Hs scale consists of: (1) items which indicate vague and diffuse somatic complaining such as is characteristic of the hypochondriac; (2) items indicating specific physical problems; and (3) items indicating general denial of good health. Analysis of the items endorsed by pain patients indicated that they largely focus on their specific pain symptoms and deny having good health. However, pain patients do not show the vague and diffuse somatic complaining that is characteristic of the hypochondriac. Watson concluded that, since pain-relevant items show the largest endorsement

differences, "it is likely that most pain patients are simply describing their specific physical problems" (p. 374).

One short-coming of this study is that Watson did not distinguish between pain patients with a single complaint (e.g., back pain) versus those with multiple complaints (e.g., back, leg, and hip pain). It might be expected that patients with multiple forms of chronic pain are relatively more hypochondriacal than those with a single pain problem. In fact, Watson found that a significant subset of the pain group in his study did exhibit the hypochondriacal pattern in their item responses.

The D scale consists of items indicating somatic complaints, psychomotor slowness, lack of involvement in suroundings, lack of self-confidence, denial of hostility and cynicism, and feelings of worthlessness. These items constitute one subscale of D, and are considered "obvious" symptoms of depression. The D scale also includes a subscale which consists of items considered "subtle" depressive symptoms. These items assess inhibition, overcontrol, rigidity, obstinacy, apathy, and emotional constriction.

Watson found that the chronic pain patients did not tend to endorse items constituting the "subtle depression" subscale. For example, they did not reflect emotional inhibition and obstinacy assessed by certain items. Watson

concluded that these patients were not characterized by the depressive personality style. These patients did demonstrate symptoms such as sleep disturbance, low self-esteem, apathy and anhedonia. Watson concluded that, in most cases, the depressed/dissatisfied state results from these patients' chronic disability due to pain and does not predate the chronic pain problem.

Yet, he determined that there was a subset of patients who were characterized by the depressive personality style (subtle depression). For these patients, the causal sequence may have been : acute pain combined with premorbid depression resulted in chronic pain.

In conducting a similar analysis of the meaning of high scores on the Hy scale, Watson noted that Hy contains both : (1) items pertaining to admission of problems, such as poor health, specific somatic complaints, and dissatisfaction in general, and (2) items involving the denial of problems, such as denial of social anxiety, hostility, and cynicism. The subscales have been labelled "Ad" (Admission of symptoms) and "Dn" (Denial of symptoms). The dynamic upon which this scale is based is a characteristic denial or repression of psychological disturbance resulting in somatic problems.

In Watson's study, the pain sample differed from the medical sample in its higher Hy scores. However, this

difference was primarily due to the endorsement of items constituting the "Ad" subscale. Pain patients were more likely than general medical patients to admit problems such as poor health, but they did not express the hysterical tendency toward repression and denial.

Regarding the K scale, Watson found that the pain sample responded in a similar manner to the general medical group and the control group. Pain patients as a group did not respond either defensively or non-defensively.

Watson cites these findings as evidence that a subgroup of chronic pain patients may be emotionally well-adjusted. He points out that there is no single mechanism by which chronic pain develops, nor is there a particular personality type that characterizes pain patients.

Watson notes that these three explanations are not mutually exclusive. Each may explain the MMPI responses of a specific subgroup of chronic pain patients. Certain patients may be somaticizing conflict; others may be anxious or depressed as a result of being chronically disabled; and a third group may be emotionally well-adjusted.

"Functional" versus "Organic" Distinction

For many years, psychological assessment of chronic pain patients has included attempts to distinguish between patients

who have a known organic "cause" of their pain and those who do not. This distinction arises from the fact that a significant number of these patients have little or no apparent organic basis for their reports of pain. For these individuals, the diagnosis of "psychogenic pain" or "functional pain" is often made. This implies that the patient's experience of pain is occuring in the absence of noxious stimulation or that there is a discrepancy between the level of noxious stimulation and the level of expressed pain. In effect, the term "functional" is often used to imply a psychological or motivational cause of the pain problem. For example, these patients may be assumed to be faking or exaggerating their pain.

The psychological instrument which has been most commonly used in making a diagnosis of functional pain versus organic pain is the MMPI. However, there have been conflicting results in the literature as to the ability of the MMPI to reveal differences in the psychological profiles of organic versus functional pain patients. Most of this research has involved the use of the MMPI to detect differences between groups of patients diagnosed as having either functional or organic pain. The average profile of a group of functional patients is compared to the average profile of a group of organic patients.

One line of research (Calsyn, Louks, & Freeman, 1976; Freeman, Calsyn, & Louks, 1976) has reported MMPI differences between patients diagnosed as having functional or "mixed" pain and those diagnosed as having organic pain. Another line of research has indicated that the MMPI is consistently unable to detect significant group differences (Cox et al., 1978; Fordyce, 1976; Sternbach, 1974).

In an early study , the authors compared the average MMPI profiles of 81 patients with positive medical findings and 36 patients without medical findings (Sternbach et al., 1973b). They reported striking similarities between these two groups of patients. There was a slight nonsignificant difference on the depression scale such that the "no-findings" group scored higher. Also, a small significant difference was found on the Ma scale, such that the "positive findings" group scored higher.

Some investigators have used special scales derived from the MMPI in attempts to distinguish functional and organic pain. One of these special scales -- the Low Back Pain (Lb) scale of the MMPI (Dahlstrom, Welsh, & Dahlstrom, 1975) was based upon the original research of Hanvik (1951). Of the 25 items that constitute this scale, 20 are keyed in a false direction. This requires that the patient deny a particular kind of thought, feeling, or experience.

Over the past 30 years since its development, the Lb scale has been used with mixed results. Various investigators failed to find any significant differences between groups of pain patients with versus without medical findings (Graham, 1978; Sternbach et al., 1973b; Towne & Tsushima, 1978, 1979). Graham (1978) has suggested that the scale has not proven successful in research studies because of demographic or clinical variability between settings. The importance of demographic variables in the assessment of functional versus organic distinctions will be further discussed in subsequent pages.

A second special scale derived from the MMPI for similar purposes -- the DOR scale -- was developed by Pichot in France (cited in Freeman et al., 1976). In a cross-validation study using the DOR scale and the Lb scale (cited in Freeman et al., 1976) these two scales were found to be independent and weakly correlated. The scale's developers contended that incremental validity was gained when DOR was used with Lb.

Several investigators have used the MMPI and its special scales (Lb, DOR) in attempts to distinguish among groups of patients with positive medical findings (organic) versus no medical findings (functional) or patients with medical findings that do not appear to account for the degree of pain reported (mixed). There is a large group of patients who

would be classified as "mixed", in terms of functional and organic distinctions.

In one such study, Freeman et al.(1976) found that all three groups were characterized by the conversion-V profile. No significant differences were found between the mixed and organic groups on D. The mixed and functional groups were also surprisingly similar. The major finding was that the mixed and functional groups differed significantly from the organic group on the Hs, Hy, Pt, Sc, and DOR scales. One conclusion drawn from these results is that patients whose pain is considered functional are more anxious and preoccupied with physical health. Calsyn et al. (1976) reported similar findings in a subsequent study of groups of pain patients.

The conflicting results of studies that attempt to find significant differences between groups of functional versus organic patients may be due to shortcomings in methodology. In general, these investigators have ignored the fact that it is very difficult for medical professionals to determine whether an individual patient best fits into a functional versus mixed versus organic group. Orthopaedic, neurological, and neurosurgical specialists cannot agree on the criteria for a "sufficient physical substrate" for low-back pain (Adams, Heilbronn, Silk, Reider, & Blumer, 1981). There are various indicators that have been used as criteria for "organic" pain,

such as muscle atrophy, decreased sensation, or decreased deep tendon reflexes.

Cox et al. (1978) attempted to overcome this type of methodological weakness. They compared a group of patients whose etiology of pain was "unknown" to a group of patients whose etiology was known to be related to surgery. Both groups had averaged seven to eight years of pain and six to seven operations. They found that the MMPI could not discriminate chronic pain patients whose pain problems were of known origins from those whose pain had no known organic origins. These authors concluded that the term "psychogenic" (or functional) is "inappropriate in the sense that it so grossly oversimplifies the psychological processes involved that any subsequent theorizing or research is bound to be wrong" (p. 442). They acknowledge that it is well-established that many chronic pain patients present abnormal profiles on the MMPI. The question that has been at the core of this functional versus organic distinction is whether or not this pattern predates or results from the pain condition. Cox et al. argue that an MMPI taken after the development of a chronic pain problem will not reveal "whether some individuals have psychological characteristics which predispose them to turn an acute incident into a chronic pain problem" (p. 442).

It has been demonstrated (Lair & Trapp, 1962) that, even when statistically significant differences between groups of patients diagnosed as functional versus organic are found, there is so much overlap that these differences are not clinically useful in the evaluation of the individual patient. Carr, Brownsberger, & Rutherford (1966) also cautioned against using group differences as a basis for individual diagnosis. They found the mean profile of patients diagnosed with psychogenic pain to be the conversion-V type, such that Hs is greater than D and Hy is greater than D. The conversion-V was also found to be present in the mean profile of the organic pain patients, although to a lesser degree.

Most authors currently agree that there is no single characteristic MMPI profile of a chronic pain patient (Long, 1981). When individuals within a group have characteristically different profiles, the process of averaging will have the effect of masking individual differences. Therefore, there is a clear methodological problem involved in looking at average profiles for either organic or functional patients and also in comparing such average profiles.

Although the research regarding the ability of the MMPI to distinguish groups of functional versus organic patients has been inconclusive, it has led to a new and broader

understanding of the psychological aspects of the chronic pain experience. These aspects have been demonstrated to be clinically significant regardless of the etiology of pain (Fordyce, 1979). In fact, many clinicians currently view the attempt to distinguish functional from organic pain as too simplistic in itself. An alternative has been to establish a probablistic classification along a continuum of medical and psychological (organic and functional) factors. The emphasis is now upon viewing the patient as responsive to both medical and psychological factors contributing to the overall pain experience.

Prediction of Response to Treatment

Assessment of chronic pain patients often includes a determination of whether or not the individual is likely to benefit from medical treatment for pain. Such a determination is useful in several ways. It may help to avoid unnecessary surgery or other invasive procedures (e.g., nerve blocks, injections of analgesics) for patients who are not likely to benefit from medical intervention. This assessment also aides in the selection of patients who are good candidates for psychological intervention, e.g., pain management.

The MMPI has been one of the more frequently used instruments in assessing likelihood of benefiting from medical

versus non-medical treatments. In several studies, investigators have compared the MMPI scale scores of patients who have been "successful" versus "unsuccessful" in benefiting from a medical treatment program for chronic pain. Investigators have looked for significant correlations between particular MMPI scales and treatment outcome.

An overview of these studies (Trief, 1983) reveals that they have yielded conflicting results. Some investigators found that pre-treatment elevations on Hs and Hy were inversely correlated with improvement after medical intervention such as chemonucleolysis and surgery, respectively (Blumetti and Modesti, 1976; Wiltse and Rochio, 1975). In contrast, others have reported that MMPI scores did not correlate with successful outcome of back surgery at a six-month follow-up assessment (Waring, Weisz, & Bailey, 1976).

It is worth noting that each of these studies suffered a methodological weakness, in that the criterion for successful outcome was surgeon's ratings of success of the procedure. Outcome measures did not include patient's own impressions of outcome or objective measures such as return to employment.

A general criticism of studies of outcome of intervention programs for chronic pain has been the failure

to assess outcome from a multi-dimensional perspective. A majority of studies have used a simplistic uni-dimensional rating by the treating physician of overall response to treatment. A more comprehensive assessment of treatment outcome would probably include such measures as: increase in physical activity level, decrease in pain behaviors (moaning, pain complaints), patient self-reports of decreased severity of pain, improved interpersonal relationships, improved mood and/or affect, and decreased use of pain medications.

Another line of research has involved the comparison of pre-treatment MMPI scale scores of patients who have undergone successful versus unsuccessful psychological interventions for chronic pain. Roberts and Reinhardt (1980) found that certain MMPI scales (Pa, Ego Strength) were significantly different in "successful" versus "unsuccessful" patients who underwent a behavioral pain management program. Other investigators found satisfactory response to a psychological/ behavioral/ biofeedback program to be related to elevation of Hs and Hy scores (Swanson, Swenson, Maruta, and Floreen, 1978).

Studies that have attempted to use the MMPI to predict outcome of either psychological or medical interventions for pain have also been criticized because of the tendency to define psychopathology in terms of single traits (scale scores) or linear combinations of traits (Blumetti & Modesti,

1976; Pheasant, Gilbert, Goldfarb, & Herron, 1979; Strassberg, Reimherr, Ward, Russell, & Cole, 1981; Waring et al., 1976; Wiltse & Rochio, 1975). This weakness might be overcome by comparing groups of pain patients with similar psychological diagnoses in terms of good versus poor outcome of pain interventions, i.e., control for degree of psychopathology.

Subgroup Profile Analyses

Early investigators of chronic pain attempted to determine a "typical" personality personality profile for pain patients, based upon MMPI scores (Liebeskind & Paul, 1977). Certain studies of low-back pain patients indicated that mean profiles of patients did feature the "conversion-V" pattern (Beals & Hickman, 1972). Sternbach et al. (1973b) also found the mean profiles to be characterized by the conversion-V, although he noted significant differences among the profiles due to factors such as the presence of chronic versus acute pain.

However, these studies involved different assumptions about what constituted homogeneous groups of pain patients. Authors frequently overlooked differences among pain patients and assumed that average MMPI profiles of groups were descriptive of most of the patients in that group. Fordyce refered to this phenomenon as the "illusion of homogeneity"

that exists regarding low-back pain patients (1976, p. 141). As a result, the evidence as to the "characteristic" profiles of pain patients was inconsistent. More recent evidence suggests that while mean profiles of groups of low-back pain patients tend to be characterized by the conversion-V, there may be within these samples more homogeneous subgroups who present MMPI profiles which do not represent the group mean profile. Bradley, Prokop, Margolis, and Gentry (1978) were the first investigators to look for distinct MMPI profile subgroups within large independent samples of low-back pain patients. They studied three independent cohorts of male and female patients over a three-year period. They were able to identify (via a hierarchical clustering method) four or fewer subgroups for each cohort. These subgroups were replicated across the three cohorts.

Among female patients, four subgroups were discovered and labelled Af, Bf, Cf, and Df. Subgroup Af was characterized by a mean profile of T greater than or equal to 70 on Hs, D, and Hy. Subgroup Bf patients scored a relatively high T on K, Hs, and Hy, but had no T scores greater than 70. Patients in subgroup Cf had T scores of at least 70 on Hs, D, Hy, Pt, and Sc. Lastly, subgroup Df was characterized by T scores of at least 70 on Hs and Hy only (conversion-V). It was also noted that subgroups Af, Bf, and Df differed in level

of elevation of scores but not in the overall pattern of scores. However, the Cf profiles differ in pattern from these three others.

Male patients fell into three distinct subgroups, labelled Am, Bm, and Cm. The mean profile of each of these subgroups was comparable to the mean profile of subgroups Af, Bf, and Cf, respectively. As for the female patients, it was noted that subgroups Am and Bm differed in level of elevation of scores but not in the overall pattern. The Cm pattern did differ in overall configuration from Am and Bm. Interestingly, a conversion-V subgroup (i.e., comparable to Df) was not found among males.

The authors compared their subgroups to Sternbach's (1974) earlier clinical observations about subgroups of chronic pain patients. They proposed that the subgroups Af and Am were comparable to the group of patients described by Sternbach as "respondent" to the pain experience. The MMPI profiles noted in these patients seemed to represent their style of responding to the pain experience. These patients did not appear to have personality traits which might contribute to the development of chronic pain, i.e., they were not defensive and not isolated. In Sternbach's earlier analysis, this type of pain patient had difficulty shifting his attention away from physical symptoms toward coping with

pain. (He speculated that they would be poor candidates for treatment.) These patients may be described as relatively depressed and hypochondriacal.

In contrast, subgroups Bf, Bm, Cf, and Cm appeared to be predisposed to the development of a chronic pain problem. The subgroups Bf and Bm were both characterized by reluctance to admit psychological conflict. These patients tended to be highly suspicious and guarded. The patients in subgroups Cf and Cm tended to be depressed, preoccupied with somatic concerns and emotionally isolated. Bradley et al. (1978) speculated that the patients in these two subgroups experienced conflict over unmet dependency needs and that chronic pain provided a socially acceptable means of depending on others for emotional and economic support.

Subgroup Df was the only subgroup characterized by the classic conversion-V profile. Sternbach had earlier described these patients as deriving particular satisfaction from their role as invalids. These patients were neither notably guarded nor depressed. They also tended to focus on a single pain complaint. Finally, Bradley et al. (1978) speculated that patients in all of the subgroups experienced intense conflicts over unmet dependency needs; yet there are differences in style of coping (e.g., defense mechanisms) with this conflict.

Armentrout, Moore, Parker, Hewett, & Feltz (1982) studied a population of patients with diverse types of chronic pain, yet more than half of these were low-back pain patients. They found subgroups which were very similar to those of Bradley et al. (1978). These included an essentially "normal" (B) group, with no T scores greater than 70, comparable to subgroups Bf and Bm of the previous study. More recent investigators (Hart, 1984) found this normal subgroup to be characterized by positive and accurate self-evaluations.

A second (A) subgroup was described as hypochondriacal and depressed, with elevations on scales Hs, Hy, and D. This profile was comparable to that of subgroups Af and Am. Hart (1984) later described these patients as worrisome, pessimistic, and experiencing feelings of depreciation.

A third (C) subgroup was described by Armentrout et al. (1982) as psychopathological, with T scores greater than 70 on scales D, Hs, Sc, Hy, Pt, Pd, F, and Pa. This profile was comparable to that of Cf and Cm in the previous study. Hart (1984) later found this subgroup to be characterized by thought disorder, overall deficits in ego functions, severe anxiety and depression.

Demographic and Pain-Related Variables

Armentrout et al. (1982) analyzed the effects of demographic variables and pain-related variables upon the profile presentations of these patients. No significant group differences were noted for age, education, income, years of duration of pain or Workers' Compensation status. Significant differences were found for patients with single versus multiple pain complaints. The C (psychopathological) subgroup reported multiple symptoms most frequently, while the B (normal) subgroup reported multiple symptoms least frequently.

Severity of pain was also revealed as a significant factor in differentiating subgroups of pain patients. The psychopathological subgroup reported the greatest overall severity, while the normal subgroup reported the least. Other studies have also indicated that subjects' subjective degree of pain differs across patient subgroups (McGill, Lawlis, Selby, Mooney, & McCoy, 1983).

In contrast to Armentrout et al.'s (1982) results, McGill, Lawlis, Selby, Mooney, & McCoy (1983) found that duration of pain was significant in distinguishing subgroups. In the latter investigation, the conversion-V subgroup reported the longest duration of pain, while the normal subgroup reported the shortest duration of pain.

Other variables determined to be of importance included restriction of physical activity due to pain, deterioration in social relationships and in marital communication, and decrease in sexual frequency since onset of the pain condition (Armentrout et al., 1982). Generally, there was a linear increase in the negative impact of the pain problem upon daily functioning from the normal subgroup to the depressed, hypochondriacal subgroup to the psychopathological subgroup.

Hart (1984) has noted that these subgroups do not necessarily represent stable premorbid character types. They may result as coping styles evolve in reaction to the ongoing pain experience. However, McGill et al. (1983) noted that the conversion-V (hysterical) subgroup reported a longer duration of pain and less often reported a clear precipitant to the onset of the pain condition. These patients were described as having a history of a focused symptom that is serving a clearly defined and central role in their lives. This history is consistent with Rangell's assessment of the dynamics of chronic pain in the conversion hysteric. The repression of depressive thoughts (relatively low D) is also consistent with the view that this personality style is hysterical. Overall, the defense against depression, the greater pain duration, and the specificity of the symptom all support the notion of a

pre-existing hysterical personality style. These patients have developed a life-style based upon their invalidism.

The determination of these MMPI subgroups underlies the fact that chronic pain patients are a varied, homogeneous group. Out of awareness of this heterogeneity, Sweet (1981) emphasized the need for individualized MMPI evaluation of pain patients. Long (1981) echoes this observation and stresses that the various subgroups are associated differentially with response to treatment.

A limited amount of research has been conducted in which demographic variables have been specifically adressed. The likelihood that gender is an important variable was evidenced by Bradley et al. (1978), who found a fourth subgroup of female patients which did not exist among male patients. The literature indicates contradictory results regarding gender differences. Some have found that women who experienced chronic pain scored substantially higher on the MMPI than men (Strassberg et al., 1981).

Other research has suggested that male patients with low-back pain express more emotional distress than women with low-back pain (Sternbach et al., 1973b). Specifically, it was found that the male patients were angrier, more anxious and more depressed than the female pain patients. Similar findings were reported by Pheasant, Gilbert, Goldfarb, &

Herron (1979) who compared profiles of men and women using group mean scores on the MMPI. The overall shape of the profiles were very similar, but the means for men were notably higher on Hy and D and slightly higher on most of the remaining scales (including Pd, Pt). These findings are consistent with those of other investigators (Calsyn et al., 1976; Maruta et al., 1976). Pheasant et al. (1979) suggest that these differences reflect the psychosocial effect of pain among males in a culture in which men are expected to be tolerant of pain and to remain employed in spite of pain.

Age is a potentially important variable in the assessment of pain patients involving the MMPI. Subjects in the 40- to 60-year-old age range show a tendency to endorse MMPI neurotic items (scales 1, 2, and 3) more readily than younger subjects. However, they do not accept psychotic items more readily than population norms (McCreary, Turner, & Dawson, 1977; Postema & Schell, 1967). Based upon early studies, it would be expected that older pain patients would score higher on scales 1, 2 and 3 than younger patients. The degree to which these higher acores would be indicative of age versus low-back pain is still unclear. As noted previously, the age variable did not distinguish between subgroups of pain patients in the research of Armentrout et al. (1982).

The evidence regarding the relationship between socioeconomic level and low-back pain is ambiguous. Several investigators discovered that low-back pain occured more frequently in low socioeconomic-level groups (Gentry et al., 1974; Leavitt, Garron, & Bieliauskas, 1979;). This may be due to the fact that individuals who perform physically demanding work are more likely to fall in the lower versus upper socioeconomic groups and are, by the nature of this work, more prone to back injuries. Individuals in physically taxing jobs are also more disabled by back pain, making the possibility of secondary gain in the form of Workers' Compensation more desirable. However, the fore-mentioned study by Armentrout et al. (1982) indicated that subgroups of pain patients did not differ significantly as a function of education, income, or IQ.

In many studies of the MMPI profiles of pain patients, Workers' Compensation claimants were included in the subject group although the effects of the compensation variable were not specifically analyzed. Sternbach et al. (1973b) compared patients with action pending to those who had already settled and were receiving benefits or those who had never litigated. Litigation included lawsuits for compensation, claims for social security benefits, disability insurance, workers' compensation, and other forms of financial compensation.

striking differences were found between the two groups. The group with litigation (action pending) scored higher on the Hs, D, and Hy scales. The authors noted that there appears to be a potentiation of the psychophysiological symptoms by the litigation factor.

Financial compensation of pain patients has been shown to be related to outcome of surgery for back pain, In a prospective study of 34 patients who underwent surgery, the two factors which best predicted outcome (in terms of pain relief) were the physicians pre-operative rating of medical status and the patient's workers' compensation status (Waring et al., 1976).

Financial compensation has also been shown to be a major factor in the maintenance of chronic pain. Actuarial studies indicate that chronic pain patients whose compensation benefits are time-limited are much more likely to decrease their reliance on medical treatment and return to work, as opposed to patients whose compensation benefits are unlimited (Miller, 1979).

Variables in medical condition have been mentioned in many studies of pain patients, although they have not been directly analyzed in most cases. As noted earlier, variables in medical condition differentiated subgroups of chronic pain patients in the Armentrout et al. (1982) study. These

variables were the presence of single versus multiple complaints and the severity of pain, based on the patient's subjective rating. In a subsequent study (McGill et al., 1983) duration of pain was noted as distinguishing the conversion-V subgroup from the others.

Development of the Millon Behavioral Health Inventory

The Millon Behavioral Health Inventory (MBHI) was initially presented in the literature in 1979 by its developers, Theodore Millon, Catherine Green, and Robert Meagher. It is a 150-item self-report inventory which yields 20 scales that are intended to provide a range of measures relevant to psychological assessment in general medical settings.

The rationale for the development of the MBHI was that the available diagnostic psychological tests (e.g., MMPI) were designed based upon the responses of a psychiatric population. Millon and his colleagues noted several problems associated with the use of these psychiatrically-oriented tests with medical populations. These problems included the unsuitability of norms, the questionable relevance of clinical signs, and the questionable applicability of interpretations.

Also, Millon points out that, in spite of the extensive use of the MMPI in clinical settings, the results of most

research are equivocal (Millon et al., eds., 1982b). Butcher and Owens (1978) agree with this general conclusion and note that the MMPI's ability to predict good versus poor response to medical treatment or to differentiate "functional" versus "organic" pain is highly questionable.

Millon, Green, and Meagher therefore spent four years reviewing the research regarding the inter-relationships between personality, behavior, and physical health. One major area of research focuses upon "personality style" or "coping style". Investigators in this area have proposed that a person's enduring personality style affects both the development of a disease and her manner of coping with it.

A second focus of the research was the various psychosocial stressors which were found to be significant precipitators or exacerbators of physical illness. For example, this area of research has dealt with the effects of social isolation upon one's ability to cope with life's stressors. Studies have reflected the inter-relationships among social isolation, ability to manage stress, and degree of pre-occupation with one's physical health or somatic anxiety.

A third area of research reviewed by the authors of the MBHI is that regarding "psychosomatic correlates" of disease. These studies are concerned with the degree to which

psychologic factors contribute to particular illnesses. Such illnesses include allergies, gastrointestinal problems, and cardiovascular disorders.

Millon et al. reviewed a fourth area of research which they termed "prognostic indices". This includes the personality factors influencing response to illness or to its treatment.

Following this survey of the literature, the MBHI was developed through a process involving theory-based rationale (substantive validity), internal consistency studies (structural validity), and demonstrations of the discrimination power of the scales (external validity). In the first stage, a pool of items was created, based upon relevant theory. The items chosen for the coping style scales were selected to be consistent with Millon's theory of personality (1969).

Initially, over 1000 items were gathered from various sources including personality tests and other psychological tests. This pool of items was to provide the basis for both the eight coping style scales and the six psychogenic attitude scales. The item set for the remaining six scales was drawn entirely from the final pool based upon these initial 14 scales. In other words, the final six scales were not subject to theory-based rationale.

A limited form of the inventory was directed only at the assessment of coping styles. The internal consistency of the various coping style scales was determined after administering the inventory to about 2500 college students. In order to maximize within-scale homogeneity, only items which showed their highest correlation with the scale to which they had been assigned were retained. This process resulted in a final group of 64 items, which constituted the coping style scales.

Using a similar process, a limited form of the inventory was developed for the assessment of psychogenic attitudes. The initial pool of psychogenic attitude scale items were sorted into appropriate scales by clinicians who had experience assessing physically-ill patients. The criterion for inclusion was 75% agreement among clinicians' ratings. This procedure resulted in 83 items which constituted the psychogenic scales. An additional three "correction items" were included to constitute the "reliability check." The final form consisted of 150 items (64 personality + 83 psychogenic + 3 correction).

To establish external validity, the 150-item form was administered in a number of medical settings. In this third validation stage, the items were administered to two groups of subjects which differed on the criterion measure. The "criterion" group and the comparison group were patients with

a given medical diagnosis. However, they varied in the degree to which "psychological or social complications were involved" (p.24). Items which were differentially endorsed by the criterion group as opposed to the comparison group were considered to have external validity. These items then constituted the empirical scales which either identified/correlated clinically relevant data (3 psychosomatic correlate scales) or predicted clinically relevant data (2 prognostic index scales). The third prognostic index scale (Emotional Vulnerability) consists of items from the MCMI (Millon, 1977) which are sensitive to psychological disturbance.

The 150 items included in the final form constitute 20 clinical scales which are divided into four groups. (Refer to Tables 1 and 2.) These four groups correspond to the four areas of research previously reviewed by the authors. Hence, the first group consists of eight scales which represent the major "coping styles", i.e., "introversive", "inhibited", "cooperative", "sociable", "confident", "forceful", "respectful", and "sensitive". The second group consists of six scales which represent various "psychogenic attitudes". Each of these scales represents a type of psychosocial stress which has been linked with physical illness. They are: "chronic tension", "recent stress", "premorbid pessimism",

Table 1

MBHI Scale Names and Abbreviations

	Scale
Coping Style	1 Introversive
	2 Inhibited
	3 Cooperative
	4 Sociable
	5 Confident
	6 Forceful
	7 Respectful
	8 Sensitive
Psychogenic Attitude	A Chronic Tension
	B Recent Stress
	C Premorbid Pessimism
	D Future Despair
	E Social Alienation
	F Somatic Anxiety
Psychosomatic Correlate	MM Allergic Inclination
	NN Gastrointestinal Susceptibility
	OO Cardiovascular Tendency
Prognostic Index	PP Pain Treatment Responsivity
	QQ Life Threat Reactivity
	RR Emotional Vulnerability

Table 2
MBHI Scale Descriptions

Basic Coping Styles

Scale 1: Introversive Style

High scorers described as emotionally flat, quiet and untalkative. Vague and difficult to pin down concerning symptoms; passive with regard to taking care of their physical state. Will not take the initiative in following a treatment plan; require clear directions from health care professionals.

Scale 2: Inhibited Style

High scorers described as hesitant with others, ill-at-ease, easily hurt, often concerned over what others may do to them. Rapport difficult to establish. Given understanding and attention, will be cooperative.

Scale 3: Cooperative Style

High scorers described as dependent, willing to follow advice closely. Will not take the initiative in seeking treatment; expect to be told exactly what to do. Inclined to deny the existence of real problems; health personnel must ask questions explicitly.

Scale 4: Sociable Style

High scorers tend to be outgoing, talkative, and charming. Initial cooperative attitude may be short-lived. Not dependable in meeting appointments or in taking necessary medications.

Scale 5: Confident Style

High scorers appear calm and confident. Expect special treatment, tend to manipulate staff members. Fear illness; motivated to follow treatment plan if impressed with the importance of doing so.

Scale 6: Forceful Style

High scorers tend to be domineering, intimidating, distrustful. Will be resistant to the prescribed treatment course; respond best to a direct approach from health care team.

Scale 7: Respectful Style

High scorers described as responsible, conforming, cooperative. Strong tendency to deny symptoms; appear well-controlled. Tend to follow treatment plan carefully.

Scale 8: Sensitive Style

High scorers described as unpredictable, moody, seemingly dissatisfied with their physical and psychological state. Often erratic in following a treatment plan.

Psychogenic Attitudes

Scale A: Chronic Tension
High scorers described as active, living under a great deal of self-imposed pressure. Similar to Type A individuals.

Scale B: Recent Stress
High scorers are at an increased risk of serious illness due to recent marked changes in their lives.

Scale C: Premorbid Pessimism
High scorers tend to interpret life events negatively; this tendency is believed to intensify the impact of such events.

Scale D: Future Despair
High scorers do not expect their futures to be productive; tend to have a bleak outlook about medical problems.

Scale E: Social Alienation
High scorers perceive low levels of family and social support; adjustment to hospitalization tends to be poor.

Scale F: Somatic Anxiety
High scorers are excessively anxious about bodily functions; overreact to the discomforts of medical procedures.

Psychosomatic Correlates

Scale MM: Allergic Inlination
Scale NN: Gastrointestinal Susceptibility
Scale OO: Cardiovascular Tendency
For high scorers on each of these scales, emotional factors precipitate an increase in symptomatology.

Prognostic Indices

Scale PP: Pain Treatment Responsivity
High scorers are similar to patients whose response to a traditional medical program was not satisfactory.

Scale QQ: Life-Threat Reactivity
High scorers who are suffering a chronic or life-threatening illness are likely to deteriorate more rapidly than is typical among patients with a similar physical illness.

Scale RR: Emotional Vulnerability
High scorers who are facing life-dependent treatment programs (e.g., major surgery) are vulnerable to episodes of severe disorientation, depression, or psychosis.

"future despair", "social alienation", and "somatic anxiety".

The third group consists of three scales, each of which represents a "psychosomatic correlate" of an illness. These were derived by differentiating patients with the same physical syndrome in terms of whether or not their illness was substantially complicated by emotional factors. A high score on one of these scales suggests similarity to patients for whom emotional factors contribute significantly to their illness. These scales are labeled "Allergic Inclination", "Gastrointestinal Susceptibility", and "Cardiovascular Tendency".

The fourth group consists of "prognostic index" scales. Each of these three scales indicates a likelihood of problems associated with treatment or a type of response to being ill. These scales assess "Emotional Vulnerability", "Life-Threat Reactivity", and "Pain Treatment Responsivity". The latter scale is of particular interest in this study since it reflects the degree to which one is empirically similar to patients who fail to respond successfully to medical treatment regimens for chronic pain.

The authors of the MBHI have been criticized for not providing enough information in their test manual regarding development of the individual scales. Due to this lack of specific information about the scales, the reader cannot

determine the potential strengths or weaknesses of any one scale. A table of scale intercorrelations presented in the manual shows that more than one third of the intercorrelations among scales are .70 or higher. As noted by Lanyon (1985), this indicates that there is a high degree of redundancy among the scales and concepts. This is consistent with the fact that there are only 150 items for 20 scales, with each item appearing on an average of 4.6 different scales.

Another criticism is that the exact nature and size of the samples on which the MBHI was constructed and normed are not specified in the manual. Overall, a group of 752 men and women, including patients and nonpatients, were involved in both the construction of the inventory and the establishment of norms. As Allen (1985) points out, the manual does not adequately describe the samples used to develop the population's base rate norms. The ages of norm groups are not specified, nor are the physical problems of the patient groups involved in the test's construction.

According to Lanyon, "it has to be concluded that the MBHI was not constructed with a high degree of psychometric care" (p. 983). He stresses the need for empirical validity evidence in order to support the usefulness of the inventory. The authors of the manual provide limited validity data. They present correlations between the first 14 scales and several

other inventories, including the MMPI, California Personality Inventory, Beck Depression Inventory, and the SCL-90.

Most of the significant correlations involved the Psychogenic Attitude scales of the MBHI. The highest correlations involve the MMPI Depression and Hypochondriasis scales. Scale C (Premorbid Pessimism) correlated with MMPI scale D ($\underline{r}$ = .57) and with MMPI scale Hs ($\underline{r}$ = .58). Scale D (Future Despair) of the MBHI correlated with MMPI scale Pt ($\underline{r}$ = .51), with MMPI scale D ($\underline{r}$ = .53), and with MMPI scale Hs ($\underline{r}$ = .51). Scale E (Social Alienation) of the MBHI correlated with MMPI scale Si ($\underline{r}$ = .51), and with MMPI scale D ($\underline{r}$ = .48). Scale F (Somatic Anxiety) of the MBHI correlated with MMPI scale Hs ($\underline{r}$ = .60), with MMPI scale Pt ($\underline{r}$ = .56), and with MMPI scale D ($\underline{r}$ = .55).

No correlations were reported for any of the MBHI scales with scales L, F, or K of the MMPI. No correlations were reported for any of the Psychosomatic Correlate scales of the MBHI with any of the MMPI scales. Furthermore, no correlations were reported for any of the Prognostic Index scales of the MBHI (including Pain Treatment Responsivity) with any MMPI scales (including Hs and Hy).

In reporting these findings, the authors note potential problems in evaluating the inter-correlations of MBHI scales with scales of other inventories. They state that the scales

sometimes address different aspects of concepts that are similarly labeled. For example, Millon et al. (1982a) reported a correlation of r = .57 between the Premorbid pessimism scale of the MBHI and the MMPI D scale. Possibly the correlation is not higher because the two scales tap different aspects of the depressive syndrome. This argument is supported by the fact that the MBHI was specifically designed for use with medical patients, while the MMPI was not. However, as a new inventory, the MBHI can only be understood in comparison with existing means of assessing pain patients.

Concurrent Validity Studies of the MBHI and the MMPI

Sweet, Breuer, Hazlewood, Toye, and Pawl (1985) are among the few researchers who have investigated the concurrent and predictive validity of the MBHI with several other measures, including the MMPI. They found that correlations between MBHI scales and Hs and Hy, the MMPI scales which are known to reflect health-related concerns and poor adjustment to chronic pain, were "unexpectedly and surprisingly low" (p. 9). The MBHI's strongest positive correlations were with MMPI clinical scales which reflect admission of emotional distress (D, Pt), or psychopathology (F, Pd, Pa, Sc, Si). These findings suggested to the authors that "the MBHI may be as much, if not

more, affected by the presence or denial of psychopathology in general as by specific health-related attitudes and concerns" (p.10).

Sweet et al. also found that the Pain Treatment Responsivity scale of the MBHI correlated highly with other MBHI scales and, therefore, questioned the specificity of this scale in predicting response to treatment. Other researchers have investigated the usefulness of the MBHI in predicting response to treatment. Gatchel, Deckel, Weinberg, & Smith (1985) found that, in a population of headache pain patients, various MBHI scales were significantly correlated with treatment outcome measures. The Pain Treatment Responsivity (PP) scale was among these; it was significantly correlated with two of the four outcome measures. However, the Emotional Vulnerability scale correlated with three of the four measures of pain relief. The authors do not account for the fact that the PP scale was not the better predictor of outcome of treatment for pain.

The utility of the PP scale was similarly questioned by investigators who used both the MBHI and the MMPI to assess whether gains in specific behavioral measures could be predicted for outpatients in a pain treatment program (Wilcoxson, Zook, & Zarski, 1988). When stepwise discriminant analyses were performed, the MM scale (Allergic Inclination)

was the most efficient of the MBHI health-oriented scales in predicting treatment outcomes. This result had also been reported by Sweet et al.(1985). The purpose of the MM scale is to indicate emotional precipitants in a patient with an existing allergy. Based upon the stated purposes of the MM and PP scales, one would expect the PP scale to be the better predictor of outcome of in a population of pain patients.

Wilcoxson, Zook, and Zarski (1988) concluded that, in general, both the MBHI and the MMPI were successful in predicting the degree of improvement in behavioral outcome measures. Specifically, the MBHI was a better predictor of gain in time standing, while the MMPI was a better predictor of gain in number of stairs climbed.

Despite the lack of support for the MBHI, in a recent national survey of psychological assessment instruments used in pain clinics, 11% of clinics reported that the MBHI was one of the five most important assessment tools for pain patients (Hickling, Sison, & Holtz, 1985). Preference for the MBHI over the MMPI seems to be notably related to the perspective of and knowledge of the user. Private psychologists prefer the MBHI to the MMPI in the assessment of medical patients, while medical psychologists view both tests as about equally useful for this purpose (Murphy, Sperr, & Sperr, 1983).

Statement of the Problem and Hypotheses

The utility of the MBHI in assessing chronic pain patients is still questionable, given the sparsity of data as to its concurrent or its predictive validity. It has been suggested by Sweet et al. (1985) that the MBHI may be particularly relevant to a specific pain problem. Patients in most previous studies of the MBHI and MMPI have presented with various types of pain, including migraine, arm/hand, and abdominal, as well as back pain. Yet it has been demonstrated that treatment outcomes differ greatly among different types of chronic pain patients (Gatchel et al., 1985). Since low-back pain patients often constitute the majority of patients in pain clinics, the utility of the MBHI for this population is of concern and will be the focus of this investigation.

In this study, the MBHI will be compared with the MMPI in the assessment of patients with chronic low-back pain. A second purpose of this study is to examine subgroups of patients based upon their responses on the MBHI. Low-back pain patients were administered both the MBHI and the MMPI; they also responded to questions about demographics and pain-related variables. Three major strategies were used in comparing the patient's responses to these two inventories. The first strategy is to investigate correlations between specific MBHI and MMPI scales. Secondly, the MBHI Pain

Treatment Scale is compared with other MBHI scales. Finally, a cluster analysis is performed on MBHI profiles.

MMPI and MBHI Correlations

Past studies (Sweet et al., 1985) have shown that the MBHI scales may be significantly affected by the presence or denial of psychopathology in general. Therefore, correlations between MBHI scales (excluding coping style scales) and the L and K scales of the MMPI, which reflect the patient's willingness to admit emotional distress are of interest. If the MBHI is a valid measure of health-related attitudes and behaviors, then one would not expect MBHI scores to be influenced by willingness to admit emotional distress. Based upon previous research (Sweet et al., 1985), it is predicted that scores on scales A to RR of the MBHI will be significantly correlated with scores on scales L and K of the MMPI. (Refer to Table 1, "MBHI Scale Names and Abbreviations".) Similarly, given concurrent validity, one would not expect MBHI scales to be significantly affected by the patient's tendency to exaggerate symptoms. However, based upon the previous study, it is predicted that MBHI scales will be significantly correlated with scale F of the MMPI. Therefore, the first two hypotheses are:

Hypothesis (1) - Scores on scales A to RR of the MBHI will be negatively correlated with scores on scales L and K of the MMPI; and

Hypothesis (2) - Scores on scales A to RR of the MBHI will be positively correlated with scale F of the MMPI.

A second focus of the analysis of correlations between the MMPI and MBHI is the Hs and Hy scales of the MMPI. High scorers on Hs and Hy are expected to experience an increase in symptomatology when under stress. According to Millon's descriptions of MBHI scales, high scorers on scales labelled "Psychosomatic Correlates" are likely to experience increased symptoms when under stress. Levine and Meagher (1983) reported positive correlations between the psychosomatic Correlates and MMPI scales Hs and Hy. However, as noted earlier, Sweet et al. did not find high correlations between MBHI scales and Hs or Hy.

Furthermore, Hs and Hy are the MMPI scales generally believed to reflect poor adjustment to chronic pain and illness (Armentrout et al., 1982; Fordyce, 1979). The MBHI scale labelled "Pain Treatment Responsivity" (PP) is of interest in the present study because of its potential usefulness in designing treatment programs for chronic pain patients. Individual who score high on PP are theoretically

similar to those patients who do not respond to traditional medical treatments for pain. These patients are therefore good candidates for psychological treatment programs. Scale pp is expected to correlate positively with MMPI scales Hs and Hy. This is expected based upon the findings of Sternbach (1974) regarding his clinical experience.

The preceding discussion of scales Hs and Hy leads to the generation of the next two hypotheses:

Hypothesis (3) -the psychosomatic correlate scales will correlate positively with MMPI scales Hs and Hy; and

Hypothesis (4) - scale PP will correlate positively with MMPI scales Hs and Hy.

It will also be of interest to determine correlations between MBHI scales (PP, in particular) and the MMPI's Pain Assessment Index (PAI). The PAI is based upon a weighted composite of MMPI scales; a high PAI score suggests poor prognosis for pain relief. The predictive validity of the PAI has been supported by previous research (Dhanens & Jarrett, 1984). Therefore, the fifth hypothesis is:

Hypothesis (5) - Scores on the PAI will correlate positively with scores on the MBHI's scale PP.

Four additional predictions are based upon data presented by Millon, Green, & Meagher (1979) regarding the validity of the psychogenic attitude scales.

Hypothesis (6) - Scores on the MBHI scale "Premorbid Pessimism" will correlate positively with scores on the MMPI scale D.

Hypothesis (7) - Scores on the MBHI scale "Future Despair" will correlate positively with scores on MMPI scale Pt.

Hypothesis (8) - Scores on the MBHI scale "Social Alienation" will correlate positively with scores on the MMPI scale Si.

Hypothesis (9) - Scores on the MBHI scale "Somatic Anxiety" will correlate positively with scores on MMPI scales Hs and Hy.

MBHI Pain Treatment Scale and Other MBHI Scales

To test the specificity of the PP scale in predicting response to treatment, correlations between it and other MBHI scales (excluding coping styles) are of interest. Low correlations among these scales would indicate specificity of scale PP. In the previous study by Sweet et al. (1985), ten of the nineteen correlations with these other MBHI scales were above .70. In particular, correlations between PP and the

eight MBHI coping scales have produced significant results in the previous work of Sweet et al. Specifically, high correlations were found between PP and coping style scales 2 (.86) and 8 (.82). Correlations between the eight coping style scales and PP will be investigated in the present study, with no specific predictions being made.

Cluster Analysis of MBHI Profiles

One consistent finding which has resulted from the research on the assessment of chronic pain using the MMPI is that there are three to four subgroups of chronic pain patients. As noted previously, these subgroups have been described by several authors. Therefore, one might expect that assessment using the MBHI would also produce subgroups of chronic pain patients.

The number of subgroups which might be expected derives from previous use of the MBHI with this population. The literature indicates that there are high negative correlations between most MBHI scales and K. Previous research also indicates that the MBHI's strongest positive correlations were with MMPI scales that reflect admission of emotional distress, or that reflect psychopathology (Sweet et al., 1985). These results suggested to the authors that the MBHI may be as much affected by the presence or denial of psychopathology in

general as by specific health-related attitudes and concerns. If this is the case, one might expect the MBHI to yield two subgroups of patients, based upon their tendency to deny psychopathology (i.e., high versus low scores on K).

In order to investigate the existence of subgroups among MBHI profiles, a cluster analysis will be done. No specific predictions can be made about the number of subgroups, or their existence in fact. If there are subgroups of patients which can be meaningly differentiated on the basis of MBHI profiles, then it would be of interest to determine in which ways these subgroups differ.

Variables of particular interest are those that have been discussed in the literature with respect to MMPI subgroups. As noted in the preceding review of the literature, these are: age and sex of the patient, socioeconomic status, Workers' Compensation status, duration of pain, severity of pain, presence of multiple pain complaints, ability to engage in sexual, social, and recreational activities, and desire to engage in sexual, social, and recreational activities.

The MBHI authors report that normative data has been collected for gender, but not for age, ethnic group, or socioeconomic status. Millon et al. state that "the role of moderators,...is not a well-understood one, despite evidence that test components can differ appreciably from one sample

to another" (p.28). They emphasize the need for further data on demographic variables, including age, gender, and socioeconomic status. No specific predictions can be made about the relationships between these demographic and pain-related variables and the potential subgroups (or clusters) of MBHI profiles. Therefore, these variables will be studied in an investigatory manner only.

CHAPTER III

METHOD

Subjects

Subjects in this study consisted of 44 males and 16 females who sought treatment at one of two multidisciplinary pain clinics. Both clinics were located in hospitals in the Chicago metropolitan area. Thirty-four subjects were patients at a private hospital, while 26 were Veterans Administration (VA) patients. Data were collected over 20 months for 46 of the subjects; data for the remaining 14 subjects were collected prior to the beginning of this study and were obtained through records at the private hospital.

The mean age of the sample was 47.2 years, with a standard deviation of 13.3 years. Mean income was about $14,400 per year, with a standard deviation of $4,800. Information regarding compensation status was available for 45 of the subjects; of these, 57.8% were neither receiving nor applying for any type of compensation. An additional 24.4% were applying for Workers' Compensation or another form

of financial compensation, while 17.8% were currently receiving financial compensation.

All subjects reported low-back pain as their primary complaint. Pain was at least six months in duration to meet criteria for chronicity. The mean duration of pain for this sample was 75.9 months (approximately 6.3 years), with a standard deviation of 108.2 months (approximately 9 years). Duration of pain ranged from six months to 507 months (42 years); the median was 31 months. The mean severity of pain was between "uncomfortable" and "distressing". Data regarding the presence of multiple complaints were available for 46 of the patients. Of these patients, 26.1% reported low-back pain as their only problem, while 73.9% reported additional pain complaints.

Instrumentation

MMPI

The Minnesota Multiphasic Personality Inventory (MMPI), developed in 1942, is a self-report inventory consisting of 566 items presented in a true/false format. It is widely accepted as a psychometrically sound test, with good reliability, as well as construct validity and concurrent validity. It was developed from an initial pool of over 1000 items, drawn from other psychiatric exam forms and clinicians' statements. The items retained were those that were endorsed

more frequently by psychiatric-patient groups (criterion groups) than by normal groups.

This study utilized the MMPI's three validity scales, and ten clinical scales (Hypochondriasis, Depression, Hysteria, psychopathic Deviate, Masculinity/Femininity, Paranoia, Anxiety, Schizophrenia, Mania, and Social Introversion). The short form of the MMPI, consisting of 369 items, was used for this investigation. One additional MMPI scale, the Pain Assessment Index (PAI) was also utilized in this study. The method used to calculate the PAI is presented in Table 3.

MBHI

The development of the MBHI is described in detail in the preceding review of the literature. The test consists of 150 items presented in a true/false response format. All 20 scales were utilized in the present study. The scales, listed in Figure 1, are: Introversive Style, Inhibited Style, Cooperative Style, Sociable Style, Confident Style, Forceful Style, Respectful Style, Sensitive Style, Chronic Tension, Recent Stress, Premorbid Pessimism, Future Despair, Social Alienation, Somatic Anxiety, Allergic Inclination, Gastrointestinal Susceptability, Cardiovascular Tendency, Pain Treatment Responsivity, Life-Threat Reactivity, and Emotional Vulnerability.

Table 3

Pain Assessment Index

1. Add one point for each 5Ts of Hs over 55
   Subtract one point for each 5Ts of Hs below 55

2. Add seven points if Hy exceeded 75T
   Add two points if Hy was between 71T and 75T

3. Add three points if D exceeded 60T

4. Add two points if Hs was = or > Hy

5. Add two points if D - Ma + 50 was greater than 55T

6. Add two points if Hs - Pt + 50 was greater than 60

When total is greater than or equal to 13,
predict poor response to treatment.

When total is less than 13,
predict good response to treatment.

Demographic Data Sheet

The format used for obtaining demographic data and information about pain-related variables is presented in Appendix C.

Duration of pain was measured in months since onset of the pain condition. Severity of pain was assessed by a subjective rating scale. Patients were asked to choose the item that best describes their pain as it usually occurs: 1 = mild, 2 = uncomfortable, 3 = distressing (fairly severe), 4 = horrible (very severe), 5 = unbearable. Presence of multiple pain complaints was coded as "0" if no complaints other than low-back pain were reported and as "1" if one or more other complaints were reported in addition to low-back pain. An example of "multiple complaints" was low-back pain that radiated to the right hip and down the right leg.

Desire for social activities, recreational activities, and sexual relations were each coded on a 5-point scale. Response choices were: 1 = remains the same as before the onset of the pain condition, 2 = somewhat less than before, 3 = about half as much as before, 4 = much less than before, and 5 = no desire for such activities. Ability for social activity, recreational activity, or sexual relations was similarly coded on a five-point scale, with "5" = no longer have the ability for such activities.

Procedure

The procedure was essentially the same at the Pain Treatment Center of the private hospital and the Pain Clinic of the VA hospital. Individuals referred to the clinics were routinely evaluated by various members of the staff. This process included a one-hour interview with a clinical psychologist, a medical history obtained by a nurse, evaluation by a physician, and recommendations of a physical therapist. The notes of each staff member were reviewed during a staff meeting and a decision was made as to whether that patient would be treated on an inpatient or outpatient basis. Those patients who are placed on an outpatient status and whose primary complaint is low-back pain were recruited for participation in this study. There were no further criteria for participation in this study. Once inpatient or outpatient status was determined, patients were invited to return to the clinic for admission and initiation of treatment.

According to customary procedures, all patients completed the MMPI upon admission to the Pain Treatment Center/Pain Clinic. Those patients who were eligible for recruitment for this study (i.e., who meet the criteria noted above) were, as soon as possible after admission, presented with a brief oral explanation of the nature and purpose of this research. No deception was involved in the stated description. Patients

were then given a consent form to read and were asked to sign the form if they agreed to participate. Once consent was established, subjects completed the MBHI. Completion of the MBHI generally required no more than 30 minutes. The location for the presentation of the explanation, consent form, and MBHI was either the waiting room of the Pain Treatment Center or an office at the VA. Since obtaining certain demographic data was not part of the usual procedure at the VA, this was obtained from the patient after consent to participate was established. Each of these steps was conducted with patients on an individual basis.

CHAPTER IV

RESULTS

Correlations Between MMPI and MBHI

Several sets of correlational analyses were conducted to examine the relationship between MMPI and MBHI scales. The large number of correlational analyses increases the probability of finding "significant" results (rejecting the null hypothesis) and producing Type 1 error. To correct for this tendency, follow-up tests were conducted to determine the significance of the correlation coefficients produced by the comparisons between scales. The follow-up test yields a *t*-statistic for "the significance of the difference between dependent *r*'s" (Cohen & Cohen, 1975).

As the initial step in testing for the significance of the correlation coefficients for pairs of scales, two correlation matrices were created. The first consisted of all correlations which were predicted to be significant, while the second consisted of all correlations which were not predicted to be significant. A given correlation which was predicted significant was then compared to a correlation which was not

predicted significant, in order to establish that the predicted correlation was in fact significantly different from the non-predicted correlation. The question became: does X correlate with Y to a significantly greater degree than another variable, V, correlates with Y? For example, MMPI scale D (X) was predicted to correlate with the MBHI scale Premorbid Pessimism (Y). However, MMPI scale Hs (V) was not predicted to correlate with Premorbid Pessimism. To test the significance of the correlation between the D scale and the Premorbid Pessimism scale, it was compared to the correlation between the Hs scale and the Premorbid Pessimism scale.

The validity scales were predicted to correlate with all 12 MBHI attitude, psychosomatic correlate, and prognostic index scales. Therefore, including the validity scales would have made it impossible to generate a matrix of non-predicted correlations. For this reason, the validity scales were excluded from this follow-up testing process. Consequently, any correlation coefficient relating to the validity scales must be interpreted with some caution. The probability of Type I error is greater for these three scales.

MBHI and MMPI Validity Scales

Correlations were computed between scales A to RR of the MBHI and scales L, K, and F of the MMPI. (See Table 4.) As predicted, significant negative correlations were found between the MBHI scales and the MMPI L and K scales. Five of

Table 4

Pearson r Correlations Between MBHI and MMPI Validity Scales

	MMPI Scales		
MBHI Scales	L	F	K
A	-.29	.37*	-.50**
B	-.28	.32*	-.30
C	-.32*	.59**	-.63**
D	-.25	.61**	-.64**
E	.20	.58**	-.61**
F	-.26	.32*	-.40**
MM	-.30*	.59**	-.64**
NN	-.33*	.49**	-.59**
OO	-.30	.59**	-.70**
PP	-.38*	.67**	-.56**
QQ	-.29	.65**	-.64**
RR	-.37*	.56**	-.68**

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* $p < .01$
** $p < .001$

the MBHI scales (Premorbid Pessimism, Allergic Inclination, Gastrointestinal Susceptability, Pain Treatment Responsivity, and Emotional Vulnerability) were negatively correlated with the L scale, with $p < .01$. Of the 12 MBHI scales (A to RR), 11 were negatively correlated with scale K, with $p < .001$. Only scale B, Recent Stress, was not significantly correlated with the K scale.

As predicted, all 12 MBHI scales correlated positively with MMPI scale F. Three of these - Chronic Tension, Recent Stress, and Somatic Anxiety - were significant at $p < .01$. The remaining nine scales, which included the three Psychosomatic Correlates and the three Prognostic Indices, were significantly correlated at $p < .001$.

MBHI and MMPI Hy and Hs

Contrary to predictions, none of the Psychosomatic Correlates were significantly correlated with the MMPI Hy scale. The MBHI scales, Allergic Inclination ($r = .27$) and Gastrointestinal Susceptability ($r = .25$) tended to correlate positively with Hs, $p < .05$. However, when follow-up t-tests were conducted , neither of those correlations were significant.

The Pain Treatment Responsivity (PP) Scale did not correlate significantly with the Hy scale. Scale PP did tend to correlate with Hs, $r = .21$, $p < .05$; however, follow-up testing revealed that this correlation was not significant.

Overall, there was no support for either hypothesis related to correlations between MBHI scales and MMPI Hs and Hy scales.

MBHI Pain Treatment and MMPI PAI

As predicted, the Pain Treatment Scale did tend to correlate positively with the MMPI's PAI, $r = .30$, $p < .05$. However, follow-up tests with corrected for an inflated alpha revealed that this correlation was not significant. Thus, it is concluded that Hypothesis (5) - stating that the Pain Treatment scale would correlate positively with PAI, was not supported by these results.

Other Correlations

The final set of correlations were regarding specific pairs of MBHI psychogenic attitude scales and theoretically related MMPI scales. As predicted, Premorbid Pessimism correlated positively with the MMPI D scale, $r = .47$, $p < .001$. Also as predicted, Future Despair correlated positively with the MMPI Pt scale, $r = .54$, $p < .001$. Likewise, Social Alienation correlated positively with the MMPI Si scale, $r = .72$, $p < .001$. Follow-up tests indicated that these correlations were significantly greater than unpredicted correlations. Somatic Anxiety tended to correlate with Hs ($r = .32$, $p < .01$) and with Hy ($r = .29$, $p < .05$). However, the more stringent follow-up tests revealed that these latter two correlations were not significant.

Correlations Between MBHI Pain Treatment and Other MBHI Scales

To explore the specificity of the Pain Treatment Scale in predicting response to treatment, correlations were computed for the Pain Treatment Scale with eleven other MBHI scales labelled A to RR . Scale PP was positively correlated with ten of these eleven other MBHI scales ($p < .01$). (See Table 5). In fact, five of these scales (Premorbid Pessimism, Future Despair, Cardiovascular Tendency, Life-Threat Reactivity, and Emotional Vulnerability) were correlated with scale PP with an r greater than .71. Only scores on Recent Stress did not correlate significantly with scores on Pain Treatment.

Correlations were also computed for the Pain Treatment Scale with the eight MBHI coping style scales. Six of the coping style scales were significantly correlated with scale PP ($p < .01$). Of these, four were negative correlations: Introversive Style ($r = -.35$), Sociable Style ($r = -.67$), Confident Style ($r = -.62$), and Respectful Style ($r = -.34$). Two coping style scales, Inhibited Style and Sensitive Style, were positively correlated with scores on PP, with $r = .87$ and $r = .79$, respectively.

Cluster Analysis and Description of Clusters

A hierarchical clustering procedure was performed on the 20 MBHI scales in order to describe subgroups of MBHI

Table 5

Pearson r Correlations Between MBHI PP and Other MBHI Scales

MBHI Coping Styles	Pain Treatment Responsivity (PP)
INTROV1	-.35*
INHIB2	.87**
COOPER3	-.29
SOCIAB4	-.67**
CONFID5	-.62**
FORCE6	.19
RESPEC7	-.34*
SENSIT8	.79**
TENSEA	.37*
STRESSB	.29
PESSIMC	.72**
DESPARD	.80**
ALIENE	.69**
SOMATF	.33*
ALLERMM	.62**
GISUSNN	.55**
CARDIOO	.71**
PAINPP	1.00
REACTQQ	.75**
EMOTRR	.76**

* p < .01
** p < .001

profiles. Based upon past research, it was expected that the MBHI would yield two distinct and homogeneous subgroups of patients. The two subgroups would differ in their tendency to deny psychopathology, i.e., patients with high K scores on the MMPI versus those with low K scores on the MMPI.

Further rationale for designating two clusters of MBHI profiles (versus three or more clusters) was the previous cluster analysis by Millon as described in the MBHI manual. In a sample of male and female patients, Millon discovered one cluster characterized by high scores on scales 2 (Inhibited Style) and 8 (Sensitive Style). A second cluster was characterized by elevations on scale 1 (Introversive Style). Unfortunately, Millon's description of the clusters, beyond noting these elevations, is vague.

The method and measure used for the present cluster analysis was taken from that used by previous researchers in performing a cluster analysis of MMPI profiles (Costello, Hulsey, Schoenfeld, & Ramamurthy, 1987). Therefore, SPSS-X subcommand "cosine" was the measure and "waverage" was the method. When profiles were divided into two clusters, 39 cases fell in the first cluster, with 21 cases in the second cluster.

Subsequently, univariate analyses of variance were performed using the 13 MMPI scales to determine which of these variables differed significantly between clusters. The mean T scores for the MMPI scales in each cluster, as well as the

results of the analyses of variance, are presented in Table 6. Results indicated that the two MBHI subgroups produced by the cluster analysis differed significantly in MMPI scales L, F, K, Pa, Pt, Sc, Ma, and Si.

A discriminant function analysis was then performed in order to determine whether or not some combination of the variables delineated above (L, F, K, Pa, Pt, Sc, Ma, and Si) would account for a significant portion of the overall variance between the groups. In other words, it was necessary to establish that the two groups were distinct from each other.

These variables were entered into a stepwise discriminant analysis using Wilks Lambda as the criterion. The function yielded by the discriminant analysis accounted for a significant amount of the variance between the groups, Wilks Lambda = 0.614, χ^2 (6)= 26.78, $p < .001$. This function consisted of K, F, L, Ma, Si, and Pa. Overall, it correctly classified 81.67% of the patients into MBHI clusters. Of the patients in Group 1, 74.4% were correctly classified; in Group 2, 95.2% of patients were correctly classified.

In order to describe the two MBHI clusters in terms of their actual MBHI scale differences, univariate analyses of variance were run on all 20 MBHI scales. Table 7 indicates the mean values of the MBHI scales for each cluster along with the results of the analyses of variance. In general, the groups were significantly different on coping style scales 1

Table 6

Mean Subscale T Scores and ANOVAS for MMPI Scales

	MBHI Subgroups			
Subscale	Group 1	Group 2	F	
L	49.54	54.57	6.56	*
F	59.38	50.95	17.37	***
K	51.08	61.10	22.06	***
Hs	73.87	68.76	1.54	
D	69.77	63.29	3.06	
Hy	70.05	66.05	1.46	
Pd	63.46	57.29	2.80	
Mf	55.23	52.95	0.95	
Pa	59.31	52.67	7.05	**
Pt	64.00	56.29	5.77	*
Sc	65.56	55.95	8.13	**
Ma	62.18	55.57	5.33	*
Si	54.41	46.00	14.60	***

df=(1,58)
* p<.05
** p<.01
*** p<.001

Table 7

Mean Scale Base Rate Scores and ANOVAS for MBHI Scales

MBHI Scale	MBHI Subgroups Group 1	Group 2	F	
INTROV1	46.87	69.62	12.22	***
INHIB2	61.64	15.57	52.40	***
COOPER3	44.69	58.81	4.64	*
SOCIAB4	28.72	66.38	41.48	***
CONFID5	39.54	62.29	15.73	***
FORCE6	47.74	37.43	2.50	
RESPEC7	56.82	64.62	2.14	
SENSIT8	61.79	14.00	57.05	***
TENSEA	55.87	31.52	15.38	***
STRESSB	54.26	34.10	12.43	***
PESSIMC	61.23	29.43	48.39	***
DESPARD	62.72	24.38	83.34	***
ALIENE	59.03	22.10	51.98	***
SOMATF	56.77	41.33	6.65	*
ALLERMM	72.95	44.86	36.61	***
GISUSNN	69.23	53.90	11.02	**
CARDIOO	73.87	42.48	63.77	***
PAINPP	61.90	24.57	34.09	***
REACTQQ	69.85	41.05	22.70	***
EMOTRR	38.56	3.33	33.68	***

df=(1,58)

* p<.05
** p<.01
*** p<.001

(Introversive Style), 2 (Inhibited Style), 3 (Cooperative Style), 4 (Sociable Style), 5 (Confident Style) and 8 (Sensitive Style). Also, the groups differed on all six psychogenic attitude scales, all three psychosomatic correlates, and all three prognostic indices.

Finally, to evaluate differences in demographic and pain-related variables, either Chi-Square analyses or analyses of variance were conducted for the remaining variables. (See Table 8.) Patients in groups 1 and 2 differed significantly in income, χ^2 (1) = 4.81, $p < .05$, and in the presence of single versus multiple complaints, χ^2 (1) = 5.50, $p < .05$. Of the patients earning less than $19,200 annually, 78.6% fell in group 1. Of patients earning over $19,200, 60% fell in group 2. Regarding the number of pain complaints, 76.5% of patients with more than one complaint fell in group 1. Also, 86.7% of patients in group 1 reported multiple complaints. Of patients with the single complaint of low-back pain, 66.7% fell in group 2.

There tended to be a significant gender difference, χ^2 (1) = 4.86, $p < .05$, before Yates Correction, with 87.5% of female patients in Group 1 versus Group 2. Only 56.8% of male patients were in Group 1. Consequently, 90.5% of Group 2 consisted of male patients. These results should be qualified by the fact that only 26.7% of the subjects were female.

Patients in Groups 1 and 2 did not differ significantly in age, severity of pain, duration of pain, or desire or

Table 8

Demographic and Pain-Related Variables Across MBHI Clusters

Variable	Chi-Square	D.F.	Significance
Hospital	2.02	1	
Gender	3.60	1	
(before Yates Correction)	4.86	1	*
Income	4.81	1	*
Compensation Status	3.38	2	
Severity of Pain	3.64	2	
Multiple Complaints	5.50	1	*
Desire for Social Activities	2.21	2	
Ability for Social Activities	1.80	2	
Desire for Recreational Activities	3.97	2	
Ability for Recreational Activities	0.87	2	
Desire for Sexual Activities	3.83	2	
Ability for Sexual Activities	5.61	2	

Variable	F	D.F.	Significance
Age	0.08	(1,58)	
Duration of Pain	1.78	(1,58)	

* p<.05
** p<.01
*** p<.001

ability for social, sexual, or recreational activities. However, patients in Group 1 tended to report lesser desire and ability for social, sexual, and recreational activities than patients in Group 2.

Summary

Hypotheses regarding correlations between the MBHI and the MMPI validity scales were largely supported by the results of this study. Particularly notable were the strong negative correlations between MBHI scales A to RR with the MMPI K scale. Also notable were the strong positive correlations between these 12 MBHI scales and the F scale of the MMPI.

Overall, there was no support for hypotheses relating to correlations between MBHI psychosomatic correlate scales and the MMPI Hs and Hy scales. Nor was there support for the hypotheses relating to correlations between the MBHI Pain Treatment scale and MMPI Hs and Hy. The Pain Treatment scale also failed to correlate with the MMPI's Pain Assessment Index.

MBHI scales Premorbid Pessimism, Future Despair, and Social Alienation did correlate as expected with MMPI scales D, Pt, and Si, respectively. However, the hypothesis that MBHI Somatic Anxiety would correlate with Hs and Hy was not supported.

The MBHI Pain Treatment scale correlated with 16 of the other 19 MBHI scales. Pain Treatment correlated positively

with ten of the eleven psychogenic attitude, psychosomatic correlate, and prognostic index scales.

The two MBHI subgroups produced by the cluster analysis differed in all three MMPI validity scales, as well as clinical scales Pa, Pt, Sc, Ma, and Si. In terms of MBHI scales, the two subgroups differed on coping style scales 1, 2, 3, 4, 5, and 8. They also differed on all six psychogenic attitude scales, all three psychosomatic correlates, and all three prognostic indices.

In terms of demographic and pain-related variables, the two subgroups differed significantly only in income and in the presence of single versus multiple complaints.

CHAPTER V

DISCUSSION

The two major purposes of this study were to explore relationships between the MMPI and the MBHI and to examine subgroups of patients. Overall, the results support the findings of previous studies, which suggested that responses on the MBHI are greatly affected by the presence of psychopathology or the willingness to admit psychopathology. The remainder of the discussion will examine these findings more specifically and their implications for the clinical use of the MBHI.

Relationships Among MBHI and MMPI Scales

The importance of the patient's willingness to admit emotional distress is first evident in the correlations between the MBHI's attitude, psychosomatic, and prognostic scales with the MMPI's validity scales. All except one of these MBHI scales yield low scores when patients assume a defensive response style, reflected in high K scores.

The only MBHI scale which does not appear to be influenced by defensive response bias is Scale B, Recent Stress. This scale purportedly indicates the patient's perception of the prevalence of objective sources of stress in the recent past. Clinical experience suggests that patients do not often assume a defensive response style when questioned about the objective sources of stress in their lives.

When questioned about other issues, it is fairly common for patients in a medical setting to distort their responses on a psychological self-report inventory (Millon, Green, & Meagher, 1982a). There are several well-accepted reasons for such distortion. Most often, patients tend to deny emotional problems because they do not see themselves as individuals whose primary problems are emotional.

It is notable that, for five of these 12 MBHI scales, scores were decreased when patients attempted to appear healthier than is objectively justifiable (as reflected in high L scores). These five scales were Premorbid Pessimism, Allergic Inclination, Gastrointestinal Susceptability, Pain Treatment Responsivity, and Emotional Vulnerability.

Scale scores on these 12 MBHI scales increased as patient's tendency to exaggerate symptoms increased, as reflected in high F scores. These results reflect a second well-accepted response tendency among patients in medical settings. A certain proportion of patients seek to appear

more disturbed and concerned about their health than is objectively justifiable. This is particularly true of patients with hysterical personality traits.

These results are largely consistent with the findings of Sweet et al. (1985). These previous investigators found significant negative correlations between all 12 of the psychogenic attitudes, psychosomatic correlates, and prognostic indices with the K scale. Of these, the lowest correlations were with Recent Stress and with Social Alienation. All but one of the MBHI scales correlated significantly with the F scale, the exception was Scale A - Chronic Tension. Contrary to the present results, none of the MBHI scales correlated with the L scale. One possible explanation for this difference in findings is the fact that 43% of the present sample were VA patients. These patients may have been less sophisticated in responding to items constituting the L scale, which appear "obvious" to the average respondent.

The failure to find high correlations between the Psychosomatic correlates and Hs and Hy casts further doubt on the ability of these three MBHI scales to assess health-related behavior. The Psychosomatic Correlates, like Hs and Hy, are intended to indicate patients who are likely to respond to emotional distress by experiencing an increase in physical symptoms.

Sweet et al. (1985) also failed to find significant correlations between the Psychosomatic Correlates and scales Hs and Hy. Among the highest of this group of correlations were Hs with Allergic Inclination (r = .29) and Hs with Gastrointestinal Susceptability (r = .25). These two correlation coefficients were almost identical to those found in this study. The previous researchers discovered a tendency toward correlation between Gastrointestinal Susceptability and Hy (r = .26); in the present study this correlation was even lower. In general, these correlations involving the Psychosomatic Correlates were much lower than would be expected, given the theoretical bases of the scales.

It is acknowledged, however, that these scales were intended by the MBHI authors for use with very specific patient populations - those already diagnosed with allergic disorders (e.g., dermatitis, asthma), gastrointestinal disorders (e.g., ulcer, colitis), or cardiovascular symptoms (e.g., hypertension, angina). Perhaps the Psychosomatic Correlates cannot be fairly evaluated in the population of pain patients.

Results also cast doubt upon the ability of the Pain Treatment Responsivity Scale (PP) to indicate patients whose pain behaviors are maintained by psychological factors. This scale's failure to correlate significantly with Hs and Hy, which are believed to reflect poor adjustment to chronic pain, is consistent with past research. Sweet et al. (1985) also

found low correlations between Pain Treatment Responsivity and Hs (r = .32) and Hy (r = .33). However, previous authors have questioned the ability of Hs and Hy to predict treatment outcome in various clinical contexts (Trieff & Yuan, 1983). Therefore, these results must be cautiously interpreted.

Scale PP was strongly correlated with 10 of the 11 MBHI scales which assess health-related attitudes and behaviors. The presence of extremely high correlations (several with r > .71) between PP and other MBHI scales raises the question of what PP is in fact assessing. The scale appears to lack specificity, even in the population of pain patients. These findings are consistent with Lanyon's observations (1985) that there is a great deal of redundancy among scales and concepts. They are also consistent with Sweet et al., who found that PP correlated with 10 of these 11 other MBHI scales (all at p < .01). Of these, the lowest significant correlation was with Scale B, Recent Stress (r = .39). The only non-significant correlation was with Scale A, Chronic Tension (r = .32).

Both the previous study by Wilcoxson et al. (1988) and that by Sweet et al. (1985) suggested that the most efficient of the MBHI scales in predicting outcome of teatment for pain patients was not the PP scale but the Allergic Inclination (MM) scale. Gatchel (1985) found Emotional Vulnerability (RR) to be correlated with more outcome measures (three out of four) than was PP (two out of four). The findings of these

three outcome studies, together with the present results, suggest that whatever PP is assessing, it is not specific to pain patients nor is it highly correlated with outcome.

The specificity of PP was further questioned by the finding of high correlations with 6 of the 8 coping styles. Two of these correlations - with scales 2 and 8 were strong positive correlations. Sweet et al. also found extremely high correlations between PP with 2 and 8, with $\underline{r}$ = .86 and $\underline{r}$ = .82, respectively. Consistent with the present findings, Sweet et al. reported significant negative correlations between PP and Scale 1, Introversive Style ($\underline{r}$ = -.36), Scale 4, Sociable Style ($\underline{r}$ = -.73), and Scale 5, Confident Style ($\underline{r}$ = -.59). Overall, PP correlated with 5 of the 8 coping styles.

Furthermore, the correlation between PP and the PAI of the MMPI is not statistically significant, although the two scales did tend to correlate. A stronger correlation between scale PP and the MMPI's PAI would be expected, based upon the stated purpose of each scale. PAI has been demonstrated to indicate poor prognosis for pain relief through traditional treatment methods. The relationship between these two scales has not been investigated in past studies.

A few correlations were as predicted: Premorbid Pessimism with D, Future Despair with Pt, Social Alienation with Si. It might be concluded that these three MBHI scales are comparable to the MMPI scales with which they correlate. It

is also possible that these correlations simply reflect the outcome already discussed. High D, Pt, and Si scores were in the more pathological MBHI subgroup; the MBHI scales Pessimism, Despair and Social Alienation reflect this greater pathology as well. Yet, the overall results regarding L, F, and K suggest that these MBHI scales reflect such pathology only to the extent that the patient is willing to admit emotional distress.

Patient Subgroups

When patients were divided into two groups based upon the similarity of their MBHI profiles, these two groups were distinct and homogeneous. This is evident by the fact that the discriminant function correctly classified over 80% of the patients into the MBHI clusters. The variables which constituted the discriminant function were K, F, L, Ma, Si, and Pa.

The groups differed significantly on all three MMPI validity scales as well as on the most pathological clinical scales - Pa, Pt, Sc, Ma, and Si. Note that Sweet et al. found the MBHI's correlations with scales Pa, Sc, Si, Pd (scales reflecting psychopathology) were among the strongest positive correlations. Strong positive correlations were also found with D and Pt, believed to reflect admission of emotional distress. Both the past and present findings support the impression that MBHI scores are greatly influenced by the

degree of psychopathology or willingness to admit emotional distress.

The pattern of mean scores on the MMPI scales indicates that Group 1 is characterized by higher scores than Group 2 on all of the clinical scales. Group 1 is also higher on scale F, but lower on scales L and K versus Group 2. Overall, Group 1 appears more pathological. These patients appear to be more either more willing to admit their distress in general, or to be in fact more distressed.

It is interesting to note that, for both groups, the mean MMPI T scores are generally not elevated. In Group 1, only Hs and Hy are above T = 70. This may be due to a broad range of scores, with low scores reducing the group average. As evidence of a broad range of scores, most of the scales are characterized by large standard deviations, for example, up to 15 points on Hy.

The pattern of validity scales for Group 2 is such that this profile should be cautiously interpreted. The F - K index yields a difference of -11.85. This indicates that a number of the MMPI profiles in Group 2 are of questionable validity. Only one of the MBHI profiles was designated as being of "questionable" validity. This designation refers to the MBHI's validity index. It consists of three items which are intended to identify patients who respond randomly, i.e. they fail to comprehend the item. This index of validity is called the "Reliability Check". When the patient responds

positively to one of these items, the profile is labelled "questionable" and the results should be considered unreliable. If the score is two or more, results must be considered invalid. Contrary to expectations, the single profile which was considered questionable was in Group 1.

The pattern of scores on the MBHI scales for each of the MBHI subgroups also indicates generally higher scores for Group 1. Group 1 is significantly higher on all of the psychogenic attitude scales, psychosomatic correlates, and prognostic indices. This is consistent with the MMPI findings which indicate that Group 1 is the more pathological group. The degree of congruence between the MBHI and the MMPI underscores the point that the MBHI is primarily a measure of pathology or of the willingness to admit pathology. One might expect more variance in the MBHI scores if it were actually assessing health-related attitudes and concerns.

In terms of MBHI coping style scale scores, Group 1 is higher on coping style scales 2, 8, and 6, with significant differences on 2 and 8. It is notable that the finding of one subgroup with high scales 2 and 8 replicates the results of Millon's cluster analysis as reported in the MBHI manual. It is encouraging that the present cluster analysis is consistent with results reported earlier in the literature. However, these results must be qualified due to small sample size, $n = 60$. Ideally, cluster analysis involving 20 scales would be drawn from data on at least 200 patients. Millon

did not specify the number of patients involved in the former analysis.

Patients in Group 1 are significantly more "inhibited" and more "sensitive" than their counterparts in Group 2. They are also poorer candidates for medical treatment of their pain complaints. At first impression, these coping styles appear consistent with the poor prognosis. From the description of high scorers on scale 2, these patients are ill-at-ease, and often hesitant with others. With considerable understanding and attention, they can be expected to cooperate with treatment. High scorers on scales 8 are unpredictable and moody. They tend to be erratic in following a treatment plan, for example, by overmedicating or undermedicating. Rapport with these patients varies from day to day. Millon describes this pairing of coping styles as one that reflects moody irritability and pessimism.

However, descriptions of the other six coping styles depict each of these alternatives as equally challenging patients, for different reasons. For example, patients whose salient style is "cooperative" are likely to deny the existence of real problems. "Sociable" patients are described as undependable in keeping appointments and in taking medication. Patients characterized as "forceful" tend to be distrustful and require a great deal of work on the part of the treatment team to be coaxed into following the prescribed treatment course.

Patients in Group 2 have a much lower average score on Pain Treatment Responsivity (24.57 versus 61.90) and are therefore expected to respond more favorably to medical treatment. In terms of Millon's coping style scales, Group 2 appears to be primarily introverted. Introverted patients are described as passive in taking care of themselves physically. They can not be expected to take the initiative in following a treatment plan.

It might be hypothesized that the more introverted patients are also less likely to use denial as a defense against anxiety about physical well-being. This tendency might allow them to benefit from psychological treatment to a greater degree than their counterparts who would more likely deny emotional factors contributing to poor health. However, it does not necessarily follow that the more introverted patients would be the better candidates for medical treatment.

Overall, the MBHI cluster analysis reveals patients with high scale PP as well as elevated scales 2 and 8 in Group 1. The higher score on scale PP suggests that patients in Group 1 have a worse prognosis (less likely to respond to medical treatment) than patients in Group 2. The difference in prognosis between Group 1 and Group 2 does not appear to be based upon coping style differences. Patients in both groups appear to be characterized by their coping styles as poor candidates for medical treatment. Furthermore, comparison of group means has indicated that Group 1 is either the more

pathological group, or the group that is more willing to admit emotional distress. These results suggest that PP is merely reflecting degree of pathology or tendency to deny pathology. Patients who are either more disturbed or who are more willing to admit their emotional distress are also likely to score high on the PP scale and therefore to be designated as poor candidates for traditional medical treatment.

The consistency with which Group 2 appears healthier on all of the MBHI attitude, psychosomatic correlate, and prognostic scales is suspect. One would certainly expect more variability in psychogenic attitudes, psychosomatic correlates, and in prognostic indices if the MBHI were a measure of more than degree of psychopathology. One would expect more differences in health behaviors and in attitudes toward health. Although differences were not significant, Group 1 tended to be lower on desire and ability for social, recreational, and sexual activity. These differences are in the expected direction, given the apparent tendency of Group 1 to be more willing to admit emotional distress.

The only significant differences between Group 1 and Group 2 in terms of demographic variables were in income and in the presence of multiple complaints. Patients in Group 1 have a significantly lower income than patients in Group 2. This may be understood in light of the observation that Group 1 is apparently the more pathological group; it follows that Group 1 consists of generally lower functioning individuals

and therefore of patients at lower income levels than those in Group 2.

The finding of a difference in the number of pain complaints may reflect the tendency of patients in Group 2 to deny distress and therefore to be less likely to report more than one pain complaint. Likewise, it reflects the greater willingness of patients in Group 1 to admit health-related problems.

The tendency toward a significant difference in gender composition of the two groups, such that most of the female patients fell in Group 1, may be due in part to the tendency of female patients to be less defensive in responding to psychological self-report inventories.

It may be noted that, for the MBHI, sex is the only dimension along which normative data are available. There is a separate table for the transformation of raw scores to base rate scores for female versus male patients.

Yet, these transformations of scores do not take response tendencies into account. They are determined by the prevalence of the particular coping style, attitude, or psychosomatic correlate tendency in the normal, non-clinical population. Raw scores are transformed into base rate scores, which are different from standard scores and do not assume a normal distribution of the coping style in the population. A base rate score over 74 indicates the presence of a coping style or psychosomatic correlate tendency. A base rate score

over 84 indicates that the particular style is salient in a smaller percentage of the population and is therefore an even more significant descriptor of the patient.

Millon points out that the coping styles, attitudes, psychosomatic correlate tendencies, and prognostic indices have different prevalence rates in male versus female MBHI respondents. However, response tendencies are not discussed in the context of establishing base rate scores.

Any interpretation of the results in terms of gender differences must also take into account the fact that only 16 of the 60 patients were female. This small group cannot be considered a representative sample of female patients with chronic low-back pain.

Although response tendencies are not discussed by the MBHI authors in the context of sex differences, they are discussed in the more general sense. The authors of the MBHI manual acknowledge that two common response tendencies among medical patients taking self-report inventories are the tendency to deny emotional problems and the tendency to complain excessively, or to exaggerate physical complaints. These are commonly known as "faking good" and "faking bad". In addition to noting these tendencies, the authors reported discrepancies between MBHI protocols and actual clinical judgement. Unfortunately, the authors did not elaborate on what these discrepancies were or how they were detected. These discrepancies "indicated the need to build in a

correction for psychological defensiveness and complaint tendencies" (p. 11).

The built-in corrections, called "adjustment scores", are reportedly "undergoing constant re-evaluation" (p. 11). The need for constant changes in itself indicates that the scales are not acceptable in their current form. Furthermore, only the psychogenic attitude scales are affected by these corrections. The present findings indicate that the adjustment scores are not sufficient to compensate for response bias among MBHI respondents.

As has already been discussed, the MBHI also lacks the ability to detect response bias, or to accurately flag a questionable protocol. The validity index for the MBHI designated only one protocol as requiring cautious interpretation, while the MMPI's validity scales indicated that response tendencies were significantly affecting scale scores. Wilcoxson et al. (1988) expressed the same concern about the MBHI, noting that one of the inventory's limitations is its questionable ability to detect response bias.

MMPI vs. MBHI: Practical Utility

The development of the MBHI arose out of recognition of the limitations of the instruments currently available for the psychological assessment of medical patients. The MMPI has been the most widely used of these instruments. Yet, the normative population for the MMPI is a non-medical, clinical

population. The applicability of these norms to a non-clinical, medical population has been questioned. The applicability of interpretations of results of the MMPI has therefore been an issue of concern. A second limitation of the MMPI is the time required to complete the inventory. This can be particularly taxing for patients who have difficulty remaining stationary for long periods of time. A third limitation is the inclusion of items that refer to bizarre experiences and thoughts. Many medical patients become anxious when presented with such questions.

The ability of the MMPI to assess the likelihood that a chronic pain patient will benefit from medical versus non-clinical treatment is arguable. Similarly, investigators disagree as to whether or not the MMPI is helpful in distinguishing patients with "organic" versus "functional" types of pain. However, most clinicians and researchers no longer attempt to make this distinction, but instead recognize that most pain complaints fall somewhere in the continuum between a purely emotional basis and a purely physical basis.

The MMPI's strengths include: good reliability, its ability to classify chronic pain patients into subgroups, strong research base with varied populations, ability to detect pathology. The frequent use of the MMPI in pain clinics nationally suggests that most clinicians believe that its strengths outweigh its weaknesses.

The MBHI is appealing to clinicians due partly to its brevity and ease of administration. It was normed on a medical, non-clinical population. As a consequence, patients find it less taxing to complete and less objectionable in content. An additional feature of the MBHI is its potential to predict in behavioral terms the ways in which patients will react to illness and treatment.

For chronic pain patients in particular, it proposes to indicate which patients will not respond well to traditional medical treatments. The implication is that these patients are candidates for psychological (usually cognitive and/or behavioral) therapy.

The limitations of the MBHI have been pointed out by several researchers (Sweet et al., 1985; Wilcoxson et al., 1988) and reviewers (Allen, 1985; Lanyon, 1985). Among these limitations are a very narrow research base, a high degree of correlations among the scales, and a highly questionable ability to detect response bias.

The results of this investigation further highlight the limitations of the MBHI, and suggest the need for cautious use of this inventory until further data becomes available.

Limitations and Directions for Future Research

One of the limitations of this study is the questionable representativeness of the sample. The total number of

subjects, 60, is relatively small. This sample size presents some question of whether the patients involved in this study are truly representative of the general population of patients with chronic low-back pain. A related issue is the very small number of female patients in this study. It is unlikely that these 16 women comprise a fair representation of women with low-back pain.

A second limitation, also related to sample size, regards the ability to meaningfully interpret the results of the statistical tests in this study. Numerous analyses were performed on a relatively small set of data, thereby increasing the risk of falsely rejecting the null hypotheses. Furthermore, certain analyses require a large amount of data in order to provide meaningful results. This is particularly true of the process of cluster analyses. Ideally, data from at least ten patients would be available for each of the 20 MBHI scales entered into the cluster analysis.

Thirdly, any conclusions about the utility of the prognostic index scales is limited by the fact that this was not an outcome study. In particular, the Pain Treatment Scale can only be fully understood and evaluated in an investigation of patient's response to medical treatment for pain problems.

Future research might investigate comparisons between the MMPI and MBHI in larger samples of patients with specific pain complaints. Since this study represents one of the few in which the MBHI was evaluated in the specific population of

low-back pain patients, much more data is needed before any definitive conclusions can be drawn about the utility of the MBHI for this subset of pain patients.

In future outcome studies, one might further investigate the specificity of the Pain Treatment Scale (PP) and its ability to predict outcome of medical treatment for pain. A puzzling finding of past outcome studies was the observation that certain MBHI scales other than PP (Emotional Vulnerability, Allergic Inclination) were better predictors of outcome of treatment for pain patients. The present findings indicated that scale PP lacked specificity and cast further doubt as to what this scale is in fact assessing.

SUMMARY

The purpose of this investigation was to explore the relationships between the relatively new Millon Behavioral Health Inventory and the MMPI in the assessment of patients experiencing chronic low-back pain. Subjects were sixty patients who had been admitted to outpatient pain clinics at one of two Chicago-area hospitals. All subjects completed both the MMPI and the MBHI and participated in a one-hour interview with a clinical psychologist.

Based upon previous research, it was predicted that the psychogenic attitude, psychosomatic correlate, and prognostic index scales of the MBHI would correlate negatively with the L and K scales of the MMPI. It was also predicted that these 12 MBHI scales would correlate positively with MMPI scale F. Results of these correlational analyses were as predicted, with strong correlations between these 12 MBHI scales and all three validity scales of the MMPI. These results supported the suggestions of previous researchers, who proposed that results of the MBHI are largely affected by the respondent's

tendency to deny psychopathology, or their willingness to admit emotional distress.

Based upon the theoretical purpose of the scales, it was predicted that the MBHI's Psychosomatic Correlates would correlate significantly with scales Hs and Hy of the MMPI. Results indicated that the correlations between these pairs of scales were not as strong as expected, thereby casting doubt as to the ability of these scales to assess health-related attitudes and behaviors.

The Pain Treatment Scale (PP) of the MBHI was predicted to correlate with scales Hs and Hy of the MMPI. Consistent with past research, these correlations failed to be significant. The ability of PP to indicate patients whose pain complaints are maintained by psychological factors is questionable.

Results of this investigation indicated that scale PP correlated significantly with 16 of the 19 other MBHI scales, which assess coping styles, psychogenic attitudes, psychosomatic correlates, and prognostic indices. These results are consistent with the findings of past research, and support the previous criticism that this scale lacks specificity.

A final set of predictions, regarding the psychogenic attitude scales, were supported by the results of the present study. The Premorbid Pessimism Scale of the MBHI correlated with the MMPI's D scale; Future Despair correlated with Pt;

Social Alienation correlated with Si; and Somatic Anxiety tended to correlate with Hs and with Hy.

A second purpose of this investigation was to compare subgroups of patients in terms of both their MBHI profiles and their MMPI profiles. Cluster analysis revealed that, when patients were divided into two subgroups based upon their MBHI profiles, these subgroups resembled those produced in the previous cluster analysis by Millon and his colleagues. A discriminant analysis involving MMPI scales as variables correctly classified over 80% of patients into MBHI subgroups.

These two subgroups differed significantly on all three validity scales of the MMPI, as well as on the five most pathological of the clinical scales. The second subgroup was lower on all of the clinical scales and higher on scales L and K. This pattern of findings strongly suggested that patients in the two subgroups differed in terms of their degree of pathology and/or their willingness to admit emotional distress.

When the two subgroups were compared in terms of their MBHI scores, the degree of congruence between MBHI profiles and MMPI profiles was striking. The first subgroup appeared to be the more pathological group on all of the MBHI psychogenic attitude, psychosomatic correlate, and prognostic index scales. The lack of variability across MBHI scales in each subgroup brought into question the ability of this

inventory to provide information about health-related attitudes and concerns.

When subgroups were studied in terms of their differences in demographic and pain-related variables, results were consistent with the previous findings of this investigation. Patients in the first subgroup reported lower income and were more likely than patients in the second subgroup to have more than one pain complaint. These patients also tended to experience a greater negative effect of pain upon their attitudes and behavior. These characterizations of the first subgroup are consistent with the belief that it represents the more disturbed patients with chronic pain, or those who are more willing to admit their emotional and physical distress.

Overall, the results indicate the need for cautious use of the MBHI at least until further data becomes available. In particular, two limitations of this inventory are the high degree of intercorrelations among its scales and its questionable ability to detect response bias.

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APPENDIX A

DIRECTIONS:

1. Use a No. 2 pencil. Make a heavy, dark mark that completely fills the circle.
2. If you make a mistake or change your mind, please erase the mark fully and then fill in the correct circle.
3. Complete the Identification Number, Major Problems, Sex, and Age areas. Do not fill in the special codes sections below. Your doctor will complete these.
4. The following pages contain a list of statements that people use to describe themselves. They are printed here to help you in describing your feelings and attitudes. Try to be as honest and serious as you can in marking the statements since the results will be used to help your doctor in learning about your problems and in planning your treatment.
5. Do not be concerned that a few of the statements will seem unusual to you; they are included to describe people with many types of problems. When you agree with a statement or decide that it describes you, fill in the (T) to mark it true (● (F)). If you disagree with the statement or decide that it does not describe you, fill in the (F) to mark it false ((T) ●). Try to mark every statement even if you are not sure of your choice. If you have tried your best and still cannot decide, mark the (F) for false.
6. There is no time limit for completing the inventory, but it is best to work as rapidly as is comfortable for you.
7. This form will be scored by computer and the results will be sent directly to your doctor where they will be kept confidential.

IDENTIFICATION NUMBER

SEX

○ MALE
○ FEMALE

AGE

What do you feel are the two major problems for which you are seeking help?

1st	MAJOR PROBLEMS	2nd
○	Accident Injury	○
○	Alcohol-Drugs	○
○	Allergies	○
○	Asthma	○
○	Arthritis	○
○	Back Pain	○
○	Cancer	○
○	Chest Pain	○
○	Diabetes	○
○	Dizziness	○
○	Fatique	○
○	Female Problems	○
○	Headaches	○
○	Heart Attack	○
○	Heart Disease	○
○	High Blood Pressure	○
○	Itching	○
○	Kidney Problems	○
○	Nerves	○
○	Overweight	○
○	Sexual Problems	○
○	Sleep Difficulty	○
○	Stomach Problem	○
○	Stress Tension	○
○	Other	○

SPECIAL CLINICAL CODES

ICD-DX | HS | CT 1 2 | S | E | Y | Z

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1 T F I have always been able to overcome the problems I've had.

2 T F Lately, life has been going along as usual, with no special things happening.

3 T F When I was a young child, my parents felt very proud of me.

4 T F I have almost never been sick.

5 T F I have friends who will listen to any problems I have.

6 T F I like to be the one in authority to take charge of things.

7 T F If I were very sick, I'm sure that everything would work out well.

8 T F I always take the medicine a doctor tells me to even if I don't think it is working.

9 T F I am very pleased with all the things I have done up to now.

10 T F I almost never feel pressure in the work I do.

11 T F I get very frightened when I think of being all alone in the world.

12 T F I am ready to attack anyone who tries to say terrible things about me.

13 T F I have a feeling that things in my life just go from bad to worse.

14 T F All my life I have to "blow up" every now and then.

15 T F This year I was successful at something that was very important to me.

16 T F I am in better health than most of my friends.

17 T F A quiet hobby is more fun for me than a party.

18 T F Most people wouldn't care much if I were very sick.

19 T F I often say things that I regret having said.

20 T F I have lots of plans of what I'd like to be doing ten years from now.

21 T F I have a lot of faith that doctors can cure any sickness.

22 T F People can influence me quite easily.

23 T F I often find time to take it easy and do nothing.

24 T F Even in difficult times, I always try to be cheerful.

25 T F I don't mind that other people are not interested in my friendship.

26 T F I've had serious money problems this past year.

27 T F I almost always have medical problems.

28 T F I often feel that others do not want to be friendly to me.

29 T F If I became ill, I wouldn't have much help from my family.

30 T F In many ways I feel very superior to most people.

31 T F If I ever got a serious illness, I think it would be the end of me.

32 T F No matter what, seeing a doctor can make me feel better.

33 T F So little of what I have done has been appreciated by others.

34 T F Keeping to a time schedule is not important to me.

35 T F I've done most things in my life very well.

36 T F When I think about the past, I remember mostly the good things.

37 T F I make nasty remarks to people if they deserve it.

38 T F I have had more than my share of troubles in the past year.

39 T F It is good to have a regular way of doing things to avoid mistakes.

40 T F Many people have been spying into my private life for years.

41 T F I almost never worry about my health.

42 T F If I thought I had a serious sickness, I would quickly talk it over with my family.

43 T F There are always a number of reasons why most problems can't be solved.

44 T F I look forward to the future with lots of hope.

45 T F I do my best to get along with others by being pleasant and agreeable.

46 T F All doctors care about is my money, not me.

47 T F I get upset when things I don't expect happen to me.

48 T F I often get angry with people who do things slowly.

49 T F I don't depend much on other people for friendship.

50 T F I feel pretty upset about most things in my life.

51 T F It is very difficult for me to stop feelings from coming out.

52 T F My family has had really bad problems in the past year.

53 T F I can stand a lot of pain.

54 T F I like to flirt a lot.

55 T F In time of trouble there are several friends that I can depend on.

56 T F Most people can be trusted to be kind and thoughtful.

57 T F Even if I were very sick, I'd keep fighting and never give up.

58 T F I sometimes feel I am in this world all alone.

59 T F I feel that the doctors I have seen are not interested in my problems.

60 T F I am a dramatic and showy sort of person.

61 T F I can't stand people who are late for appointments.

62 T F I do my best to stop anyone from trying to boss me.

63 T F I often think about unhappy things that have happened to me.

64 T F I often do things for no reason other than it might be fun.

65 T F During the past year, someone close to me has been very ill.

66 T F I guess I'm a complainer who expects the worst to happen.

67 T F It is not unusual to feel lonely and unwanted.

68 T F I worry a lot about my health.

69 T F Lots of people would care about me if I became very sick.

70 T F I would much rather follow someone than be the leader.

71 T F If I had a very serious sickness, I think I would fall apart mentally.

72 T F To get ahead in this world I'm willing to push people who get in my way.

73 T F Doctors have always been helpful to me.

74 T F I find it hard to feel sorry for people who are always worried about things.

75 T F I seem to fit in right away with any group of people I meet.

76 T F I like being in a crowd just to be with lots of people.

77 T F Most of my problems just go on and on.

78 T F I guess I depend too much on others to be helpful to me.

79 T F I moved during the past year.

80 T F I have always felt some kind of problem between me and the opposite sex.

81 T F I get frightened when I think I have a medical problem.

82 T F Punishment never stopped me from doing whatever I wanted.

83 (T) (F) I would have lots of visitors if I were in the hospital.

84 (T) (F) Among the most important things a person can have are a strong will and the drive to get ahead.

85 (T) (F) I would never let a serious sickness stop me from working toward the future.

86 (T) (F) I often feel so angry that I want to throw and break things.

87 (T) (F) I dislike going to doctors, and do so only after trying everything myself.

88 (T) (F) I really hate to have my work pile up.

89 (T) (F) I find it hard to take my mind off my work even when I'm supposed to be relaxing.

90 (T) (F) I have not seen a car in the last ten years.

91 (T) (F) I very often think I am not wanted by others in a group.

92 (T) (F) Even when things seem to be going well, I expect that they'll soon get worse.

93 (T) (F) I would rather be direct with people than avoid telling them something they don't like.

94 (T) (F) Many important things have happened in my life this past year.

95 (T) (F) What this country really needs are more serious and devoted citizens.

96 (T) (F) At no time in my life have I had any hair on my head or my body.

97 (T) (F) T.V. programs about illness make me very upset.

98 (T) (F) Ever since I was a child I have been losing touch with the real world.

99 (T) (F) I cannot depend on my family when I need them.

100 (T) (F) I like to tell others about the things I have done well.

101 (T) (F) I'd rather be dead than have a very serious sickness.

102 (T) (F) I usually let other people have their own way.

103 (T) (F) I usually won't take any medicines, even if a doctor tells me to.

104 (T) (F) I wish the people around me would move faster and get more things done.

105 (T) (F) I often feel that there is nothing I can do to make my life easier.

106 (T) (F) I have very few close personal ties with others.

107 (T) (F) This past year has been one of the most difficult ones in my life.

108 (T) (F) If I thought I were getting sick, I would quickly call a doctor.

109 (T) (F) I have a strong desire to win any game I play with others.

110 (T) (F) Nobody really cares about my state of health.

111 (T) (F) I have faith that human nature is good.

112 (T) (F) I haven't thought much about what I'll be doing a year from now.

113 (T) (F) All my life I have had the feeling that I have done something terribly wrong or evil.

114 (T) (F) When someone hurts me, I try to forget it.

115 (T) (F) Hospitals are frightening and lonely places to be in.

116 (T) (F) My work makes me tense almost all the time.

117 (T) (F) I have flown across the Atlantic 30 times last year.

118 (T) (F) In this world you either push or get shoved.

119 (T) (F) If I were young again, I would do things very differently.

120 (T) (F) It is very important that children learn to obey their elders.

121 (T) (F) I've had a lot of shocks and disappointments this past year.

122 (T) (F) Rather than demand things, people can get what they want by being gentle and thoughtful.

123 (T) (F) I get very upset when I feel pain in any part of my body.

124 (T) (F) I can see more sides of a problem better than others can.

125 (T) (F) If I were getting sick, I wouldn't waste my time telling anyone in my family.

126 (T) (F) I am more worried about finishing things that I start than most people.

127 (T) (F) For me, the future looks like it will be full of trouble and problems.

128 (T) (F) I do my best not to hurt people's feelings.

129 (T) (F) I have never felt much life in me.

130 (T) (F) I would rather be in pain than take any medicines.

131 (T) (F) I often doubt whether people are really interested in what I am saying to them.

132 (T) (F) It is very easy for me to relax and slow down.

133 (T) (F) I don't know what I want out of life.

134 (T) (F) Life has never gone well for me.

135 (T) (F) I've been touchy or tearful about everything most of my life.

136 (T) (F) I am very uneasy when I have to tell people what to do.

137 (T) (F) I am too rushed and busy to take the vacations I should.

138 (T) (F) There has recently been an important change in my job.

139 (T) (F) I like to follow instructions and do what others expect of me.

140 (T) (F) I often think that I have a serious illness.

141 (T) (F) I am a quiet and cooperative person.

142 (T) (F) I'd be a pretty lonely person if I ever were hospitalized.

143 (T) (F) I become very excited or upset once a week or more.

144 (T) (F) I always try to do what is proper.

145 (T) (F) I don't think I would want to go on living if my body was marked up a lot in a serious operation.

146 (T) (F) I get so touchy that I can't talk about certain things.

147 (T) (F) From things I hear about them, I don't trust the people who work in hospitals.

148 (T) (F) I have a strong need to feel like an important person.

149 (T) (F) My day is filled with pressures and responsibilities.

150 (T) (F) I like to arrange things down to the last detail.

APPENDIX B

Composition of Scales

Scale 1 Introversive Items = 32

True
10 17 25 49 106 112

False
3 11 14 19 22 37 45 48 50 51
54 60 63 64 66 67 76 78 81 86
94 100 104 143 148 149

Scale 2 Inhibited Items = 43

True
18 28 29 33 47 50 63 67 77 80
91 92 98 99 105 106 116 119
127 129 131 133 136 142 146

False
9 35 36 44 45 53 55 56 57 69
75 76 83 85 93 111 122 124

Scale 3 Cooperative Items = 33

True
11 22 45 56 70 76 78 102 111
114 128 136 139 141 144

False
6 25 30 37 48 49 60 61 62 74
82 93 104 106 109 118 126 148

Scale 4 Sociable Items = 40

True
15 41 45 54 60 64 75 76 83 94
100

False
17 25 28 33 38 43 47 49 50 58
63 67 70 77 91 102 105 106 108
112 118 119 121 127 131 136 141
144 146

Scale 5 Confident Items = 33

True
1 6 7 9 15 16 30 35 53 62 74
75 82 83 88 93 100 124 126 148
150

False
22 28 33 58 67 70 78 91 102
119 131 136

Scale 6 Forceful Items = 33

True
6 12 30 37 48 54 60 61 62 72
74 82 84 87 93 104 109 118 126
148 150

False
22 56 70 78 102 111 114 122
128 136 139 141

Scale 7 Respectful Items = 42

True
1 2 8 9 10 17 21 32 35 38 39
45 47 56 57 73 84 85 88 89 93
95 106 108 112 114 120 126 139
141 144 150

False
14 34 37 41 54 60 64 82 86
133

Scale 8 Sensitive Items = 48

True
11 12 13 14 19 31 33 37 43 47
48 50 51 58 59 63 64 66 67 68
71 77 86 92 103 104 105 107
116 118 131 133 134 135 143 146
149

False
1 3 9 10 24 35 88 111 114 126
141

Scale A Chronic Tension Items = 29

True
6 14 19 43 47 48 58 61 62 66
86 88 89 104 109 116 118 126
137 143 146 148 149 150

False
10 23 24 34 132

Scale B Recent Stress Items = 20

True
14 15 26 38 40 52 58 59 65 77
79 92 94 107 121 137 138 143
146

False
2

Scale D — Future Despair — Items = 38

True
13 31 43 50 51 63 66 67 71 77
81 92 101 105 106 112 115 118
119 123 127 129 133 134 140 142
145 146

False
7 15 20 41 44 57 69 75 83 85

Scale E — Social Alienation — Items = 33

True
18 25 28 29 33 49 50 58 67 80
91 98 99 106 110 113 125 131
133 135 142 146

False
5 9 36 42 44 55 56 69 75 83
122

Scale F — Somatic Anxiety — Items = 34

True
11 13 27 32 38 42 43 47 50 51
63 66 68 71 77 81 89 92 97
108 112 115 121 123 127 129 134
135 140 143

False
4 16 41 53

Scale MM — Allergic Inclination — Items = 34

True
18 19 21 27 28 29 32 33 37 47
52 63 68 84 89 92 95 99 106
108 113 119 127 131 134 140 150

False
1 4 5 7 41 69 83

Scale NN — Gastrointestinal Susceptibility — Items = 27

True
13 21 25 27 32 38 42 50 52 63
68 77 89 97 105 106 108 112
116 121 123 127 134 140

False
4 16 41

Scale OO — Cardiovascular Tendency — Items = 38

True
12 13 18 26 29 33 37 40 43 47
48 49 50 52 61 63 65 68 77 84
95 99 104 106 110 116 118 119
120 121 134 146

False
4 10 34 64 69 83

Scale PP — Pain Treatment Responsivity — Items = 42

True
13 18 27 29 31 34 38 50 58 59
63 66 71 74 77 79 82 87 92 97
103 105 107 115 125 127 140 142
145 147

False
7 8 16 36 42 44 53 57 69 85
111 132

Scale QQ — Life Threat Reactivity — Items = 42

True
13 17 25 33 34 43 46 47 50 51
52 63 68 77 92 97 99 102 105
106 108 110 112 113 115 119 121
123 125 127 130 134 140 142 146
147

False
20 44 45 53 57 64

Scale RR — Emotional Vulnerability — Items = 12

True
12 40 50 77 92 98 113 127 129
134 135 146

False
None

Scale 21 — Reliability Check — Items = 3

True
90 96 117

False
None

Scale C — Premorbid Pessimism — Items=40

True

13 18 26 27 28 31 33 38 43 50 52 58

63 66 67 68 71 77 91 92 105 107 119 121

123 127 129 131 134 135 140 142 143 146

False

1 9 15 24 36 69

APPENDIX C

I. GENERAL INFORMATION

1. Date: _____

2. Name: _____
last first middle

3. Address: _____
street city state zip

4. Social Security Number: _____-____-_____

5. Phone: _____ Work Phone: _____
(area) (area)

6. Hospital Number: _____

7. Age: _____ 8. Date of Birth: _____

9. Sex: Male Female

10. Name of Spouse (or significant other) _____

11. Referring Physician: _____

12. Physician's Address: _____

13. Distance from home to Illinois Masonic Medical Center: _____

14. Mode of Transportation: _____

15. Environment:
1. farm
2. rural (non-farm)
3. town/village
4. small city
5. large city

16. Religion:
1. Protestant (denomination) _____
2. Catholic
3. Jewish
4. Other (specify) _____

17. Ethnic Group:
1. White
2. Black
3. Hispanic
4. American Indian
5. Other (specify) _____

18. Highest level of school completed:
1. less than 8th grade
2. 8th grade or above but not high school
3. high school
4. technical or business school
5. some college
6. college
7. graduate or professional school

19. Do you now live (circle all that apply):
    1. alone
    2. with spouse
    3. with children
    4. with unrelated others
    5. with brothers/sisters
    6. with own parents
    7. with in-laws
    8. with other relatives_____ (specify)

20. Number of Children:_____

21. Ages of Children:_____ _____ _____ _____ _____ _____ _____ _____ _____

22. Ages of Children Living at Home:_____ _____ _____ _____ _____ _____

23. Current marital status:
    1. single, never married
    2. married (how long)_____
    3. divorced (how long)_____
    4. separated (how long)_____
    5. widowed (how long)_____

24. Number of previous marriages:
    1. none
    2. one (how long)_____ marriage ended by: divorce annulment death of spouse (date of death)_____
    3. two (how long)_____ marriage ended by: divorce annulment death of spouse (date of death)_____
    4. three (how long)_____ marriage ended by: divorce annulment death of spouse (date of death)_____
    5. more than three (how many)_____

25. Weekly family income from all sources:
    1. less than $100
    2. $101 - $200
    3. $201 - $300
    4. $301 - $400
    5. more than $400

26. Number of individuals supported on family income:_____

27. Circle all sources of income:
    1. salary
    2. retirement
    3. pension
    4. social security
    5. personal disability insurance
    6. investments
    7. compensation
    8. social security disability
    9. other (specify)_____

28. If married, what is your spouse's occupation? (be specific)_____

II. ONSET AND DESCRIPTION OF PAIN

29. Under what circumstances did the pain begin?
    1. accident at work
    2. accident at home
    3. other accident
    4. at work, but not an accident
    5. following surgery
    6. following illness
    7. pain just began; can't relate it to anything
    8. other reasons or circumstances (describe)_____

30. Date that you first experienced the pain:_____

31. In what parts of your body did the pain BEGIN? (circle all that apply)
    1. head
    2. face
    3. neck
    4. shoulders
    5. low back
    6. arms
    7. legs
    8. abdomen
    9. other (specify)_____

32. What parts of your body NOW hurt when you experience pain?
    1. head
    2. face
    3. neck
    4. shoulders
    5. low back
    6. arms
    7. legs
    8. abdomen
    9. other (specify)_____

* Whenever the pain occurs, do you also experience difficulties or changes in other parts of the body? For example, if pain occurs in the upper arm, does it cause twitching fingers; or does a pain in the leg bring on headaches, etc. If such things happen to you, please describe what happens, when it happens and how often._____

33. Is the pain:
    1. rarely present
    2. only occurs under certain circumstances
    3. frequently present
    4. usually present
    5. always present (describe)_____

34. How many hours of pain do you experience in an average week?_____

35. What is the LEAST number of hours of pain you experience in any given week?_____

36. Is the INTENSITY OF THE PAIN always the same, or is it sometimes worse? 1. same 2. worse (describe)_____

37. What activities bring on the pain or make it worse?_____

38. About how long after beginning this activity does it take for the pain to begin or to become worse?_____

39. Does the pain disappear if you stop these activities? 1. no 2. yes

40. How many times a day is the pain likely to interfere with your activities?_____

41. How many times a day do you have to stop what you are doing because of the pain?_____

42. How many times a day do you have to lie down because of the pain?_____

43. Do you have days when the pain is so bad that you stay in bed?
1. no
2. yes--How often does this happen?_____

44. The following words represent degrees of pain severity:
1. mild
2. uncomfortable
3. distressing (fairly severe)
4. very severe (horrible)
5. unbearable, excruciating

WRITE THE NUMBER OF THE WORD ABOVE THAT BEST DESCRIBES:
1. Your pain as it usually feels:_____
2. Your pain right now:_____
3. Your pain at its worst:_____
4. Your pain when it hurts least:_____
5. The worst toothache you ever had:_____
6. The worst headache you ever had:_____
7. The worst stomach-ache you ever had:_____
8. The worst sunburn you ever had:_____
9. The worst insect bite you ever had:_____

45. Estimate the intensity of your CURRENT PAIN AT ITS WORST using a number from 0 to 100, with 0 being no pain and 100 being pain so severe you could commit suicide rather than bear it:_____

46. Using the same 0 to 100 scale, rate your TYPICAL LEVEL OF PAIN currently:_____

If your present pain condition was caused by your job, occurred while on the job, or resulted from an accident, please answer questions 105 through 115. (If not, please skip to the next section.)

105. Was your employer helpful and understanding of your problem?
1. no 2. yes

106. Do you believe your employer was fair in the treatment of you since you have been sick/injured? 1. no 2. yes

107. Have you received compensation for your injury? 1. no 2. yes

108. If you have received compensation, do you feel that it has been adequate? 1. no 2. yes

109. Are you bringing suit (suing) because of your injury?
1. no 2. yes

110. Have you already had to sue to get compensation? 1. no 2. yes

111. Have you tried to return to work? 1. no 2. yes

112. If you have returned to work, are you working:
1. part time
2. full time

113. Did your employer allow you to return to work? 1. no 2. yes

114. Do you think you can work at your regular job? 1. part time
2. full time
3. not at all

115. Compared to your job ability (including housewife) before your present pain condition, can you do:
1. as much as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. not do the job at all

V. SOCIAL INFORMATION

Comparing yourself before you had pain with your present condition, please answer these questions:

SOCIAL ACTIVITIES:

116. DESIRE for social activities:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no desire for social activities

117. ABILITY for social activities:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no longer have the ability

HOBBIES AND RECREATIONAL ACTIVITIES:

118. DESIRE for such activities:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no desire for such activities

119. ABILITY for such activities:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no longer have the ability

SEXUAL FUNCTION:

120. DESIRE for sexual relations:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no desire for sexual relations

121. ABILITY for sexual relations:
1. remains the same as before
2. somewhat less than before
3. about half as much as before
4. much less than before
5. no ability for sexual relations

122. If married, how would you describe your marital relationship?
1. very satisfactory
2. satisfactory
3. tolerable
4. intolerable
5. persistent minor problems and conflicts
6. persistent major problems and conflicts

APPROVAL SHEET

The dissertation submitted by Dianne Lee-Riordan has been read and approved by the following committee:

Dr. Patricia Rupert, Director
Associate Professor, Psychology, Loyola University

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

April 18, 1989
Date

Patricia Rupert
Director's Signature