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DISSERTATION

USE OF THE PAIN PRESENTATION INVENTORY IN COMPARING PERSONALITY TRAITS WITH SYMPTOM PRESENTATION

Submitted by

Lynn Ansher

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Fall 2002

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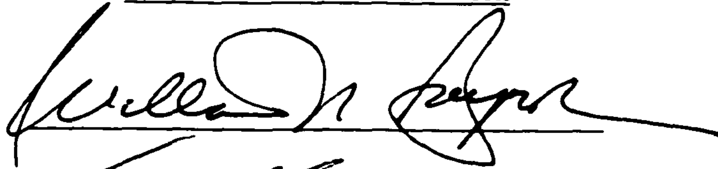
COLORADO STATE UNIVERSITY

July 19, 2002

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY LYNN ANSHER ENTITLED USE OF THE PAIN PRESENTATION INVENTORY IN COMPARING PERSONALITY TRAITS WITH SYMPTOM PRESENTATION BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work



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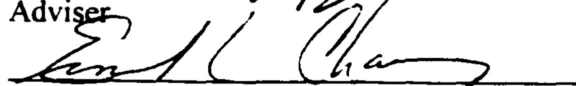

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ABSTRACT OF DISSERTATION

USE OF THE PAIN PRESENTATION INVENTORY IN COMPARING PERSONALITY TRAITS WITH SYMPTOM PRESENTATION

Evaluation of pain patients has revealed that a subset of patients report pain intensity and severity, functional disability, and physical limitations that do not reflect the degree of physiological damage at the pain site. Psychological factors, including personality traits, availability and type of coping strategies used, locus of control, sense of self-efficacy, and psychosocial factors such as social support and the presence of reinforcement, have been implicated in the experience, expression, maintenance, and duration of pain syndromes. Factors such as these are considered to be non-organic, as they are not direct physiological aspects of pain.

Individuals suffering from chronic pain have been classified into distinct constellations in an attempt to better understand the psychological mechanisms underlying the manifestations of their pain symptoms in the absence of corresponding tissue damage. The MMPI-2 is a frequently-utilized instrument in the evaluation of pain patients, and has yielded a prominent typology that categorizes pain patients into one of four "types" based upon MMPI-2 scale elevations and configurations.

The Pain Presentation Inventory (PPI) is a previously-unexplored measure that combines patient self-report data with clinician evaluation of overt patient behaviors during interview to generate a patient "type" that categorizes each patient based on a

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combination of process, either unconscious or conscious, and motivation, either internal or external. These patient types, founded on DSM-IV diagnostic entities, are identified as Pain Disorder Associated with Psychological Factors (Somatoform), Psychological Factors Affecting Physical Condition (Compensation), Factitious Disorder with Predominantly Physical Signs and Symptoms (Factitious), or Malingering. Group type for patients who are unable to be classified as one of these four types is deferred.

An investigation of patients in each PPI group revealed similar MMPI-2 profile configurations for the four PPI patient types, as well as for the patients whose group membership was deferred. With respect to individual scale elevations, Compensation and Factitious patients exhibited the highest levels of psychopathology, whereas Malingering patients yielded a profile indicative of greater psychological health. Malingerers did not, as hypothesized, score significantly higher than the Somatoform, Compensation, and Factitious patients on the Non-Organic Signs scale. Convergent validity between group profiles and DSM-IV diagnostic classifications was supported to some extent.

Treatment implications based upon the unique characteristics of each PPI group, their presentation of pain symptoms, sense of self-efficacy and locus of control, and corresponding use of specific coping strategies, are discussed. As this is the first exploratory study to ever use the PPI, further research is warranted in order to evaluate the PPI's ability to usefully classify pain patients.

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There is one individual with whom I share a relationship characterized by a myriad of qualities: friendship, respect, antagonism, humor, immaturity, protectiveness,

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camaraderie, love, and most importantly, competitiveness. By challenging this individual that I would attain my doctoral degree before he attained his own, I stayed focused, goal-oriented, dogged, and dedicated to this project. For being spurred on by the threat of losing this great race, I offer my heartfelt thanks to and unconditional admiration of my older brother, Dr. Jay A. Ansher, Postdoctoral Research Associate at Illinois State University (by the way, he beat me by a few months with a Ph.D. in Physics).

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USE OF THE PAIN PRESENTATION INVENTORY IN COMPARING PERSONALITY TRAITS WITH SYMPTOM PRESENTATION

Chronic pain syndromes have become one of the most costly and destructive afflictions in modern medicine. The continuing exploration into chronic pain has resulted in relatively little new information with respect to etiology or treatment, and costs continue to skyrocket for both the consumer and society. Sixty to 80 percent of individuals report a lifetime prevalence of chronic pain (Frymoyer & Cats-Baril, 1991); the number of individuals who do not seek medical treatment or fail to report because of a lack of functional impairment may boost that number to even higher percentages. A 1991 estimate of the incidence of chronic low back pain was approximately 5.2 million Americans (Frymoyer & Cats-Baril, 1991); by the year 2000, this estimate had grown to 75 million (Turk, 2000).

The cost impact of chronic low back pain (CLBP) can be divided into direct and indirect costs; direct costs are those expenses comprised by services and goods for the delivery of medical care, and indirect costs represent lost earnings by those who are disabled (Frymoyer & Cats-Baril, 1991). Compared to other chronic and disabling conditions such as lung cancer, schizophrenia, and heart disease, the rate of increase in disability awards for chronic back pain has exploded to almost a 3000% increase, as

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compared to only a 500% increase for schizophrenia (Frymoyer & Cats-Baril, 1991). Estimates of individual costs per person suffering from chronic lower back pain range from $15,000 to $24,000 per year, and over 50 billion dollars in direct and indirect costs for society as a whole (Newshan & Balamuth, 1990-91; Turk, 2000).

The physical impairment associated with such a condition makes the amenability to and likelihood of rehabilitation low, whereas with other conditions, those individuals who suffer are able to continue, albeit in moderate capacity, gainfully in the workforce. Cause for alarm exists when individuals have not returned to work within one to two weeks following injury, as they most likely will anticipate chronic disability and compensation from employers and insurers (Lehmann, Spratt, & Lehmann, 1993).

Current conceptualizations of chronic low back pain have focused increasingly on the role of psychological factors, given that distinct organic pathology is often disproportionate to levels of pain and functional impairment. A variety of physiological conditions may underlie the elusive phenomenon, including inflammatory processes, degenerative changes, structural deformities, traumatic incidents, and muscular or ligamentous strain, yet curiously, there is often no correspondent relationship of any these conditions with the presence of pain sensations (Flor, Turk, & Birbaumer, 1985). The psychogenic model of pain "suggests that pain reports in the absence of objective medical data can be explained by emotional factors, specific personality characteristics, or the presence of an outright psychiatric disorder" (Turk, 1994). Numerous psychosocial concepts have been implicated in the cause, continuation, maintenance, and worsening of pain, as well as the transition from acute to chronic stages and the likelihood of becoming permanently disabled (Flor et al., 1985; Frymoyer, 1992; Turk, 1994).

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Other conceptualizations of medically-incongruent pain suggest that extrinsic motivational factors, such as malingering or receipt of disability, are responsible for reports of pain; the operant conditioning paradigm explains pain-related behaviors from a reinforcement perspective: pain is a subjective state, and pain behaviors are communications of distress and suffering. When such behaviors are reinforced by attention or care from others, or avoidance of undesirable activities, operant theory predicts the pain manifestations will increase in frequency, and even persist after the original pain stimulus is gone (Turk, 1994).

With the proliferation of managed care, the necessity of a physiological foundation of pain becomes even more crucial in terms of psychological treatment for pain related issues; without physical pathology consistent with the report of pain, the psychological consequences such as depression, anxiety, fear, activity avoidance, and passive or inappropriate coping strategies, may appear illegitimate, if not downright ridiculous. Yet the reality of pain syndromes in the absence of tissue pathology, and hence the implication of psychological factors in the perception and experience of pain, remain quite a real phenomenon, as demonstrated by the experience of "phantom pain." Following amputation of a limb, individuals often suffer sensations of cramping or burning as if the limb were still present, yet there is no limb, and there are no nerves to conduct any impulses to pain centers of the brain. However, pain is still experienced. What mechanisms underlie the "feeling" of pain, when that which is painful, is absent? According to Melzack, it is the brain that generates the pain experience, even in the absence of external stimuli (Gawande, 1998). In view of that, the concept of back pain, regardless of corresponding tissue damage, becomes an issue not of the body, but of the

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mind. Stimulation of specific cell regions within the thalamus, the primary center related to experience of physical sensation, can produce physical sensations in the body; this is the premise of surgical procedures to treat seizure disorders and obsessive-compulsive disorder. Such stimulation can produce physical pain despite the absence of any physical or tactile stimulation of the particular site where the pain occurs. Thus, the mechanism and activity of the brain plays an immense role in the experience of pain, regardless of actual involvement of tissue.

What psychological factors predispose one to the experience of pain, and to what degree? What implications does this have for the role of personality traits in the experience of pain, whether there is tissue damage or not? What is the connection between the psychology of pain, and the psychology of personality? If pain is "cognitive," how do affect, personality, cognition, and expectation influence the experience thereof? The crucial factor may no longer be actual damage to the body, but rather the role of the mind, encompassing a myriad of influences: attitude, coping strategies, locus of control, sense of self-efficacy, and social support (Turk, 1994). There have been numerous investigations into the concept of personality and psychological factors that affect CLBP. Studies have examined factors that influence the degree to which CLBP is experienced, demographic variables that may impact the experience of pain, personality traits that are common to CLBP patients, and comprehensive profiles of personality traits as measured by personality inventories.

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The Role of Psychological Factors

In a group of two hundred low back pain patients with no psychiatric illness, it was determined that physical impairment accounted for less than one-half the total disability, whereas a third of the disability was accounted for by psychological and behavioral factors, including depression, bodily awareness, and clinical measures of inappropriate symptoms and signs. Analysis determined that psychological distress, as expressed by increased depression and bodily awareness, far outweighed any influence that somatic preoccupation or hypochondriasis may have contributed to the overt expression and report of pain. Authors concluded that objective physical impairment accounted for only one-half the total disability, and that emotional distress is the more important contributing factor in terms of psychological ramifications of pain (Waddell, Main, Morris, DiPaola, & Gray, 1984). Others have estimated that 40% physical factors and 31% psychological factors contribute to low back disability (Waddell, 1987). The proportion of contribution accounted for by psychological factors is fairly substantial in comparison to what might be expected based upon how much effort has been exerted in addressing the physical aspects of chronic pain.

Fisher and Johnston (1998) explored links between emotion and health that may explain the association of CLBP and psychological factors. The "psychosomatic hypothesis" implies that emotional distress causes pain and disability. The "disability hypothesis" contends that health problems cause emotional distress. Just as illness is

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associated with many negative consequences, such as chronic pain, physical disability, and impaired social and occupational functioning, poor mental health is simply another causative factor in poor physical health. The "symptom perception hypothesis" states that perception of and responses to bodily sensations vary based upon individual emotionality; those with higher negative affectivity will attend more acutely to bodily sensations, thus magnifying actual health problems (Watson & Pennebaker, 1989). Using a measure of disability that addressed limits of functioning in nine areas of patient activity (walking, standing, lifting, sitting, self-care, sex, and traveling), results indicated that emotional distress, rather than a quantitative report of pain, influenced perception of disability. Additionally, level of pain was significantly correlated with emotional distress, supporting the psychosomatic hypothesis that emotional distress is the mediating factor between pain and disability, rather than scores on the McGill Pain Questionnaire. They suggest that reducing distress and encouraging adjustment to continuing pain may be a better treatment goal than reducing physical pain itself. This approach implicates a significant change in current treatment goals and protocol that address reduction of physical load, and improving back strength and general fitness through physical rehabilitation; others have suggested addressing multiple factors in the etiology of low back pain, rather than devising preventive measures for physical factors (Flor et al., 1985; van Poppel, Koes, Deville, Smid, & Bouter, 1998).

Differences in attitudes toward pain have been identified as other psychological influences in treatment response and adjustment to pain. The Survey of Pain Attitudes (SOPA) was used to assess attitudes regarding pain in relation to self-report of pain intensity, functional impairment, disability, and coping skills. Analyses indicated that

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patients with a "high medical-high emotional" orientation were characterized by strong attitudes toward pain as being disabling, harmful, uncontrollable, and amenable to medical intervention (high medical); they also perceived their pain to be affected by emotional and social support factors, including attention and solicitude from others (high emotional). This patient cluster reported the highest scores on the Pain Disability Index, measures of affective distress, depression, passive coping attitudes, and help-seeking, and significantly higher levels of least and usual pain. Thus, having an orientation toward pain as a debilitating, overwhelming construct that is responsive only to medical intervention, and relying heavily on others without using active coping strategies was predictive of a more unpleasant experience of pain (Tait & Chibnall, 1998).

One model of the influence of psychological factors on symptom perception addresses private body consciousness (PBC), the attentional self-focus sensitive to somatic or afferent input (Ferguson & Ahles, 1998). This concept, in conjunction with Watson and Pennebaker's (1989) account, proposes that negative affect can amplify the perception of pain sensation when the individual attends to and processes the sensation affectively. Results of a comparison of pain patients to controls on measures of PBC, anxiety, pain frequency, and pain total, showed that pain patients with high PBC reported a greater frequency and intensity of pain symptoms. Pain patients and controls were also compared on measures of PBC, with no significant differences between them, suggesting that PBC is a trait, rather than a situational variable, which develops after the onset of a pain condition.

Epping-Jordan et al. (1998) questioned whether pain intensity predicts subsequent disability and depression, or if the opposite directional relationship exists. Over a 12-

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month assessment period, results revealed that high pain intensity did not at any time predict disability or depression. Interestingly, the level of pain experienced was not predictive of current or subsequent deterioration in functional capabilities or emotional stability, implicating again the importance of psychological factors as predictors of the experience of pain, rather than the objective quantification of pain itself. Instead, higher levels of disability predicted persisting pain intensity and subsequent depression, and high depressive symptoms predicted continued disability.

Efforts have been made to better predict disability, with the aim of early intervention with preventive and cost effective rehabilitation. In an analysis of all factors believed to predict disability, the majority of them were determined to be "nonorganic," meaning those which are not direct physiological aspects of the pain. Weights were assigned to each factor, as well as its components. Strikingly, the assigned weights of job factors, as compared to psychosocial factors, were 20.1 and 20.0, respectively. Psychosocial components included psychological symptoms (weight=8.6), self-efficacy (weight=5.0), personality type (weight=3.4), and daily hassles (weight=3.0). Diagnostic factors, including pain, presence or absence of sciatica, and physical findings, were weighted only 15.4 in comparison (Frymoyer, 1992). These statistics underscore the comparable, if not dominant, role of the psychology of pain, as well as implicate the role of personality traits, which will be addressed in detail later.

Flor et al. (1985) tested the hypothesis that psychological factors would predict elevated and prolonged back musculature reactions to stress, as opposed to the organic factors of amount of degenerative damage, number of surgeries, and duration of the pain. Results indicated that CLBP patients, in comparison to general pain patients and normal

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controls, displayed abnormal EMG elevations when asked to describe a personally stressful event or pain situation for one minute. These data indicated that CLBP patients had higher mean muscular back tension levels, had a different physical reaction to stressors, maintained a higher degree of muscular tension, and had a delayed return to baseline following tension. These data were significantly different from that of general pain patients, implicating a constitution unique to CLBP patients. Furthermore, the intensity of their physiological response was directly related to depression and a negative evaluation of psychologically stressful stimuli, as opposed to organic factors. These findings are key to the development of the theory that CLBP patients have an exclusive niche with respect to psychological condition, and that psychological factors are integral to the experience and maintenance of chronic pain. If chronic pain patients react to psychological stress in a way that prolongs and exacerbates their pain, psychological interventions aimed at reducing stress or cognitive management of stressors may be more germane to the treatment of muscular tension.

The "chicken and the egg" debate sparks much controversy regarding the role of psychological factors in chronic pain; it comes down to a battle between Fisher and Johnston's (1998) psychosomatic and disability hypotheses: does psychological distress cause pain, or does pain cause psychological distress? The answer to this question is elusive and complicated; what is apparent is that psychological factors such as depression, anxiety, emotional distress, attitude, and psychosocial circumstances play an undeniable role in pain intensity, persistence, maintenance, and functional impairment.

If cognitive factors can influence pain maladaptively, then they might also be able to exert a positive influence (Turk, 1994). Thus the importance of psychologically based

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interventions and treatment goals, rather than pain reduction or management, becomes more focal in the current understanding of chronic pain syndromes. In addition to the influence of psychosocial factors in the etiology and continuation of pain, specific variables that differentiate between pain patients have been examined in the quest to better understand and treat pain. Numerous studies have attempted to classify pain patients on the basis of such variables, particularly personality traits or characteristics. Because of the role of psychological factors, such as depression, anxiety, somatic preoccupation, and overt pathology, identification of specific patient profiles has become increasingly important. Identification of discrete personality profiles may target patients who are at risk for transitioning from acute to chronic pain, those who may be poor treatment responders, or those for whom a particular treatment intervention may have greater success.

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Differentiating Patient Types

Functional versus Organic

Given the existence of the "medically incongruent" CLBP patient (Turk, 1994), the classifications of organic versus functional pain have been used to describe CLBP with respect to etiology; organic patients are those who have corresponding and congruous physiological damage to the body. With the various conditions of functional patients, psychological factors become a reasonable explanation for their anomalous presentation. However, the difference between functional and organic patients is not as clear cut as might be assumed; organic pathology may simply be undetected and thus undiagnosed, leading to the presumption of functional etiology. The assumption of psychopathology in functional patients is assumed from the absence of organic pathology, rather than validly demonstrated through psychological assessment (Leavitt & Garron, 1979). Others have found a greater frequency and amount of narcotic and sedative use in functional groups, suggesting the presence of learned pain behaviors based on the reinforcement of receiving such medications (Fordyce, 1976). McCreary and Colman (1984) speculated that patients who used narcotics would evidence greater psychological disturbance or personality dysfunction versus non-narcotic users. Results confirmed this hypothesis, as well as indicating that narcotic users described their pain as more intense, as well as frightening and punishing, suggesting a psychologically distinct

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experience of their pain in comparison to patients who do not evidence any psychopathology.

Sixty organic patients were identified on the basis of clear signs of organic damage, versus fifty functional patients who did not show damage as clearly. Functional patients were then administered various psychological assessments, including the Rorschach and the MMPI, resulting in diagnosable psychiatric disorders in 32 cases. The Low Back Pain Questionnaire (LBPQ) was used to classify patients on the basis of endorsement of particular pain variables indicative of functional or organic etiologies. Cases were assigned to the group for which probability of membership was highest on the basis, resulting in 98.4% and 84.4% accuracy rates for organic and functional groups, respectively. Overall accuracy rate was 93.62%. Results were cross-validated on a separate sample, yielding overall accuracy of 83.02%. Thus, functional versus organic patients as identified by medical and psychological assessment can be reliably differentiated and confirmed on the basis of psychological factors and endorsement of psychologically-loaded pain questionnaire items (Leavitt & Garron, 1979).

Consistent with a psychological foundation for low back pain, it has been speculated that extrinsic motivation may contribute to the expression of pain in the absence of organic evidence, in the direction of severity: "it is frequently alleged that personal injury litigants exaggerate the severity of the pain they experience—or complain of pain when it is not present—so as to maximize the damages awarded to them" (Mendelson, 1984). Several studies have compared CLBP patients involved in compensation claims to those who have no litigation current or pending, and there have been no significant differences between groups on measures of personality, anxiety,

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depression, and hostility (Leavitt, Garron, McNeill, & Whisler, 1982; Mendelson, 1984; Peck, Fordyce, & Black, 1978). It would appear that involvement in litigation does not necessarily impact the subjective experience and report of pain, nor does it confirm "compensation neurosis," the contention that patients involved in litigation develop more psychological disturbances than non-litigants do (Mendelson, 1984). Additionally, these findings say nothing about the existence of psychological factors at work that may divide pain patients overall. It is possible that circumstances such as seeking compensation or litigant claims are extrinsic motivational factors that predispose CLBP patients to seek payment for monetary reasons, regardless of internal correlates, i.e. functional versus organic pain. Bluntly put, money may motivate litigation in anyone, regardless of psychological or physiological substrates of pain.

Acute versus Chronic

Yet another domain in which pain sufferers differ is duration; numerous variables, including personality traits, depression, pain intensity, degree of disability, and amount of time before return to work, may influence the likelihood of the transition from acute to chronic suffering. Research has attempted to extricate factors that may be influential in this transition, as well as predict response to treatment based on duration of suffering. The majority of low back pain patients studied are chronic sufferers; chronic is defined by the International Association of the Study of Pain (1986) as pain for 6 months or longer, whereas acute pain is less than 6 months. Due to the overwhelming financial blows to the U.S. economy, researchers seek a better understanding of chronic conditions

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and attempt to identify appropriate interventions to prevent acute sufferers from becoming chronic. Behavioral and cognitive theories have been invoked to explain the evolution from acute to chronic states of pain and disability; however, these explanations are generally based on retrospective examination of patient groups who are already identified as chronic, and therefore direction of effect is difficult to establish (Epping-Jordan et al., 1998). A prospective analysis was undertaken to more accurately identify the contributing roles of pain intensity, depressive symptoms, and disability to the prolonged experience of each factor. Subjects were recruited within 2 months of onset of their first lifetime episode, and followed longitudinally. Multiple regression analysis revealed that in the transition from acute to chronic pain conditions, the most important predictors were levels of depression and disability, rather than pain intensity. Disability was predictive of subsequent depression, as well as persisting pain intensity, and depressive symptoms were predictive of continued disability. These results would suggest that cognitive factors such as depression, interference in daily activities, and perception of impairment, have more influence than quantitative measures of pain (Epping-Jordan et al., 1998). What is striking is that not only may the source of pain be related to factors other than organicity, but that these factors again are implicated in the presence and persistence thereof. That chronicity is more a matter of psychological well-being and level of functioning speaks to the necessity for appropriate treatment strategies, for it seems that lessening pain intensity may be ineffective in curtailing the continuance of chronic pain syndromes once an individual reaches a certain level of disability.

Other outcome prediction research that longitudinally followed patients presenting with acute episodes of pain have inferred that "the best predictor of the course

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of LBP during the first 2 months appears to be the Fear-Avoidance model, which incorporates both stress and personality variables" (Klenerman et al., 1995). Results indicated that the majority of pain patients recovered significantly within two months following the onset of their low back pain; those who reported no real improvement at two months transitioned into a chronic condition, and reported increased pain severity at 12 months. The authors conclude that the first two months constitute a "critical period" in which the interaction of several factors, namely physical and psychosocial, determines the likelihood of recovery versus transition to a chronic pain condition. The time period immediately following an acute low back pain episode has been recognized as tantamount to subsequent risk for developing a chronic syndrome, especially if the patient does not return to work within 2 weeks (Klenerman et al., 1995; Lehmann et al., 1993; Linton & Halldén, 1998). Chronic patients have also been shown to differ from acute pain patients in that they represented their pain inaccurately or exaggeratedly on a pain drawing, reported inappropriate symptoms, and greater physical impairment (Hadjistavropoulos & Craig, 1994).

When factors that differentiate pain patients interact, it creates a complicated clinical portrait. CLBP patients were categorized as either congruent or incongruent, and compared to an acute low back pain population who had experienced pain for three months or less. Numerous statistically, as well as clinically, significant differences between groups emerged, creating several unexpected as well as counterintuitive clinical pictures. The acute group obtained a higher score on the nonorganic physical signs assessment versus the chronic congruent group, and more acute and chronic incongruent patients were receiving workers compensation or insurance disability payments. Acute

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patients also reported more pain unpleasantness and disability than chronic congruent patients, while acute and chronic incongruent groups endorsed psychologically based factors indicative of greater distress. In particular, these groups used more passive coping strategies, catastrophizing cognitions, and emotional responses to pain (Hadjistavropoulos & Craig, 1994).

In light of other research, these findings are curious in that acute pain patients presented as more pathological than even chronic congruent groups in terms of physical disability and psychological coping mechanisms. In contrast to these findings, claims have been made that the condition of the acute pain patient is governed primarily by physical factors, whereas the pain of the chronic patient is more a function of emotional distress, depression, and social isolation (van den Hoogen, Koes, van Eijk, Bouter, & Deville, 1997). It is possible that in the acute experience of low back pain, patients may react more negatively and intensely to pain, and as duration increases, they adapt to levels of discomfort and impairment, and cognitively process their situation in a more positive manner. This implies that high risk acute pain patients may be identified on the basis of psychological factors such as remarkably heightened distress and poor coping strategies, and then targeted for specific interventions so as to curtail the possibility of transition to chronic pain (Hadjistavropoulos & Craig, 1994). Another prospective study targeted pain patients at acute (less than 6 weeks), subacute (6-12 weeks), and chronic (greater than 12 weeks) stages of their pain. At four week, three month, and six month follow-up assessments, all groups steadily declined in ratings of pain intensity, and improved in perceived health and daily functioning, though chronic patients less so (van den Hoogen et al., 1997). No significant differences were found between groups on the variables of

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interest; however, the demarcations for pain duration were substantially different than most studies differentiating between acute and chronic, and may have shortened the requirement for "chronic" to a degree that any true duration-related differences had yet to emerge.

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Locus of Control and Coping Strategies

Investigations based on Rotter's concept of locus of control (LOC) have focused on identifying specific orientations of LOC in CLBP patients. Those with an internal LOC perceive themselves as exercising personal control over their circumstances, whereas those with an external LOC feel events are controlled by luck, fate, or powerful others (Rotter, 1966). The Multidimensional Health Locus of Control scale (MHLC), which was developed to assess those attributions specific to health care, further breaks down external LOC into reliance on chance factors, such as fate or the weather, versus reliance on powerful others, including god, or aptly, health care professionals (Buckelew et al., 1990).

Pain patients have been expected to exhibit an external LOC, with factors of pain duration, severity, and psychological distress influencing the degree to which an external orientation is endorsed (Harkapaa, Jarvikoski, & Hurri, 1989). They may attribute their problems to external events, such as accidents, and therefore feel less responsible for their condition; additionally, they may place greater reliance on physicians based on their frequent contact with medical professionals in the context of their chronicity, as well as strictly adhere to prescribed treatment regimens. On the other hand, patients with an internal LOC believe their own efforts to manage pain will reduce discomfort and distress (Buckelew et al., 1990; Tait, DeGood, & Carron, 1982). Harkapaa et al. (1989) found stronger external beliefs and a weaker sense of internal control in a group of 459 CLBP

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patients. Longer duration of pain and greater psychological distress were predictive of a weaker sense of personal control, while the more severely disabled subjects exhibited a strong external LOC. While it cannot be concluded that CLBP propels one to develop an attitude of helplessness and reliance on external sources, or whether LOC orientation influences the course of suffering by inducing patients to more readily relinquish belief in personal control, these findings would support the idea that the expression of pain symptoms interact with cognitive beliefs about self-efficacy, responsibility, and coping ability. "Experiences of pain episodes, and one's beliefs in the controllability of illness episodes in general and pain attacks in particular probably have an impact on the selection of coping strategies" (Harkapaa, et al., 1989).

While locus of control has been less focal as a factor that differentiates between CLBP patients, it has been shown to influence the type of coping strategies employed for self-management of health care needs. Coping strategies are integral to conceptualizing the chronic pain patient, by identifying distinct patient types, personality traits intrinsic to particular coping styles, and thus guiding treatment using strategic interventions. A cluster analysis of CLBP patients' loci of control yielded four distinct MHLC profiles: "pure internals" endorsed a high internal LOC relative to both external attributions (powerful others and chance); "double externals" showed a high endorsement of all loci, with chance LOC slightly higher than powerful others and internal LOC; "naysayers" endorsed a low internal LOC with the reliance on powerful others slightly higher than attributions to chance, and "believers in control" had a high internal and powerful other LOC relative to chance. These particular orientations to LOC were predictive of the use of six coping strategies on the Ways of Coping-Revised questionnaire; female patients

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with a high internal LOC used more information-seeking, threat minimization, cognitive restructuring, and self-blame strategies, whereas those with high internal and powerful other LOC reported greater use of cognitive restructuring. These results suggested several important concepts regarding the interaction between LOC and coping strategy; namely, that patients who view themselves as personally responsible for their health status are more likely to use more cognitive and adaptive coping strategies than those who rely primarily on medical professionals. Those with externally-oriented attributions to chance are more likely to use passive coping strategies and experience more depression (Buckelew et al., 1990). McCreary & Turner (1984) found that externalizers were more prone to anxiety, rumination, and self-doubt. Passive coping strategies correlate highly with measures of distress (.708), and active coping strategies are negatively correlated with disability and distress on the SOPA (-.128 and -.493, respectively); patients with an external LOC regarding pain felt that their pain was uncontrollable, placed high reliance on a medical cure, and endorsed passive coping strategies significantly more than those who had more self-reliant attitudes toward pain and believed it to be controllable (Tait & Chibnall, 1998).

Coping strategies have been shown to result from intrinsic factors, including demographic characteristics and dispositional optimism, and extrinsic or contextual variables, including ability to control pain, ability to decrease pain, and average pain severity. The Coping Strategies Questionnaire (CSQ) was administered to 90 chronic pain patients to analyze the relationship between intrinsic and contextual factors, and the corresponding choice of coping strategy. Canonical correlation analysis yielded three distinct methods of coping; higher levels of dispositional optimism, plus higher levels of

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perceived ability to control and decrease pain, predicted use of diverting attention, using coping self-statements, increasing activity, and less catastrophizing. The second profile showed that higher levels of education predicted less praying or hoping and catastrophizing. Reinterpreting pain sensations, praying, and hoping, and less use of ignoring pain sensations, using coping self-statements, and catastrophizing was characteristic of patients who had higher levels of dispositional optimism and lower levels of ability to control pain (Novy, Nelson, Hetzel, Squitieri, & Kennington, 1998). Differential use of coping strategies has also been linked to gender, with women using cognitive restructuring, information-seeking, and catastrophizing more than men, and women also tended to increase their behavioral activity (engaging in distracting activity) to cope more often than men did (Buckelew et al., 1990; Jensen, Nygren, Gamberale, Goldie, & Westerholm, 1994).

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Personality and Symptom Inventories

The illustration of differences in locus of control and coping strategies as linked to personality traits has increased the focus on personality characteristics unique to CLBP patients. An enormous amount of literature has been amassed that demonstrates traits, as well as full profiles, that differentiate patients from control populations, and also depicts within group differences (Carlsson, 1986; Sivik, 1991). Numerous assessment instruments have been employed in the examination of personality traits, predominantly the Minnesota Multiphasic Personality Inventory (MMPI) and MMPI-2; the Eysenck Personality Questionnaire (EPQ), the Symptom Checklist-90 (SCL-90), and the Multiaxial Pain Inventory (MPI). Many profiles have been identified and replicated across studies, and a solid framework from which to conceptualize different types of patients has been created. The most highly replicable profiles are based on classification using the MMPI or MMPI-2 (Armentrout, Moore, Parker, Hewett, & Feltz, 1982; Bernstein & Garbin, 1983; Costello, Hulsey, Schoenfeld, & Ramamurthy, 1987; Curtiss, Kinder, Kalichman, & Spana, 1988; Guck, Meilman, Skultety, & Poloni, 1988; Lee, Cheung, Man, & Hsu, 1992; McCreary, 1985; McCreary, Turner, & Dawson, 1979; McCreary, Turner, & Dawson, 1980; Ornduff, Brennan, & Barrett, 1988; Prokop, Bradley, Margolis, & Gentry, 1980; Tsushima, Pang, & Stoddard, 1987; Tsushima & Stoddard, 1990). Most studies analyze gender-specific personality profiles, yielding comparable as well as dissimilar profiles for men and women. Adams, Heilbronn, Silk,

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Reider, & Blumer (1981) present a comprehensive review and discussion of the role of the MMPI in classifying CLBP patients.

Relatively few investigations have been conducted that use cluster analysis of the SCL-90 to classify CLBP patients; it is more often utilized in the context of an overall psychological evaluation to yield more descriptive factors. The SCL-90, like the MMPI, provides scores indicative of psychological distress and psychopathology, represented by nine subscales. Jamison, Rock, & Parris (1988) used the SCL-90 to classify CLBP patients and found three distinct patient profiles for both male and female populations. The first subgroup, termed "psychologically overwhelmed," showed extreme elevations on all subscales, whereas a second group showed scores within the normal range on all subscales, and were considered "psychologically adjusted;" the third group yielded high-normal scores. In another SCL-90 cluster analysis, the first and second subgroups were replicated, whereas a third group endorsed a wide range of somatic complaints in addition to those complaints specific to low back pain (Shutty & DeGood, 1987). These three profiles roughly approximate an MMPI typology proposed by Bradley, Prokop, Margolis, & Gentry (1978), who termed their correspondent CLBP patient profiles psychopathological, nonclinical, and somatization, respectively.

Profiles based on the MMPI or MMPI-2 have consistently yielded four subgroups of CLBP patients, though there are often variations in the number of suitable subgroups for males versus females. Sternbach (1974) was the first to propose a CLBP patient classification, and spurred the eruption of research into personality profiles. Costello et al. (1987) designated this four-cluster typology as "P-A-I-N;" a classification scheme that has fallen under fire from other researchers who attempted to classify a group of pain

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patients using the scheme, and were able classify only 31% of their population. However, Costello and Schoenfeld (1990) stand behind the typology, arguing that this approach is generalizable, and resulted from meta-analysis of nine clustering studies conducted over the years of 1978 to 1987.

One of the most reliably demonstrated profiles is the "neurotic triad," represented by elevations on the Hs (Hypochondriasis), D (Depression), and Hy (Hysteria) scales. This profile has been estimated to have the highest base rate of occurrence of the four profiles (Costello et al., 1987). Patients with the neurotic triad have been found to report more pain, are described as passive and dependent, having long-standing hypochondriacal complaints, and hence are more difficult to treat, because their focus on their pain complaints interferes with their ability to focus on more proactive, self-initiated coping strategies. They also have had the greatest number of surgeries, the most hospitalizations, the longest period of vocational disability, the least pre-treatment out-of-bed hours daily, the least pre-treatment range of motion, and the least physical improvement (Armentrout et al., 1982; McGill, Lawlis, Selby, Mooney, & McCoy, 1983; Prokop et al., 1980).

Treatment outcome studies have yielded curious findings with respect to profile congruence between females and males. Despite identical profile shape, female patients were predicted with 89% accuracy as having a good outcome, as measured by follow-up pain intensity levels, whereas males were predicted with 96% accuracy for poor outcome. There were comparable numbers of males and females with this profile, thus the outcome data was not biased due to an unequal *n* (McCreary, 1985). It is possible that social constructs and gender expectations may contribute to females emphasizing the distress

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and degree of pain experienced, versus males, who are socially expected to mask pain sensations and psychological distress; Guck et al. (1988) reported that a group of 94 male patients with this profile reported their subjective level of pain as less intense as compared to the other male subgroup. Female patients with the neurotic triad profile exhibited greater levels of anxiety and a tendency to readily express anger, and to express it aggressively, rather than suppress it (Curtiss et al., 1988). A study using the Karolinska Scales of Personality revealed that pain patients scored lower on Inhibition of Aggression measures compared to normal controls and depressed patients without pain, and higher Aggression and Verbal Aggression scores than the depressed patients (Carlsson, 1986).

The "conversion V" profile has been replicated in numerous studies (Costello et al., 1987; Curtiss et al., 1988; Guck et al., 1988). It is characterized by elevations on Hs and Hy, with a lower D forming a valley or "V" formation. The presence of this profile type has appeared less consistently within the CLBP populations; sometimes emerging for females only (Bernstein & Garbin, 1983; Bradley et al., 1978; Gentry, Shows, & Thomas, 1974; McCreary, 1985; Prokop et al., 1980). Neither Lee et al. (1992) nor Armentrout et al.'s (1982) clustering yielded any conversion V patients; however, the sample in Armentrout et al. (1982) consisted only of males. It has been suggested that the predominance of elevated Hs and Hy scales in female profiles, as well as the higher mean T-scores for such scales, may reflect a cultural bias which expects men to be strong and deal with problems in a socially acceptable manner, and thus express distress and anxiety through the development of somatic symptoms (Bolton, 1994; Curtiss et al., 1988; Prokop et al., 1980). In McCreary's (1985) predictive model based upon subgroup

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membership, the conversion V pattern was highly predictive of poor outcome, for both males and females.

The third profile is most distinct for exhibiting numerous scale elevations indicative of severe psychopathology. It is this category of patients for whom the most information has emerged with regard to associated features and complications. Correlates for this subgroup include greater severity of pain, a greater percentage of time that pain is present, higher levels of pain at both its worst and least measurements, more accompanying somatic symptoms, a greater portion of body area in which pain is present, the least amount of change in pain intensity from pre- to post-treatment, greater social isolation and somatic preoccupation, and more pain-related hospitalizations and surgeries. They also reported pain as having a greater negative impact on interpersonal and intrapsychic realms, had a higher likelihood of unemployment, sought treatment most frequently, and reported more psychological distress (Armentrout et al., 1982; Costello et al., 1987; Guck et al., 1988; McCreary, 1985; McGill et al., 1983; Prokop et al., 1980). In the psychopathological profile, all scales were elevated to a clinically significant degree except for Mf (gender-based scale) and Si (Social Introversion); the highest elevations generally occurred for scales Hs, D, and Hy, with Sc (Schizophrenia), Pt (Psychasthenia), and Pd (Psychopathic Deviate) also reaching T-scores of above 70. Ma (Mania) is usually the lowest of the elevated scales. This subgroup is the most psychologically and physiologically distressed, experiences pain to a greater degree, and manifests more of their distress in somatic complaints.

The last empirically substantiated profile, termed "normal" in Costello et al.'s (1987) typology, is characterized by the absence of any clinically significant scale

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elevations. They are viewed as psychologically normal, as all T-scores fall within normal limits, but have been hypothesized to use denial of psychological distress, which would consequently create a profile with few to no clinical elevations (Bradley et al., 1978).

Often both males and females demonstrate profiles absent of clinically significant elevations, but certain scales are higher than others are. There is considerable variation between genders with regard to which scales are higher, primarily among the clinical scales. Scales have included K-correction, Hypochondriasis, Depression, Hysteria, Psychopathic Deviate, and Mania (Costello, et al., 1987; Curtiss et al., 1988; Guck et al., 1988; McCreary, 1985; Prokop et al., 1980). These profiles do not fall within an established subgroup as identified through clustering procedures, and hence are generally not classified as distinctive representations of any particular type.

McGrath, Sweeney, O'Malley, and Carlton (1998) invoked the K-correction scale of the MMPI-2 to evaluate psychological characteristics of CLBP patients, based on the idea that use of the K scale enables better identification of psychological contributions to physical conditions. Results indicated the K scale was a useful predictor of patients' response to development of chronic pain. Specifically, elevated K scores suggest better psychological adjustment despite the pain condition, and a lower likelihood of psychological contribution to the pain complaints. They also concluded that individuals with higher K scores were seen as less self-concerned, sad, insecure, needy, dependent, or avoidant of psychological issues, and less likely to use physical complaints to avoid psychological issues. Despite standard interpretations of high K scale scores indicating defensiveness or use of denial, they hypothesize that high K scores represent the "tendency to deny emotional correlates of distress or a negativistic attitude," and that

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elevated K scores will have differing meanings between pathological versus nonpathological populations. This suggests the potential of yet another specific chronic pain personality profile, in light of the frequent findings of heterogeneous profiles that exhibit an elevated K.

An extensive body of literature has been amassed on the clinical significance of the Hs and Hy scales. Individuals in a pain population who produce elevations on the Hs and Hy scales routinely report a significant number of somatic complaints, which tends to increase in times of stress. Such individuals experience a great deal of psychological distress and somatic preoccupation, and resist acknowledging the psychological influences underlying their pain symptoms. This is said to be a "typical defensive style of the psychogenic patient, a denial of awareness of psychological conflict and a subsequent expression of this conflict through somatic concerns and bodily functioning" (Graham, 1993; Love & Peck, 1987). Information gleaned from these scales is likely influential in psychological response and adaptation to CLBP, adjustment to a chronic pain condition, prediction of return to work, and prediction of general outcome (McCreary et al., 1979; McCreary et al., 1980; Milhous et al., 1989; Ornduff et al., 1988; Sivik et al., 1992; Vendrig, Derksen & deMey, 1999). McCreary et al. (1980) found that good versus poor outcome was mediated by somatic concern, and that those patients who externalize emotional problems by focusing on bodily symptoms would be less likely to benefit from standard medical care. Patients evaluated as having pain psychogenic in nature, as opposed to an organic or mixed etiology, scored significantly higher on Hs and Hy scales, indicating a psychologic vulnerability in the experience of low back pain (Sivik et al., 1992). Hs has also been investigated as an outcome predictor; higher

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pretreatment Hs scores correlated with higher pain intensity and diminished ability to return to normal activities. However, no conclusions regarding outcome were drawn based on pretreatment Hy scores. The authors suggest this contrast may be due to a tendency for those patients who somaticize to exaggerate ailments, in an attempt to draw solicitous attention, and thus they demonstrate poorer response to treatment, whereas the suggestibility and conformity characteristic of patients with an elevated Hy would report improvement, despite a lack of objective physiological improvement (McCreary et al., 1979).

In contrast to Milhous et al.'s (1989) finding that lower scores on Hs and Hy were predictive of return to work, no significant correlation was found between Hs or Hy3 and Hy4, (subscales comprising the somatic discomfort factor of Hy), and subsequent return to work. However, these scales did evidence a significant negative correlation with treatment outcome measures as represented by pain intensity and disability (Vendrig et al., 1999). A hypothesis offered that may explain the differential results obtained between studies follows the logic that treatment may differentially affect outcome variables, and that over the course of intervention geared toward improving physical function, physical function itself may become "disconnected" from disability and emotional distress, and thus outcome prediction based on responses to somatic-based items on the MMPI-2 may be confounded by the effects of treatment on physical functioning, regardless of continued psychological distress.

Ornduff et al. (1988) also addressed the psychological implication of elevated Hy scores with respect to the tendency to acquiesce or please others to obtain acceptance or affection. The Hy scale is composed of Bodily Concern and Psychological Denial

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subscales; they hypothesize that the elevated Hy scores common in CLBP populations represent endorsement of legitimate bodily concern, rather than psychological denial. Endorsement of psychological denial items has been interpreted as a personality style of being "interpersonally placating," and may result in denial of the level of pain severity and detrimental effects on normal functioning, in an attempt to avoid becoming a "burden" to others. They conclude that "the Bodily Concern subscale is uniquely responsive to increased pain and is not simply indicative of increasing psychological distress requiring psychological denial."

Within the context of both established and variegated profiles, research has consistently shown that males exhibit more pathological profiles than females, with respect to level of scale elevation. In Lee et al.'s (1992) examination of a CLBP sample, the male mean scores for D and Pt were significantly higher than females'. Prediction of response to treatment by gender breakdown yielded a larger percentage of males with more severe psychopathology and poor response to medical treatment (McCreary, 1985). Tsushima et al. (1987) analyzed single scale differences between males and females, and found that males scored significantly higher on D, Pd, Pa (Paranoia), Pt, and Sc. This is consistent with the finding that females generally score higher on Hy and Hs, and are more likely to cluster in the conversion-V profile than males.

Costello et al.'s (1987) delineation of the four pain groups was found to demonstrate unique qualities with respect to the impact of pain on psychosocial dynamics. Specifically, distinct attributes were found for the patient groups with respect to the severity rating of worst, least, and current pain; number of surgeries, number of hospitalizations, frequency of treatment, and employment status. McGill et al. (1983),

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whose patient sample replicated the four MMPI typologies, also found significant between-group differences on various pain-related demographic and treatment variables. Based upon the significantly longer duration of pain experienced by their conversion-V patient group, it was hypothesized that these individuals, in response to their long-standing pain syndrome, had developed a coping response characterized by a "strong emotional defense posture" that is represented by the particular "V" pattern of elevations on Hs, D, and Hy. Those individuals with a "subclinical" profile, demarcated by the lowest T-score values on the MMPI clinical scales, were found to have significantly shorter duration of pain, least amount of pain, shortest vocational disability, and the fewest number of hospitalizations and surgeries in comparison to the other three groups. The psychopathological group identified in their study did not evidence and statistically significant differences between discriminating variables.

On the other hand, McCreary's (1985) sample not only replicated the traditional pain groups (neurotic triad, conversion V, psychopathological, and normals), but also found significant differences on demographic and pain-related variables that included the psychopathological group. Specifically, the psychopathological and conversion V groups were more likely to be unemployed, and had the highest post-treatment pain intensity ratings, with the least amount of change from pre-treatment to post-treatment. By comparison, the "normals," individuals whose scales did not reach clinically significant levels, were found to have lower pre-treatment and post-treatment pain intensity ratings, and also evidenced the greatest decrease in this rating from pre- to post-treatment.

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Creating a Taxonomy of Pain Patients

Some have argued that the use of inductive, statistical procedures to identify and group patients quantitatively by the characteristics they share, particularly personality traits or psychopathology, are inadequate in comparison to the deductive approach of classification that is based on medical knowledge and consensus and results in assignment to a specific diagnostic category. Such classifications are based upon pain variables such as location, system involved, symptoms, signs, and test results. Rather, an integration of all possible information, including physical, functional, psychosocial, and behavioral characteristics has been proposed as the most desirable empirically derived classification system.

In an effort to integrate both perspectives, Turk and Rudy (1986, 1987, 1988, & 1990) devised the Multiaxial Assessment of Pain (MAP), a taxonomy based on psychosocial and behavioral characteristics of chronic pain patients. Using the West Haven-Yale Multidimensional Pain Inventory (MPI), this assessment procedure yielded three distinct profiles within groups of CLBP, temporomandibular, and headache patients. These profiles were designated "dysfunctional," "interpersonally distressed," and "adaptive coper." Despite differences between mean scale scores and proportions of each type of pain patient that fell into the respective profiles, results indicated that psychosocial and behavioral response patterns were generalizable to different pain syndromes, and that the MAP taxonomy represented an empirically-derived classification

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scheme based on psychosocial and behavioral factors. Other researchers have utilized the MAP taxonomy and MPI to discriminate between patients, and replicated the three profiles successfully (Asmundson, Norton, & Allerdings, 1997; Walter & Brannon, 1991).

Dysfunctional patients were described as reporting greater severity of pain, that the pain interfered more with their lives, higher degrees of psychological distress, a lower ability to control their lives, and a low activity level. Interpersonally distressed patients, on the other hand, perceived their families and significant others as unsupportive, while adaptive copers reported lower levels of pain severity, lower interference with their lives, lower affective distress, and greater perception of life control (Turk & Rudy, 1988; Walter & Brannon, 1991). The MPI and the MAP taxonomy have been used less frequently in the evaluation and classification of CLBP patients; Asmundson et al. (1997) examined whether CLBP patients in the three respective MAP clusters differed on measures of fear and avoidance, and found that profiles did not differ on non-pain fear and avoidance variables (agoraphobia, blood/injury, or social phobia), but the dysfunctional group scored significantly higher than the two other groups on measures of pain-specific fear and avoidance. These results suggested that pain-related fear and avoidance, and specifically, cognitive and physiological responses to pain and pain stimuli, play a larger role in the pain experience of those individuals classified as dysfunctional, than they do for interpersonally distressed individuals or adaptive copers.

Combining the MAP taxonomy with a screening measure of physical pathology, Turk and Rudy (1987) reclustered their sample of chronic pain patients and found that the dysfunctional group split into two smaller subgroups that differed only on the basis of

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abnormal medical and physical findings. Both subgroups were characterized as "dysfunctional" on the basis of high pain severity, interference, affective distress, and low levels of control, yet one group had significant evidence of physical pathology, whereas the other group's level of physical pathology was significantly lower. These findings suggest that while the MPI is a useful instrument in categorizing CLBP patients, when used alone, it fails to capture the subtle yet important difference between organic versus functional CLBP patients. Overall, the MAP classification system may not characterize as many of the psychological aspects of chronic pain patients as do the MMPI and other instruments. As stated by Turk (1990): "The inability of a taxonomy to incorporate previously unnoticed cases suggest the need to revise (and sometimes scrap) the taxonomy."

Though the MMPI and MMPI-2 have by far been the most commonly used personality assessments in the study of CLBP, numerous criticisms have been leveled at the instrument. McCreary et al. (1980) critically evaluated studies that relied on a single instrument for description of the emotional disturbances characteristic of CLBP patients. While the MMPI and EPI may adequately assess those particular areas for which they were designed (specific traits and personality patterns by the MMPI, and broad categories of emotional disturbance in terms of extraversion and neuroticism by the EPI, respectively), these inventories "may not tap all the significant characteristics that typify the personality disturbance of chronic pain patients." They propose that the addition of other instruments may assist in identifying other psychosocial factors that comprise the portrait of psychological dysfunction in this population. Additionally, in light of the commonly found elevations on other clinical scales, specifically Pd, Pa, and Sc, the

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authors suggest that this cluster elevation does not necessarily differentiate CLBP patients from the normal population (McCreary et al., 1980). However, in accordance with others, they do support the notion that the Hs and Hy elevations carry significant clinical importance and clearly indicate a unique aspect of CLBP patients that non-pain populations do not share (McCreary et al., 1979; Milhous et al., 1989; Ornduff et al., 1988; Sivik et al., 1992; Vendrig et al., 1999). Others have alluded to the inaccuracy of the assumption that certain scale elevations are indicative of psychopathology; in particular, high D and Sc scores were attributed to somatic distress and preoccupation, rather than underlying personality disturbance (Moore, McFall, Kivlahan, & Capestany, 1988; Prokop, 1986). The purported relationship between psychological distress and physically-based pain behaviors as indicated by correlation and external validation was not found, calling into question the veridical relationship between emotional disturbance and chronic pain; the distress represented the Psychological Disturbances factor may more likely be a result of heightened somatic awareness and anxiety, rather than true psychopathology. In sum, the MMPI may not be able to ascertain the direct relationship between "pure" psychological distress and physical pain, without the inherent mediation of somatic preoccupation (Vendrig, deMey, Derksen, & Akkerveeken, 1998). In addition to methodological shortcomings in the factor analysis of the MMPI, it has been critiqued in terms of its utility with the chronic pain population, as its atheoretical nature may preclude its use with those populations whose personality profiles may not fall under the rubric of the general or psychopathological populations for which it was developed (Vendrig et al., 1998). Others have warned against the use of single-scale data,

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recommending the use of code types or profile configurations to draw conclusions or predictions for CLBP condition or outcome (McCreary et al., 1979).

However, as Costello and Schoenfeld (1990) point out, "the P-A-I-N typology was not proposed to foreclose on additional exploratory clustering attempts." To impose rigid boundaries of well-established subgroups would defeat the purpose of exploring additional types, and eliminate the possibility of further categorizing CLBP patients on the basis of personality.

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The Pain Presentation Inventory and the Present Study

An innovation in pain patient taxonomies has been released based upon research on non-organic signs in LBP patients, defined as those symptoms or signs that may help predict non-physiological contributions to the etiology of the pain (Dirks et al., 1996). The Pain Presentation Inventory (PPI), developed by Kinsman, Dirks, Wunder, Carbaugh, and Steig (1989), combines patient self-report data with information gathered by the clinician at the time of evaluation, to yield a more comprehensive and illustrative pain assessment, as well as classify each patient into one of four categories. The absence of physiologic signs, or an incongruent degree of physiologic markers to account for reported pain, suggests a psychosocial component of pain presentation. The authors propose that there are internal and external motivational factors, in combination with either a conscious or unconscious process in the identification of pain patient type (Dirks & Kinsman, 1996). This scheme is represented by a two-by-two matrix that creates four cells, each corresponding to a different type of pain patient. Type I represents an unconscious process and internal or psychological motivation, and parallels the formal DSM-IV diagnosis of Pain Disorder Associated with Psychological Factors, formerly Somatoform Pain Disorder (DSM-III-R, 1987). Type II also represents an unconscious process, but an external motivation (e.g., compensation for an injury), and finds its parallel in the concept of compensation neurosis, or the DSM-IV diagnosis of Psychological Factors Affecting Physical Condition, with the specific designation of

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Personality Traits or Coping Style Affecting Medical Condition. In contrast, the third type is a conscious process and internal motivation, and is best understood as Factitious Disorder with Predominantly Physical Signs and Symptoms, or Factitious Disorder with Combined Psychological and Physical Signs and Symptoms. Lastly, Type IV combines conscious process and external motivation, and is synonymous with the formal diagnostic label of Malingering.

Insert Figure 1 about here

The Pain Rating Scale (PRS) is a visual analog scale depicted by a pain "thermometer" that ranges from 0 ("no pain") to 100 ("extreme pain, that would be so bad that to experience it for one second would lead to suicide"). The Pain Behavior Checklist (PBC) is completed by the evaluator who observes the patient's overt behaviors during interview, including limping, grimacing, sighing or moaning, having a rigid immobile torso or pain site, etc. This score is then compared to the PRS to obtain the consistency score, which reflects the degree of agreement or discrepancy between the pain behavior and the present pain ratings. The PRS and PBC have been shown to reliably discriminate between patients who consciously exaggerated their symptoms, and those who did not (Dirks, Wunder, Kinsman, McElhinny, & Jones, 1993).

Also comprising the PPI is the Pain Symptom Checklist (PSC), a self-report inventory that is divided into eleven clear symptom clusters. These clusters include four affective symptom categories, two somatic symptom categories, and five additional categories. The PPI combines scores of a non-organic signs scale, the PBC, the PRS, and the PSC, as well as five additional scales derived from patient response. The scales of the PPI, with descriptions, are as follows:

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Non-organic Signs (NOS): likelihood of nonorganic factors affecting the client's pain presentation.

Pain Behavior Scale (PBS): total score from the PBC.

Worst Pain (Worst): worst pain rating for the last month.

Least Pain (Least): least pain rating for the last month.

Present Pain (Present): rating of pain during the interview.

Generalized Pain Intensity (GPI): summary of pain ratings and behavior.

Range of Pain (ROP): peak to trough pain range.

Consistency (CON): compares present pain rating to pain behavior during the interview.

Cognitive Dysfunction (CD): problems in attention, memory, and concentration.

Angry Depression (AD): depression and anger directed at others.

Sleep Disturbance (SD): disturbed sleep.

Diminished Drive (DD): disinterest in everyday activities.

Ecto Pain (ECTO): pain, tingling, and/or numbness confined to the body surface.

Fatigue: tiredness and lack of energy.

Withdrawal (WD): withdrawal and unwillingness to become involved.

Endo Pain (ENDO): pain and/or cramping confined to deep within the body.

Disequilibrium (DISEQ): lightheadedness, tinnitus, loss of balance.

Intropunitive Depression (ID): guilt and depression directed at oneself.

Anxiety (ANX): fear and anxiety.

Visual Disturbance (VD): blurred, doubled, or other vision problems.

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Mislabeling (MIS): mistaking suffering for pain.

Atypical Symptoms (ATYP): symptoms rarely reported by other pain patients.

Minimization (MIN): the tendency to minimize reported symptoms.

Maximization (MAX): the tendency to maximize reported symptoms.

Following administration of the PPI, it is scored using a computer-based program designed by Medical Management Institute, LLC. This program yields an interpretive report that lists the patient's T-scores for each scale, and classifies the patient as at least one of four types, as well as indicating which types should be ruled out. In addition, the interpretive report describes the pattern of scores on the PPI, and what characteristics are typically found in such individuals. Based on a patient's scores, the type(s) classification may also be deferred, thus the program does not insist or "force" a patient into a particular category unless warranted by the data. Those patients who are not classified as one of the four types will be analyzed as having a group membership of "deferred." Complete details on the derivation of these types can be found in the description of their development by Dirks and Kinsman (1996).

No research exists at this time that utilizes the Pain Presentation Inventory. The purpose of the present study is to examine the MMPI-2 individual scales and profile configurations of chronic pain patients based upon PPI-designated type, to determine if each of the four types have particular MMPI-2 scale elevations corresponding to and congruent with the associated diagnosis. Dirks & Kinsman (1996) state that each pain patient's motivation and process foster a clinical "disposition" that parallels a distinct Axis I diagnosis. It is hypothesized that, if pain symptoms, behaviors, and resulting

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reports are shaped by such factors as motivation and process, then each patient type will possess particular personality scale elevations that correspond to the scale patterns for Somatoform Pain Disorder (DSM-III-R), Malingering, Factitious Disorder, and compensation neurosis (DSM-III-R), as researched and suggested by the MMPI-2. For instance, the MMPI-2 profile that is reliably indicative of malingering exhibits an extremely elevated F, usually exceeding a T-score of 100, based on an overendorsement of deviant items. This results in clinical scales that are much higher than those of patients with legitimate psychopathology. In addition, the F score is significantly higher than the K scale (Graham, 1993). The modal diagnosis for individuals with clinically elevated scales 1, 2, and 3 is a somatoform disorder: "Somatic complaints...are common, and often, there appears to be clear secondary gain associated with the symptoms" (Graham, 1993). Similarly, the conversion V pattern, frequently found in chronic pain patients, is commonly associated with a diagnosis of somatoform pain disorder (Bernstein & Garbin, 1983; Bradley et al., 1978; Gentry et al., 1974; Graham, 1993 McCreary, 1985; Prokop et al., 1980).

A unique study by Oostdam and Duivenvoorden (1984) found that patients with and without organic substrates of back pain could be reliably discriminated on the basis of their use of pain descriptors. They built upon this work by examining the relationship between pain descriptor words and MMPI factors [L (Lie), K, Hs, D, Hy, and Pt scales]. Pain words fell into three variable categories: evaluative-affective, temporal, and sensory. Results indicated that patients with high scores on all three variables also evidenced high scores on the Hs, D, Hy, and Pt scales. Overall, the authors concluded that affective distress plays a major role in the choice of words patients use to describe

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their pain, though there were no MMPI differences between patients with "somatically explicable" low back pain versus those whose back pain was not somatically explicable. Though their work did not lend support to the literature that has differentiated between organic and functional pain patients on the basis of psychological assessment, it did demonstrate that the choice of words used to describe pain symptoms is affected considerably by the experience of psychological distress (Oostdam and Duivenvoorden, 1987). The power of these findings, in the context of the present study, lies in their demonstration that the choice of specific descriptors, used to label pain as affective, temporal, or sensory, can be influenced by personality attributes as indicated by the MMPI. Hence, patients' labeling of pain on affective, sensory, and functional dimensions as assessed by the PPI, is likely to be influenced by those characteristics measured by the MMPI.

This study will attempt to answer the following questions:

a. How do the four types of pain patients differ with respect to MMPI-2 scales?

b. Does convergent validity exist between the MMPI profile's known classification and the PPI's group assignment (i.e., "neurotic triad" scale elevations for a PPI Type I patient)?

c. Are there demographic differences between the four types?

d. What are the differences between the four types, and the group of patients whose type identification was deferred?

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Additionally, it is hypothesized that those patients who are classified as Type IV (synonymous with a conscious process and external motivation; parallels with Malingering), will have higher mean values on the following PPI scales:

Pain Behavior Scale (PBS)

Worst Pain

Least Pain

Generalized Pain Intensity (GPI)

Maximization (MAX)

Non-organic Signs (NOS)

This hypothesis is based upon the assumption that malingerers, or patients who "fake bad" for the purpose of secondary gain, will be motivated to report their pain as more severe for the purpose of presenting themselves as more disabled. The Non-organic Signs scale is designed to evaluate the likelihood that there is a psychological contribution to the patient's pain report. A patient who is malingering attempts to create the impression that he or she is more disturbed than is actually true; in this case, a patient's report of symptoms, or pattern of responding itself, may be incongruous with the organic pathology, creating a response set that reflects more than just a physiological basis for symptom report, and hence suggests exaggeration.

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METHODS

Subjects

Subjects included both males and females over the age of 18, who were seen at private pain clinics in Loveland, Greeley, and Thornton, Colorado. All patients were referred for a psychological evaluation by a physician or other medical professional, or referred for an independent evaluation by an attorney or insurance company. Due to the potentially biased response style of patients represented by an attorney, or by those patients whose cases were in arbitration with an insurance company, those individuals who were referred for independent evaluations were excluded from the analysis. Patients were also if they were under the age of 18 (the MMPI-2 was normed on a group of individuals aged 18 and older), if the subjects were Spanish-speaking (the PPI does not currently have a Spanish version), or if there were any missing data for variables pertinent to this study. Subjects who were categorized by the PPI Interpretive Report system as belonging to more than one PPI subgroup were also excluded. Of the 279 patients initially included in the study, 23 were excluded by virtue of being referred for an independent evaluation; ten individuals were classified into more than one PPI category and were thus excluded as well. An additional 27 patients were excluded because their duration of pain did not exceed three months, and a final patient was

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excluded due to a lack of demographic information, leaving a final sample of 218 patients.

Subjects ranged in age from 18 to 65 years (X= 41.28, SD = 9.83) and years of education completed ranged from seventh grade to graduate level (18 years). The mean and standard deviation for education were 12.82 and 2.03 years, respectively. Duration of pain ranged from three months to 13 years (X = 15.38, SD = 19.80). The mean PBC score for the entire sample was 5.54 (minimum = 0, maximum = 15), with a standard deviation of 2.76. The mean number of different types treatments received by the sample as a whole ranged from zero to nine (X = 4.42, SD = 1.63). The mean worst pain, least pain, and current pain ratings are as follows (standard deviations in parentheses): 78.60 (14.38); 34.47 (20.68); and 45.20 (23.05). Summaries of additional characteristics of the entire patient sample, as well as each PPI subgroup, are presented in Tables 1 through 6.

Procedures

Comprehensive psychological evaluations were conducted at each pain clinic. Standard evaluations included a personal history interview pertaining to demographic and pain-related factors, and a pain psychology assessment battery. Among other instruments, this battery included:

Minnesota Multiphasic Personality Inventory-2 (MMPI-2)

Pain Presentation Inventory (PPI), consisting of:

Pain Behavior Checklist (PBC)

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Pain Rating Scale (PRS)

Pain Symptoms Checklist (PSC)

Information obtained by the psychosocial history questionnaire included demographic data, such as age, gender, educational history, vocational history, employment status, and relationship/marital status; medical history and treatment, psychological history and treatment, medications, and information pertaining to characteristics of both current and prior pain complaints and related compensation and treatment information. Completion of both the interview and the assessment instruments was voluntary.

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RESULTS

Data were analyzed using SPSS for Windows Version 10.0. Statistical analyses were undertaken to examine MMPI data pertaining to Groups I through IV, as well as examining MMPI, PPI, and demographic data pertaining to Groups I through V. These analyses addressed two questions of the study: 1) exploring differences between members of the four established groups, and 2) differences between the four groups and individuals who failed to be assigned to one of those groups. Because the latter question pertained only to MMPI and PPI differences, statistical comparisons on demographic variables were made between all five groups only. For ease of interpretation of the results and discussion, from this point forward, the groups will be referred to by the following labels:

Group I: Somatoform

Group II: Compensation

Group III: Factitious

Group IV: Malingering

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Patient characteristics, Groups I Through V

Comparisons of demographic characteristics and pain related variables between each identified PPI pain group (Somatoform, Compensation, Factitious, Malingering), plus Group V, are presented in Tables 1 through 6.

Insert Tables 1 and 2 about here

Means and standard deviations for demographic data of a continuous nature for each PPI pain group are summarized in Table 1. Variables were subjected to separate univariate analysis of variance (ANOVA). The results of these analyses revealed a significant difference among the five groups on Pain Behavior Checklist score, F (4, 213) = 4.304, $p < 0.01$. There were significant differences between groups on least pain rating, F (4, 212) = 6.311, $p < 0.001$, and current pain rating, F (2, 213) = 3.321, $p < 0.05$. Subsequent simple ANOVAs were conducted in order to determine the locus of the differences. These analyses yielded the following results: with respect to Pain Behavior Checklist Scores, the Somatoform, Factitious, and Malingering groups scored significantly higher than Group V, $p < 0.05$ for all groups. For least pain rating, Somatoform and Compensation groups rated their least pain as significantly higher than Group V, $p < 0.001$ and $p < 0.01$, respectively. The Somatoform group's current pain rating was significantly higher than the current pain rating of Group V, $p < 0.05$. The four primary pain groups did not differ from one another on any pain ratings. There were no significant differences found between any of the five groups on age, duration of pain,

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years of education, or number of different interventions utilized for treating the current pain complaint.

Summaries of demographic data of a categorical nature are displayed in Table 2. Pearson chi-square analyses were conducted on these variables to determine if group differences existed for these characteristics. The results revealed significant differences for the following variables: gender, χ^2 (4, N = 212) = 21.235, $p < 0.001$; prior injury at the site of the current pain complaint, χ^2 (4, N = 218) = 12.825, $p < 0.05$; previous psychological or psychiatric treatment, χ^2 (4, N = 218) = 10.014, $p < 0.05$, and history of sexual abuse, χ^2 (4, N = 215) = 12.777, $p < 0.05$. There were no significant group differences on marital status, ethnicity, history of physical abuse, or family psychiatric history.

Chi-square analyses did not reveal any significant group differences with respect to the site of the injury, rating of pain behavior displayed, type of injury sustained, psychiatric treatment or diagnosis received following the injury, or type of post-injury psychological/psychiatric treatment received.

Subsequent examination of the adjusted residuals further elaborated upon the nature of these differences. The actual count of Somatoform males was significantly lower than the expected count, whereas the actual count of Somatoform females showed the opposite trend, and was significantly higher. The Factitious group showed the identical pattern, whereas Malingerers and groups V showed the opposite pattern with respect to the gender distribution, with the actual count of males being significantly higher than expected, and the actual count of females being lower than expected.

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Malingerers had significantly more members who had experienced a prior injury at the same site as their current pain complaint, versus the Compensation group, which demonstrated fewer cases than expected of individuals with a prior same-site injury.

The Somatoform and fifth groups evidenced history of sexual abuse differences; members of the Somatoform group were significantly more likely to have had a history of sexual abuse, whereas members of Group V were significantly less likely with respect to the percentage that was expected. Significantly more Factitious patients had a history of psychological/psychiatric treatment, whereas fewer members of Group V had a history of mental health interventions.

Insert Tables 3 and 4 about here

In regards to modalities utilized in treating the present injury, there were no differences between groups on use of pain medications, steroid, trigger point, or other types of injections, or external applications including physical therapy, TENS units, massage, chiropractic treatment, or acupuncture. However, a significant group difference did emerge between groups on the number of patients who had undergone surgery for their injury, $\chi^2(4, \underline{N} = 218) = 13.196$, $\underline{p} < 0.05$. Adjusted residual values revealed that significantly fewer Somatoform members had undergone surgery to treat a pain complaint, versus those in Group V who were more likely to have undergone surgery. No significant differences between groups occurred for the following pain management strategies: use of prescription pain medication, use of psychotropic medication, use of sedative/hypnotic medication or prescription sleep aids, use of alcohol or drugs, or use of either substance for pain relief.

Insert Tables 5 and 6 about here

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Analysis of Groups I Through IV

MMPI-2 Variables

Only results pertaining to differences between the MMPI scores of Groups I through IV will be presented here. Results pertaining to Group V will be presented later in this section. Two separate multivariate analyses of variance (MANOVA) were conducted to ascertain group differences on MMPI-2 scales. The first MANOVA was conducted for the validity scales of the MMPI. A second MANOVA was performed on the clinical scales, due to the fact that fractions of raw score values of K, a validity scale, are used to compute raw score values for several clinical scales. Thus, to eliminate the possibility of a group effect emerging due solely to this relationship, a separate MANOVA was conducted for these clinical scales.

Means and standard deviations of MMPI-2 validity and clinical scales are presented in Tables 7 and 8. The Malingering group achieved a clinically significant elevation on the L scale, though very minimally. All four groups had clinically significant elevations on scales Hs (Hypochondriasis) and Hy (Hysteria) (mean T-score > 65). These were the only clinical elevations for the Malingering group, whereas the Somatoform mean D (Depression) score also reached clinical significance. In contrast, the clinical profiles of the Compensation and Factitious groups were much more pathological; Compensation means reached clinical significance on scales F, Hs, D, Hy,

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Pt, and Sc. The Factitious group presented as the most psychologically distressed, with means exceeding clinically significant levels on scales Hs, D, Hy, Pd, Pa, Pt, and Sc.

Insert Table 7 about here

Validity Scales

A significant overall group effect was found for the validity scales of the MMPI-2, $\lambda = 0.841$, F (12, 558) = 3.154, $p < 0.001$, $\eta^2 = 0.056$. Thus, separate ANOVAs were performed on the data to determine the locus of the differences. Results of these analyses indicated significant differences on the following scales: L (Lie), F (4, 213) = 3.094, $p < 0.05$; F (Infrequency), F (4, 213) = 4.663, $p < 0.01$, and K (Defensiveness), F (4, 213) = 5.475, $p < 0.001$. Subsequent Tukey pairwise comparisons, $\alpha = 0.05$, were performed to ascertain the nature of these differences. Results indicated that the Malingering group was the most atypical in comparison to the other groups' Validity scales, scoring significantly lower than the Compensation group on F, $p < 0.01$, and significantly higher than the Compensation and Factitious groups on K, $p < 0.01$ for both.

Insert Table 8 about here

Clinical Scales

A significant group effect was also found on several of the clinical scales, $\lambda = 0.745$, F (4, 212) = 1.558, $p < 0.05$, $\eta^2 = 0.071$. Results of univariate ANOVAs indicated significant differences existed on the following four scales: Pd (Psychopathic Deviate), $F = 2.954$, $p < 0.05$; Pa (Paranoia), $F = 3.963$, $p < 0.01$; Pt (Psychasthenia), $F = 3.579$, $p < 0.01$, and Sc (Schizophrenia), $F = 4.263$, $p < 0.01$. Tukey pairwise comparisons ($\alpha =$

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0.05) revealed that Malingerers differed the most from other groups, and in particular, from Compensation and Factitious patients. The individuals in the Malingering group scored significantly lower than patients in the Factitious groups on Pd, $p < 0.05$; on Pa, $p < 0.01$, and on Sc, $p < 0.01$.

The Malingering group also scored significantly lower than the Compensation group on Pt and Sc, $p < 0.05$ for both. The Factitious group scored significantly higher than the Somatoform group on Pa, $p < 0.01$.

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Analysis of Groups I Through V

MMPI-2 Variables

Clinically significant elevations occurred for Group V on three scales: Hs, D, and Hy. The overall profile configuration was virtually identical to those of the other groups. Of the five groups, Group V emerged as having the lowest levels of psychopathology on three scales: Hs, Hy, and Ma. However, none of these differences reached a level of statistical significance when compared to the other groups.

Validity Scales

With respect to statistical analysis that compared the four identified groups to the individuals placed into Group V, there were several significant differences. MANOVA data illustrating overall group differences are presented in the previous MMPI results section. Subsequent ANOVAs and Tukey pairwise comparisons ($\alpha = 0.05$) indicated significant differences between Group V and two of the identified groups. Group V scored significantly lower than Malingerers on L, $p < 0.05$, and on K, $p < 0.01$. They also scored significantly lower than the Compensation group on F, $p < 0.05$.

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Clinical Scales

Group V emerged as significantly different from an identified group on only three of the ten clinical scales. Data from the between-subjects MANOVA of the clinical scales is also presented in the previous MMPI results section. Follow-up ANOVAs and Tukey pairwise comparisons ($\alpha = 0.05$) resulted in significant differences only between Group V and the Factitious group. These differences emerged on the following scales: Group V was significantly lower on Pd, Pa, and Sc, $p < 0.05$ for all analyses.

PPI Variables

Means and standard deviations of all PPI scales are presented for each group in Table 8. The Factitious patients were the only group to score above the T-score 70 cutoff (mean T-score = 71.04) for "marked" non-organic signs, indicating a significant presence of psychological components to pain etiology, and suggesting symptom magnification for various reasons. Mean T-scores of the Compensation and Malingering groups, though not reaching the cutoff, were quite close to critical levels, at 67.06 and 65.03, respectively. Of the five groups, Group V had the lowest scores on more than one-third of the scales.

Insert Table 9 about here

Following MANOVA and subsequent analyses of the PPI scales, the differences between Group V and the other four groups became much more salient. A significant group effect was found for the PPI, $\lambda = 0.247$, $F(4, 196) = 3.028$, $p < 0.001$, $\eta^2 = 0.295$.

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Thus, separate ANOVAs were performed to more closely examine where differences emerged.

Group V and Malingering Groups

Results of these analyses indicated that the groups differed significantly on virtually every scale of the PPI, except Range of Pain, Consistency, and Mislabeling. In comparison to the Somatoform, Compensation, and Factitious groups, Group V scored lower where significance emerged, with the exception of the minimization scale. On this scale, Group V scored significantly higher. However, a different pattern of scores was evident when comparing Group V and Malingerers that is inconsistent with the prior groups' comparisons. Group V exhibited higher scores on three of the scales where differences reached significance, with the exception of, once again, minimization, as well as NOS, upon which Group V scored lower than Malingerers.

The Malingering group's anomalous appearance on the MMPI was substantiated by exhibiting the most significant differences in comparison to the Somatoform, Compensation, and Factitious groups on PPI scales; they displayed the greatest discrepancy from the Compensation group, with significant differences on 15 of the 24 PPI scales. The Malingering group tended to score significantly lower than the Somatoform, Compensation, and Factitious groups on the majority of PPI indices. Given that the differences between the groups are so numerous, p-values for significant differences between Malingerers and Group V versus the other groups on the various PPI scales will be presented in Tables 10 and 11.

Insert Tables 10 and 11 about here

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Somatoform, Compensation, and Factitious Groups

There were fewer differences between the remaining groups on scales of the PPI. The Factitious group scored significantly higher than Somatoform patients on intropunitive depression, $p < 0.01$; anxiety, $p < 0.001$; and maximization, $p < 0.05$. However, they scored significantly lower than Compensation patients on least pain, $p < 0.05$. The Somatoform and Compensation groups differed on four scales as well, with Compensation patients scoring significantly higher than the other group on ecto pain, $p < 0.05$; endo pain, $p < 0.01$; anxiety, $p < 0.51$, and maximization, $p < 0.01$.

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DISCUSSION OF THE RESEARCH QUESTIONS

The purpose of the present study was to investigate four questions regarding the relationships between the four identified groups of pain patients as identified by the PPI, and to explore possible differences between these four groups and "Group V," or, those patients who were not classified into one exclusive category by the PPI analysis. An additional hypothesis was postulated regarding elevated scores for the Malingering group on certain scales of the PPI. Each question will be addressed individually, and followed by a more comprehensive discussion of the data and conclusions.

Question 1: MMPI-2 Differences between Groups I Through IV

Several differences were illuminated by statistical comparison of the mean MMPI scores of the Somatoform, Compensation, Factitious, and Malingering groups. Malingerers emerged as being the most disparate in comparison to the other groups, and most frequently in contrast to the Factitious group. The MMPI scores for Malingerers also frequently differed significantly from those of the Compensation group. The Factitious group demonstrated a significant difference from the Somatoforms on only one occasion, and there were no significant differences between Somatoform and Compensation groups, between Somatoforms and Malingerers, or between the Compensation and Factitious groups.

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Single Scales

Specifically, the Malingering group scored significantly lower than the Compensation group on F, suggesting that these Malingering patients presented themselves as relatively well adjusted, and did not respond to as many items of the MMPI in an atypical manner as the Compensation individuals. Though the Compensation patients' mean value for the F scale was only just over the clinically significant cutoff, in comparison to the Malingerers, this does suggest that Compensation patients may experience clinically severe neurotic or psychotic disorders, or, in the absence of psychopathology, are likely more emotionally labile and dissatisfied, and may endorse non-mainstream or nontraditional values or beliefs.

Malingerers also demonstrated a significantly higher K scale score than either Compensation or Factitious patients, suggesting that Malingerers responded in a more defensive manner. Such individuals may be attempting to portray themselves as effective, having control, and functioning adequately, and may lack awareness or insight of their psychological dysfunction. Other theories suggest that a high K indicates better adjustment and lower likelihood of non-organic factors contributing to pain complaints (McGrath et al., 1998). However, from a clinical perspective, despite the significantly higher K scale score, none of the groups scored in the clinically significant range on this scale, suggesting that all patients openly acknowledged psychological concerns and symptoms of depression, anxiety, or interpersonal difficulties.

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With regard to clinical scales, Factitious patients scored significantly higher than Malingerers on Pd (Psychopathic Deviate), Pa (Paranoia), and Sc (Schizophrenia), suggesting that the Factitious patients tend to be more unconventional in their beliefs or values, may be perceived by others as childish or immature, and may behave in a manner that is impulsive, self-serving, and demonstrates poor judgment. They are also more likely to portray themselves as confident and extroverted, but are actually emotionally volatile and lacking in empathy. The Factitious group's trend toward greater psychopathology in comparison to Malingerers continued to be supported by the analysis of mean scores on the Paranoia scale; they scored significantly higher than Malingerers on measures of sensitivity to criticism, suspiciousness, the tendency to feel they are being treated unfairly and thus feel hostile toward and resentful of others, and to consequently blame others for their difficulties. They also scored significantly higher on this scale than Somatoform patients. Only Factitious patients scored in the clinically significant range on this scale.

The Malingering group's mean score on Pt (Psychasthenia) was significantly lower than that of the Compensation group, indicating that by comparison, the Compensation patients tend to be more anxious, worrisome, and self-critical, have more self-doubt, tend to be more compulsive and rigid in their cognitive processes, and are often unimaginative in their problem-solving approaches. There were no significant differences between the Compensation and Factitious groups, and these were the only two groups to exhibit clinically elevated scores on this scale. Significant differences were evident on Sc (Schizophrenia), with Malingerers again scoring significantly lower than either the Compensation or Factitious patients, suggesting that the latter two groups

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exhibit both clinically and statistically higher levels of interpersonal isolation, detachment, and inferiority, as well as self-doubt, eccentricities, and emotional dysphoria including depression, anxiety, and hostility.

Overall, the Factitious group, when compared to Malingerers, emerged with the most statistically significant differences. They appeared to have a higher level of psychopathology, maladjustment, and poorer self-control. They also emerged as being more pathological than the Somatoform patients with respect to feelings of interpersonal sensitivity, suspicion, and persecution. The Compensation group also presented as experiencing more neuroticism compared to Malingerers.

Profile Configurations

With respect to overall profile shape (scale highpoints or codetypes), all four groups exhibited roughly the same pattern. There were no discrepancies between groups on codetypes; all groups' two highest scales were scales Hs and Hy, and all evidenced a large drop to the mean value of the Pd scale, followed by a lowest value for the Mf scale. All groups then exhibited a gradually increasing slope from Pa to Sc, followed by a lower Ma; Si scores were somewhat more variable but all groups' mean values were less than a T-score of 56.1. This would support other observations that pain groups' MMPI scales differ primarily in terms of elevation, rather than configuration (Bradley et al., 1978; Keller & Butcher, 1991).

In examining validity scales, the Somatoform and Malingering groups exhibited the most unique shapes; both the Compensation and Factitious groups were characterized by an inverted "V" pattern for L-F-K, whereas the Malingerers' validity scales

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demonstrated just the opposite pattern, with scores on L and K exceeding that of F, creating a "V" pattern. In comparison, the scores for Somatoforms demonstrated more subtle differences between scales, with a peak score on L and a gradual downward slope to a lower F score, and finally an even lower K score, but with a only six-point differential between scales L and K (61.89 and 55.15, respectively).

Though clinical elevations were evident only on scales L (Malingering) and F (Compensation and Factitious), the "V" shape representative of Malingerers is most similar to a "fake-good" or "defensive" contour of the validity scales. In the former case, the pattern results when an individual attempts to deny problems, present a positive impression of oneself, or strives to appear more psychologically well adjusted than one actually is. Hence, in studies where subjects were instructed to "fake good," the L and K scales were significantly elevated, and the F scale was below 50. Correspondingly, all clinical scales were fairly low (Graham, 1993; Graham, Watts, & Timbrook, 1991). In the latter case, an individual attempts to emphasize positive attributes while minimizing negative ones, in a less blatantly self-promoting manner than a "fake good" subject. The higher-L-than-K of the Malingerers would suggest that an individual is trying to present an image of oneself as honest, moral, and conforming (Graham, 1993). In sum, the validity scales of the Malingerers share some characteristics of a "fake-good" profile (F scale lower than 50 but not as low as in a defensive profile) and of a defensive profile (L and K not as elevated as in a "fake-good" profile). The inverted "V" is more characteristic of an individual who completes the instrument following standard testing instructions, though the Compensation and Factitious means for scale F, 66.11 and 64.35, respectively, are suggestive of the possibility that members of this group, barring the

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presence of psychopathology, may be less traditional or conforming to standard societal beliefs, may be emotionally labile, or, more than likely, have openly endorsed items relevant to a particular problem area.

In comparing clinical scale patterns, several interesting configurations emerged. The Somatoform, Compensation, and Malingering groups replicated the MMPI conversion V profile, with clinical elevations on scales Hs and Hy, separated by a "valley" created by a lower score on the D scale (notated as "1-3-2" or "3-1-2" where the scale listed first is the highest, with each successive scale representing the next highest elevation). As there were no significant intergroup differences on the clinically elevated scales Hs or Hy, this would suggest that all individuals are comparable with respect to their excessive reports of somatic complaints that increase during times of stress, their lack of insight into the psychological contributions to their pain, and subsequently, high reliance on medical explanations, which fosters significant dependency upon medical professionals and physically-based interventions, and a tendency to reject or resist exploration of psychological factors in relation to their pain (Graham, 1993).

As the Somatoform group demonstrated clinical elevations only on scales Hs, D, and Hy, this group would most closely parallel Costello et al.'s (1987) "neurotic triad" of the P-A-I-N classification. This profile is typically associated with a DSM-IV diagnosis of somatoform pain disorder (Bernstein & Garbin, 1983; Bradley et al., 1978; Gentry et al., 1974; Graham, 1993; McCreary, 1985; Prokop et al., 1980). The neurotic triad is characterized by patients who are "hypochondriachal," have had the greatest number of surgeries and hospitalizations, are more functionally disabled, and more difficult to treat due to their excessive focus on physical distress that interferes with the use of

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cognitively-based coping strategies (Armentrout et al., 1982; McGill et al., 1983; Prokop et al., 1980).

Factitious patients also demonstrated clinically significant elevations on scales Hs, Hy, and D. To note, the significantly higher D score in comparison to Malingerers suggests that particularly when compared to Malingering patients, those individuals in the Factitious group have a greater likelihood of depression, emotional turmoil, and lack self-esteem and self-efficacy.

Due to having numerous clinically elevated scales, the Compensation and Factitious groups emerged as the most psychologically distressed of the four groups. These groups evidenced clinically significant elevations on scales Hs, D, Hy, Pt, and Sc. In addition, the Factitious group's Pd and Pa scales were also clinically elevated, suggesting that in comparison to the Compensation patients, Factitious patients tend to be less conforming to traditional social mores, may have difficulties with impulsivity and tend to make snap decisions without considering the consequences of their actions, and fail to create trusting or mutually satisfying relationships with others. The clinical elevation on Pa suggests that in comparison to Compensation patients, this group was also more interpersonally sensitive to criticism, hostile and resentful toward others, and more likely to externalize and blame others for their problems. However, as there were no statistically significant differences between these two groups, their characterological styles and corresponding behaviors, in addition to their interpretation, experience, and portrayal of pain, are quite likely to be highly similar. Taken as a whole, these score profiles are most similar to the psychopathological profile of Costello et al.'s (1987) P-A-I-N typology, indicative of, for both groups, more severe pain, higher values when pain is

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rated at both its worst and its least levels, more frequent attempts to seek treatment, and a greater negative impact of pain on social and emotional functioning (Armentrout et al., 1982; Costello et al., 1987; Guck et al., 1988; McCreary, 1985; McGill et al., 1983; Prokop et al., 1980).

The Malingering group distinguished itself from the other three groups by virtue of demonstrating clinical elevations on scales Hs and Hy only. This pattern is representative of the "conversion V" pain patient category. Somatic symptoms of individuals demonstrating the conversion-V pattern are more likely to be influenced by pain severity, whereas the somatic complaints of "neurotic triad" patients are more likely to be influenced by levels of depression (Riley & Robinson, 1998). In fact, this sample of Malingering patients yielded the lowest mean scores on all seven clinical scales, and in comparison to all other groups, this group appears to be absent of psychopathology with respect to deviant attitudes, paranoia, anxiety, or social withdrawal and interpersonal difficulties. However, the absence of clinical elevations on these scales may be due in part to the overall tendency toward defensiveness and positive self-presentation as indicated by the validity scales, which may artificially depress the remaining clinical scale means. Despite its characteristic clinical/personality characterization in the context of chronic pain, Costello et al. (1987) described the conversion V group as failing to demonstrate demographic correlates that distinguish them from the other groups on the basis of those variables.

Analysis of mean MMPI scale scores successfully replicated three of the four groups identified by the P-A-I-N typology, and also evinced statistically significant variations between groups on several of the scales. The greatest demarcations occurred

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between Factitious versus Malingerers, followed by Compensation versus Malingerers, indicating that the personality profile of the Malingering patients is the most dissimilar in comparison to the other groups. As there were no significant differences evident between the Somatoform and Malingering groups, it is reasonable to state that these two groups shared the most commonalities in profile, with the exception of the validity scales. All groups share similar shape and score trends, yet what appears to most definitively set Compensation and Factitious groups apart from the other two groups is the presence of clinically significant psychopathology on several additional scales, that reached a level of statistical significance when compared to Malingering patients.

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Question 2: Convergent Validity between PPI Group and MMPI Profiles

Examination of the four pain groups' MMPI profiles resulted in both a confirmation and a surprising contradiction to the question of convergent validity. According to the DSM-IV, the diagnosis of Pain Disorder Associated with Psychological Factors, formerly Somatoform Pain Disorder, is characterized by an identifiable organic source of pain that "causes clinically significant distress or impairment in social, occupational, or other important areas of functioning," and "psychological factors are judged to have an important role in the onset, severity, exacerbation, or maintenance of the pain" (APA, 1994). Examination of the data supports the notion that patients classified as members of the Somatoform group yielded an MMPI profile that does indeed typify individuals whose stress tends to be manifest in physical complaints, who lack insight, and who engage in denial and repression to avoid realistically evaluating the role of their psychological process as it pertains to and influences their problem; in this case, their pain condition.

The "conversion V" codetype (1-3-2 or 3-1-2) of the MMPI customarily represents the diagnosis of *pain* disorder, though the 1-2 and 1-3 codetypes, as well as the 1-2-3 and 2-1-3 codetypes (all three scales clinically elevated but scale 3 is much lower than scales 1 or 2), are more frequently associated with a diagnosis of *somatoform* disorder (Graham, 1993). There is little that differentiates "somatoform disorder" from "somatoform pain disorder" other than in the former, the physical symptoms are more

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general and diffuse, and the individual must report four pain symptoms, two gastrointestinal symptoms, one sexual symptom, and one pseudoneurological symptom, whereas in the latter, the essential feature of the physical complaint is the experience of pain. Thus, common to both somatoform disorders and pain disorders are scale elevations on scales 1, 2, and 3, with the conversion V most often typifying the profile of patients whose specific complaint is pain. Hence, the data does indeed confirm the hypothesis that individuals most decisively assigned by the PPI classification system to Group I/Somatoform, or Pain Disorder Associated with Psychological Factors, generate a profile consistent with that which is predicted by the MMPI.

The characterological profile of the Compensation group is best captured by the DSM-III-R diagnosis of compensation neurosis, or its current DSM-IV moniker, Psychological Factors Affecting Medical Condition (Personality Traits or Coping Style Affecting Medical Condition). Though this diagnostic category has no known specified personality characteristics, nor does literature exist that describes MMPI data gathered from and reflective of individuals with this diagnosis, one may logically conclude that the presence of numerous maladaptive characterological features undoubtedly influences one's interpretation, expression, and report of pain.

Compensation patients demonstrated several clinically noteworthy MMPI elevations representative of depression, anxiety, emotional turmoil, self-doubt, and lack of insight into the psychological influences on pain. The influence that symptomatology and personality attributes, such as depression, lack of self-efficacy, and lack of insight, have on the perception and experience of pain and its severity, have been reported by prior studies (Epping-Jordan et al., 1998; Harkapaa et al., 1989; McCreary & Turner,

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1984). This very lack of insight may serve as one of the most important personality traits or methods of coping that perpetuates the existence and consequent disability and severity of such a condition. Based on the literature that describes those patients with elevated Hs and Hy scales as more treatment-resistant due to their reluctance to explore psychological influences on their pain, the elevated Hs and Hy, and concomitant endorsement of several other symptom areas, suggest that Compensation individuals tend to seek out external explanations for both physical and psychological symptoms, rather than genuinely examining the role played by internal or psychological factors. An individual with an external locus of control, who is experiencing significant depression, hopelessness about the future, and has low self-esteem, and who also holds a belief that he is powerless in managing or reducing his pain, may be highly likely to rely on the intervention of others, be it spiritual guidance of a faith, or medical guidance of a provider; he may be unwilling to examine the role his cognitions play in the maintenance and experience of his pain (Buckelew et al., 1990; Harkapaa et al., 1989; Tait et al., 1982). Consequently, such an individual is constrained by his own lack of insight, because his personality traits and choice of coping strategy create a perpetual cycle of avoiding examination of the role of said psychological factors.

Though no clearly delineated hypotheses were proffered in regard to either the Compensation or Factitious groups, the tentative conclusion may be drawn that these data, while not necessarily staunchly affirming the notion set forth in the above paragraph, certainly do not contradict the idea, nor do the MMPI data represent a diagnostic class that consequently rules out the possibility that this hypothesis remains viable.

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With respect to the Factitious group, the same premise is applied: no specific personality patterns are offered or suggested by the diagnosis of Factitious Disorder; the current DSM-IV diagnostic information describes the syndrome as one in which "physical or psychological symptoms are intentionally produced or feigned in order to assume the sick role" (APA, 1994). That symptoms are intentionally produced or feigned is determined through observation of direct evidence or by excluding other, more logical causes. The final hallmark of this disorder is the absence of obvious, external incentives. Thus, there is little upon which to evaluate the premise that individuals designated by the PPI typology as having Factitious Disorder will exhibit an analogous MMPI profile. However, the Factitious group did demonstrate the highest number of clinically elevated scales and the highest values on said scales in comparison to the other groups. It may be reasonably intimated that one who is clearly motivated to present as physically disabled in order to reap the benefits of functioning (or, in this case, *not* functioning) in the sick role might attempt to portray himself as overly symptomatic, suffering from distress in a variety of modalities, and also present as unaccountable for these problems, feigning helplessness at the whim of his "purely" physiological condition.

Regardless of diagnostic accuracy based upon PPI typology, all four groups likely present similarly when describing their pain. Compensation and Factitious groups, who are comparable to one another in terms of clinical profile and statistical measures, are likely the most similar in terms of pain complaints, coping strategies, perception of disability and symptomatology, and subsequent behavioral responses. They are likely the least amenable to treatment, demonstrate minimal reductions in pain severity in response to medical interventions, experience more somatic symptoms, report pain to be more

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widespread throughout the body, and experience more deleterious effects of their pain on social and occupational functioning. Additionally, their degree of emotional distress is likely to be higher, with impairment in a greater number of emotional domains, including the experience of depression, worthlessness, agitation, anxiety, cognitive difficulties, hostility and poor interpersonal relationships.

The greatest discrepancy with respect to presentation and experience of pain occurred between Factitious and Malingering groups; Factitious patients were found to be significantly more psychologically handicapped and to suffer to a greater degree. The hypothesis that these differences are borne out by comparisons between demographic and injury-related variables will be addressed in the following section.

Contrary to expectation, Malingerers emerged as the most psychologically "healthy" of all four groups. It was hypothesized that these individuals, whose psychological process and motivational factors are best captured by the concept of Malingering, would correspondingly present with the most significant psychopathology and highest scale elevations. Paradoxically, the validity scales of this group suggested that these individuals bordered on a defensive or "fake-good" pattern most reminiscent of someone attempting to maximize positive attributes and minimize negative ones. This pattern often results from an individual who attempts to present himself as more psychologically well-adjusted than is truly the case; this stands in frank opposition to the profile expectations of someone who is malingering, or intentionally "faking bad" for the purpose of secondary gain, which is usually monetary. The extremely high F ($T > 100$) with commensurate extreme elevations on the clinical scales was not found in this

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sample. Thus, convergent validity between the PPI group and its MMPI profile was not supported by the data of Group IV/Malingering.

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Question 3: Demographic Differences Between Groups I-IV

In order to examine the demographic correlates of each PPI group, analyses were undertaken to compare each group on a wide range of social, occupational, and physical functioning. Other studies that replicated Costello et al.'s (1987) typology of four patient groups have found between-group differences on such variables as ratings of pain intensity, medical treatments, and employment status. Many of these differences were hypothesized to be related to the patient type, as they were based upon interactions of demographic and pain variables unique to that group (McGill et al., 1983; McCreary, 1985).

Analyses of the present data indicated statistically significant differences between the groups on the following demographic variables: gender, history of sexual abuse, and previous psychiatric treatment. Significant group differences were also found on the following pain/injury-related data: Pain Behavior Checklist score, least pain rating, current pain rating, prior injury at the site of the current pain complaint, and number of surgeries.

Several studies have replicated the conversion-V pain group but within groups of female patients only (Bradley et al., 1978; Gentry et al., 1974; McCreary, 1985; Prokop et al., 1980). Within the current patient sample, a greater number of female patients than expected were found in the Somatoform and Factitious groups, whereas more male patients than expected were found in Malingerers. The presence of fewer female patients

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in the Malingering conversion-V classification is contrary to the findings of previous studies. However, those studies performed separate cluster analyses for each gender, whereas the present study examined MMPI profiles of groups, regardless of gender breakdown, thus the significant gender differences present in this sample may not necessarily reflect a meaningful gender difference with respect to groups. Instead, it is more likely that unequal group sizes (*N*s = 47, 18, 23, and 36) are responsible for these results.

The finding that members of the Somatoform group were more likely to have had a history of sexual abuse may have implications for the particular MMPI profile obtained by this subgroup. Individuals with a history of sexual abuse traditionally have lasting psychological ramifications with respect to self-concept, intrapsychic distress, and interpersonal relationships; it is possible that individuals who have not effectively processed their history develop a psychological style of coping with distress by "transforming" emotional distress and intrapsychic conflict into external, behavioral symptoms. In this paradigm, an individual still grappling with the ramifications of such abuse may manifest psychological problems in the more overt experience of depression and somatic illness.

With respect to earlier clinical descriptions, the Factitious group's higher-than-expected count of individuals with a history of mental health intervention is not surprising. Such individuals have the most psychological and characterological disorders, thus the likelihood that they would have sought psychological or psychiatric treatment in the past, whether genuinely warranted or not, is high. In contrast, the fewer-than-expected count of individuals in Group V with a prior history of mental health

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treatment is also congruent with their clinical picture; these patients exhibited the lowest overall MMPI scores, as well as scoring significantly lower than the other groups on a majority of the PPI indices.

That the Somatoform, Factitious, and Malingering groups scored significantly higher on the Pain Behavior Checklist is not surprising; the score is a rating made by the interviewing clinician that is an observation of the patient's overt pain behaviors. For Somatoform patients who excessively attend to somatic complaints and are highly alert to their physiology, it is quite likely that their intensive focus on pain and physical sensations would result in behavioral responses even when the smallest of discomforts is experienced. They may also demonstrate Asmundson et al.'s (1997) fear/avoidance behavior, moving ever-so-carefully to avoid exacerbation or reinjury, and thus exhibit the behavioral representations thereof, such as guarding, bracing, etc. Factitious patients, on the other hand, are motivated to present as genuinely dysfunctional as possible; hence, exaggeration of pain behaviors and responses to the experience of pain sensations seem plausible in the context of their conscious process and internal motivation. Lastly, Malingering patients' reasons for exaggeration and/or overt display of pain behaviors would follow the same line of reasoning. In contrast, the individuals in Group V may represent a more "normal" or nonpathological group of patients, and thereby share neither similar perceptive processes nor overt manifestations of their pain perceptions. This concept of "normalcy" will be further addressed later in the discussion. A more parsimonious explanation of the higher PBC scores in the clinical groups is simply that these patients do indeed experience pain, are highly sensitized to it, and react overtly to pain sensations.

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The Somatoform and Compensation patients' least pain rating exceeded that of Group V; in the context of their profile configurations, this finding may be explained by their excessive focus on physical distress and hypochondriacal disposition. The data confirm the Compensation patient's higher level of pain at its least measurement, but this was not replicated by the Factitious patients, who also exhibited the "psychopathological" profile that corresponded to higher ratings of both least and worst pain levels. Additionally, there were no significant differences between the Compensation group and other groups on worst pain rating, nor were there any differences between the Factitious group and the other groups. The Somatoform group's current pain rating was significantly higher than the current pain rating of Group V; again, this might easily be understood in the context of the differences between the groups on somatic focus and attention to bodily sensations.

Compensation patients were less likely than expected to have suffered a prior injury at the site of their current pain complaint, whereas Malingerers were found to be more likely. Given that the earlier occurrence of an injury at the same site as the current pain complaint is a factor that likely has no bearing on determinations of PPI group membership, the findings are difficult to explain. Once again, this may be an artifact of small *n*s, or perhaps is a function of certain individuals' vulnerability to reinjury based upon behavioral variables.

Prior studies have shown neurotic triad patients to have had the greatest number of surgeries and hospitalizations; the neurotic triad (Somatoform) group in this study did not confirm this finding. In fact, it was the patient subgroup deemed Group V that had a significantly greater number of surgeries. Again, however, it is possible that the small *n*

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of the Somatoform group, in comparison to a group exactly twice its size, accounts for the lack of approximation between groups. Another possible explanation for the greater number of surgeries occurring for Group V patients lies in the concept that such an individual represents a "normal" pain patient who exhibits neither excessive denial nor channeling of psychological issues into somatic symptoms, nor overendorses or exaggerates the severity of his experience of pain. This will be elaborated in the following section, but for the present discussion, the fact that Group V patients scored significantly lower on the NOS scale, in addition to their demonstrated distinctness from other groups who have specific motivational forces characterizing their identity, suggest that the members of this group may simply represent a class of patient suffering from and reporting pure tissue pathology. Given that this patient would then likely evidence genuine organic damage, he may be a more suitable candidate for a variety of medical interventions, including surgery, as there are fewer identifiable psychological contraindications to such procedures.

Though this explanation does not fit as neatly in place when considering the greater number of surgeries found for the Somatoform group, some of the same conclusions may be drawn, particularly with respect to the tendency of the Somatoform patient to readily identify physical complaints and to have an identifiable organic source of pain (APA, 1994). However, it may be the excessive hypochondriacal complaints and requests for medical intervention by this sample's Somatoform patients that prevent providers from immediately embarking upon surgical interventions before examining all contributing factors, which led to the failure of the data to support previous findings that neurotic triad patients have had the greatest number of surgeries and hospitalizations.

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Question 4: Differences Between Group V and Identified PPI Groups

The differences between the Somatoform, Compensation, Factitious, and Malingering groups as compared to Group V were considerable. Means for MMPI-2 validity scales suggest that Group V patients were significantly less guarded or defensive in acknowledging their symptoms than the Malingerers. Additionally, they endorsed fewer atypical items in comparison to the Compensation group.

Group V exhibited the prevailing neurotic triad configuration, with clinically significant elevations on scales Hs, D, and Hy. This group appeared to be remarkably similar to the others, except the Factitious group, and the differences between these two were notable only on three scales: Pd, Pa, and Sc. In comparison to the Factitious group, the Group V patients presented with less emotional turmoil and fewer interpersonal difficulties. The Factitious individuals appear to have much greater difficulty in establishing relationships, developing trust, controlling impulses and behaving in a socially acceptable manner than the Group V patients.

The Group V patients were more likely to be absent of overt psychopathology, and displayed the least amount of pathology in terms of coping with their chronic pain complaint. Though demonstrating the neurotic triad configuration, which is associated with a diagnosis of somatoform pain disorder and the concept of "hypochondriasis," these patients were likely more well-adjusted than patients with numerous scale elevations. Their psychological distress is likely to be manifest more in the expression of

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physical symptoms and somatic preoccupation, as opposed to exhibiting other indications of pathology in various realms of functioning, such as self-concept, affective states such as anxiety and depression, and interpersonal difficulties. However, their expression of pain symptomatology is likely more sensitive to mood states, such that emotional distress tends to express itself as increased pain and physical discomfort. It is customarily assumed that the presence of elevated Hs and Hy scales in pain patient populations is indicative of the experience of pain and chronic illness, rather than reflective of psychological disorder or hypochondriasis per se (Love & Peck, 1987; Ornduff et al., 1988).

Overall, the MMPI profile contour of Group V was comparable to those of the four identified groups, whereas the differences on the PPI were much more prominent. These findings were not surprising, given that the PPI classification system follows an algorithm for classification, and thus one would expect that the group assignments demonstrate construct validity. The most salient difference was on the Non-Organic Signs scale; the four PPI groups endorsed a greater number of non-organic signs, or factors other than the physiological characteristics that influence pain expression, in their pain descriptions. This suggests that Group V patients' evaluations and descriptions of pain were based more upon the physiological substrates of pain and perception thereof, leading to a lower non-organic signs score. The notion of a less "impure" perception of pain and subsequent symptom report is supported by the fact that Group V also reported fewer atypical pain symptoms than the Somatoform, Compensation, or Factitious groups. These three groups reported more symptoms rarely reported by other pain patients, in comparison to Group V.

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Group V was significantly different from at least one PPI group on 17 of the 24 scales, and differed from two or more groups on a majority of those occasions. With regard to these 17 scales, the patients in Group V consistently scored lower than the Somatoform, Compensation, and Factitious patients on measures of affective symptoms, somatic symptoms, functional deficits, and other symptoms such as disequilibrium and visual disturbance.

Taking a broad view of MMPI and PPI characteristics, intergroup differences, and trends for Group V, an individual in this group begins to look more like a "typical" or "normal" pain patient: one who has little concomitant psychopathology, whose pain is not unduly influenced by psychological distress, internal or external motivating factors, and who experiences, interprets, and reports pain symptoms in a fundamental, physically-based fashion.

If this framework is used to further elaborate the essence of Group V, it may offer an explanation for the fact that the PPI classification of 43% of the patients in this sample was "deferred." These patients may represent the patient group identified in other studies, termed the "hypochondriasis" or "somatization" profile, and characterized by the neurotic triad configuration and considerable endorsement of somatic scale items, but lower overall scale scores (Armentrout et al., 1982; Bradley et al., 1978; McCreary, 1985; Prokop et al., 1980; Shutty & DeGood, 1987). Based on the tendency that individuals suffering from chronic pain generally exhibit a hypochondriasis profile due to their physical condition, rather than demonstrating these profiles due to rampant psychopathology, the Group V patients may represent an average, "middle of the road"

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chronic pain patient who is dealing with the psychological and physiological ramifications of suffering from a chronic and debilitating physical condition.

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Hypothesis: PPI Characteristics of Malingerers (Group IV)

Based upon the premise that the external motivation and conscious process amalgamating as malingering would substantially impact reports of pain complaints, it was hypothesized that mean values of particular PPI scales would be significantly higher for the Malingering group in comparison to other groups, whose PPI typology is determined by factors other than the combination of external motivation and conscious process. Specifically, it was predicted that Malingerers would have notably higher scores for the following scales: Pain Behavior Scale, worst pain, least pain, generalized pain intensity, and maximization. The theory behind this prediction was based in part upon the literature that proposes that non-organic, or functional pain, is highly influenced by psychological factors, particularly the drive for reinforcement (Dush, Simons, Platt, Nation & Ayres, 1994; Elkins & Barrett, 1984; Leavitt & Garron, 1979; Mendelson, 1984; Mendelson, 1987). Hence, it was speculated that those individuals whose pain complaints were more psychologically-based, i.e., based upon the hope of reinforcement, in addition to the fact that pain complaints are not nearly as severe as the individual would like to claim, would also report more medically-incongruent or uncommon pain symptoms as defined by the Non-Organic Signs scale of the PPI.

The data failed to confirm the above hypothesis. Malingerers' scores varied across all scales with respect to their rank in comparison to the other three groups' values. This group did have the highest score among groups on the scale of Minimization; this

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suggests that Malingering patients in this sample tended to consistently minimize their pain complaints, i.e., chose the rating of "never" more often than any other patient group in reporting the occurrence of symptoms. They had the second highest scores of peak-to-trough range in pain (ROP) and on the clinician-rated Pain Behavior Scale (PBS); they demonstrated relatively high levels of consistency between observed pain behavior and report of present pain (Consistency), and lastly, had more reports of non-pain symptoms (depression, withdrawal) than physical pain symptoms during peak pain periods, indicating that they frequently tended to mistake the psychosocial context or experience of "suffering" for the pain itself (Mislabeling). Malingerers had the second highest score of all groups on these latter two variables as well.

In stark contrast, however, they had the lowest mean scores out of all the groups on the following scales: Present Pain, GPI, CD, AD, SD, DD, Ecto, Fatigue, Withdrawal, Disequilibrium, Anxiety, VD, Atypical Pain Symptoms, and Maximization. Significant differences did exist between the Malingering group and many of the other groups, but with the exception of Minimization, the differences were always in the direction of Malingerers scoring significantly lower than the other group(s). This mix of results depicts Malingerers as sometimes presenting as quite physically compromised, yet other times, straightforward and without embellishment of their pain reports. These inconsistencies and peculiar combination of results make interpretation of this patient group very complicated.

Several studies have failed to find any significant psychological differences between litigants and non-litigants (Mendelson, 1984; Snibbe, Peterson, & Sosner, 1980). Another study failed to demonstrate significant differences between litigants and non-

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litigants using a scale specifically developed to detect conscious symptom exaggeration. It was concluded that trait anxiety, hostility, state anxiety, and "miscellaneous pain descriptors" accounted for 57% of the variance in the Conscious Exaggeration score. The author concluded that a pain patient's personality factors (traits) and emotional state are more influential in affecting his presentation, and also that there is a high likelihood that dysphoric affect is present; thus, the presence or absence of litigation is an insufficient variable upon which to discriminate conscious exaggeration of symptoms (Mendelson, 1987).

In keeping with the results which were inconsistent with the hypothesized trend of the Malingering group, other literature notes that patients who are involved in litigation or are otherwise pursuing some source of external reinforcement, in fact make every effort to *avoid* being perceived as having a psychological component to their pain (Dush et al., 1994; Leavitt & Garron, 1979). A comparison of litigant to non-litigant chronic pain patients was conducted, and interpreted in light of the results on several MMPI dimensions, including, among others, the F minus K index, the conversion V configuration, the Pd scale, the Pa scale, and the Subtle-Obvious scale. Litigants endorsed a significantly greater number of obvious and fewer numbers of subtle items versus non-litigants. The next most impressive distinction between the two groups emerged on the conversion V dimension; litigants' conversion V was significantly more pronounced. Additionally, it was suggested that "patients under the scrutiny of litigation minimize less." Though traditionally it has been held that litigating patients or patients who stand to gain from appearing more disabled will exaggerate symptoms, the authors make a novel and compelling case that individuals involved in litigation make a

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concerted effort to present themselves as *free* from psychopathology or other emotional distress as possible. They state that such patients insist:

> ...that their problem is all physical. These are patients who are hypersensitive to any comment, referral or action that could be construed to somehow suggest that their pain is not real, but purely in their head. Clinically this corresponds to selectively exaggerated profiles where most or all somatically loaded scales and subscales are very high, psychologically oriented scales are low or very low, and the $F - K$ index is highly negative.

This description quite accurately portrays the MMPI profile exhibited by this study's Malingering group. The authors go on to say that such patients may be influenced by the litigation circumstances to endorse pathology only in realms that can be directly related to their injury (Dush et al., 1994). Others add to this by commenting that frequently, the presentation of symptoms and disability disproportionate to organic pathophysiology in litigation patients is mistakenly interpreted as malingering (Mendelson, 1987; Reesor & Craig, 1988). Mendelson (1987) concludes by asserting that malingering, as defined by the DSM, "is not a disorder but an act, and thus not a matter for diagnosis but for a judicial finding on the facts of the case."

If McGrath et al.'s (1998) formulation of the elevated K is applied to the data representative of Malingerers, the results may be explained in the context of this subset's relative psychological health and predominantly lower PPI scores. They propose that the characteristic Hs and Hy elevations are not necessarily indicative of psychological denial, because the Hy scale is composed of two dimensions which can be endorsed: somatic complaints and denial of psychological difficulties. Thus, they suggest that the conclusions being drawn that chronic pain patients tend to lack awareness into the influence of psychological factors in their pain is mistakenly going unquestioned. They criticized the "association of the K scale with the ambiguous term *denial*," because K

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elevations may instead be based upon heavy endorsement of somatic complaints. Rather, they chose to corroborate patients' K, Hs, and Hy MMPI scores with an additional rating that provided an index of psychological contribution to physical symptoms. Their results allowed them to conclude that among a particular subset of chronic pain patients, an elevated K is indicative of the "extent to which the respondent has been able to cope adaptively with the demands of the stressor."

Using this theory as an interpretive guide for the present results, it might henceforth be concluded that the Malingering group's elevated K and absence of clinical elevations on any scales other than the cunning Hs and Hy scales, is, in fact, interpretable at face value. The clinical elevations on Hs and Hy reflect endorsement of somatic complaint subscale items; the absence of other psychopathology is a genuine portrayal of the patients who experience neither poor adjustment to their pain problem, nor pre-existing or emergent psychopathology. Again, the high K reflects a bias toward effective coping with physical stressors, and avoidance of psychological distress manifesting in the physical arena. For individuals who possess this coping style, it would then also predicted that such individuals would be relatively free from depression, anxiety, interpersonal difficulties, low self-esteem, or other indices of psychological distress measured by the MMPI. In this sample, the elevated K is indicative of "a greater-than-average tendency to deny correlates of emotional distress or a negativistic attitude," and would thus confirm the integrity of the absence of elevations on the remaining scales (McGrath et al., 1998).

Invoking this theory also provides a plausible explanation for the failure to find the expected higher-or-highest scores on particular scales of the PPI. It would also

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support the data that pronounces Malingerers as the lowest scoring group on the majority of the PPI scales. However, this assumption is less sound if the premise is maintained that the members of this group do indeed suffer from significant physical distress, and have achieved the elevations on the Hs and Hy scales because of consistent endorsement of items measuring such distress.

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GENERAL DISCUSSION

Comparisons were undertaken that did indeed yield descriptive and significant differences between groups, though not all the hypotheses set forth by this study were borne out by the results of the data. Possible reasons for these findings, as well as a discussion of the limitations of the present study, will be addressed.

Somatoform, Compensation, Factitious, and Malingering groups appear to have several distinguishing characteristics that allow for clinical description. However, these differences are moderate rather than staggering, and with respect to the MMPI, tend to be based more upon variance in scale elevation than profile configuration. One explanation for this may be that the clinical elevations observed on scales Hs and Hy are not only common to all four groups, but especially to this patient population, by virtue of the physical syndrome with which they all contend, as opposed to a unique psychopathology shared by chronic pain patients. If this is the case, the Hs and Hy scales would have little discriminant value in assessing differences between groups of pain patients; some investigators have asserted just that (Leavitt & Garron, 1979; Love & Peck, 1987; McCreary et al., 1980; Ornduff et al., 1988).

That the PPI is able to successfully categorize pain patients to one of four distinct groups on the basis of process and motivation is reflective of its construction and discriminant function in evaluating variance in patients' endorsement of symptom clusters and symptom severity ratings. The designation of patients into discrete groups is

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based upon fine distinctions between reports of each patient's unique symptoms, endorsing particular atypical symptoms, complaints of emotional versus physical distress, and evaluations of the patient's overt pain behaviors, pain reports, and the corresponding physical findings (Dirks & Kinsman, 1996).

Group V may not have concurrently differed from the other groups on the same variables because, in reality, they may share many of the same characteristics. It is possible that those individuals who did not "fit" into one of the four pain groups, and instead were classified as Group V, did so not because they were a diverse and disparate group that has physical and emotional correlates mutually exclusive to that classification and accordingly, were assigned *to* that group, but rather, because they *lacked* the score patterns that distinguish Somatoforms from Compensation, Compensation from Factitious, and so on. Those individuals falling into the classification of Group V may have done so more by default; it seems more plausible that these patients do not differ so drastically that they represent a unique class, but instead they did not fit the profile of a Somatoform, Compensation, Factitious, or Malingering patient closely enough on the required parameters such that they were classified into one of the four primary groups by the algorithm that determines group membership. This would reflect the fact that Group V did not vary considerably from all of the other groups on several of the PPI scales, but instead differed from some groups on some scales, and other groups on other scales. It is also possible that the use of the mean value from 94 Group V members obscured any discrete differences between group scores, particularly in comparison to groups with smaller *n*s.

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Mean T-scores differed significantly between Group V and the four other groups only on the PPI scale of NOS. This suggests that the NOS scale is somewhat more sensitive to ratings of non-organic signs, and has more stringent criteria in ascertaining to which group a patient belongs on the basis of the NOS score. The absence of consistent significant differences between Group V and the four groups on the other scales may be due to classification being based upon more liberal score ranges or cutoffs; it is possible that several of the Group V members might be classified more accurately into a specific group on the basis of some PPI variables. However, by virtue of the fact that any given patient was not similar enough to the prototypical group member, he/she would be assigned to Group V instead. Thus, when considering the mean values of Group V on each PPI scale, it is possible that the similarity an individual value has to one of the primary groups is obscured because the mean group value is derived from a composite of all individual scores. Hence, few between group significant differences exist because of the standard deviation of that mean.

On the other hand, if the "normal pain patient" premise described earlier was to be invoked, this would imply that the individuals in Group V were assigned to that group specifically *because* they did not fit the profile of a Somatoform, Compensation, Factitious, or Malingering patient closely enough on the required parameters such that they were classified into one of those four primary groups. This would suggest that the assignment into Group V, rather than occurring by default, is a more purposeful and systematic process that is based upon the absence of non-organic signs and lack of overemphasis of particular symptoms; it has been demonstrated in a prior study that

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functional versus organic patients can be differentiated on the basis of endorsement of psychologically-loaded pain questionnaire items (Leavitt & Garron, 1979).

Pain Presentation, Personality Traits, and Coping Strategies

It has already been demonstrated by the previous literature and presented earlier in this study that relationships exist between locus of control and specific coping strategies; in sum, "patients who report more reliance upon medical professionals are likely to have internalized fewer cognitive and potentially adaptive coping strategies than patients who view only themselves as responsible for their health status." Accordingly, patients with an external LOC or high reliance on medical providers tend to be less emotionally (by restructuring cognitions or minimizing threat) and intellectually (by seeking out information) proactive in reducing their pain (Buckelew et al., 1990).

Numerous studies using the Coping Strategies Questionnaire (CSQ) have examined the relationship between coping strategies and psychological distress, functional impairment, and pain intensity. Results have consistently indicated that patients with a higher sense of control over pain and use of active, positive coping strategy report lower levels of pain and psychological distress. Conversely, those patients using passive coping strategies reported higher levels of depression, pain and pain flare-ups, and greater functional impairment, in addition to a lower sense of self-efficacy (Brown & Nicassio, 1987; Keefe et al., 1987; Tait & Chibnall, 1998). Rosenstiel and Keefe (1983) linked high levels of helplessness with higher levels of depression and anxiety, and linked use of passive coping strategies with higher levels of pain and functional impairment, respectively, in a factor analysis of the CSQ.

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A multiple regression analysis with the MMPI and Rotter's Internal-External (I-E) Locus of Control Scale found a positive relationship between external locus of control and the tendency to openly voice problems and be self-critical. The authors suggest that this response set and its relationship to an external locus of control may be a result of pain patients' urgency to communicate their need for medical attention. Their interpretation of externals' open acknowledgement was based upon correlations and regression analyses with the F and K scales (McCreary & Turner, 1984). As only the Malingering group demonstrated clinically significant scores on the F scale, further research is warranted before conclusions could be generated regarding the relationship between externalization in any of the four PPI groups and their F and K scores.

Unfortunately, there is only a small body of literature that examines the association between locus of control and the MMPI scales (McCreary & Turner, 1984). One study in particular has focused on the relationship between coping strategies and the MMPI. A study using the Pain Coping Questionnaire assessed pain patients' endorsement of four pain coping strategies: self-management, helplessness, social support, and medical remedies. These factors were examined in relation to each patient's MMPI scales. Results indicated that patients who endorsed the use of self-management and social support strategies had lower scores on MMPI scales D, Pd, Pt, Sc, and Si. Those patients who predominantly used helplessness had higher scores on D, Pa, Sc, and Si. Patients relying on medical remedies had higher scores on Hs, Pd, Pa, and Sc. These findings suggest that unique coping strategies are associated with certain MMPI scales, and those patients utilizing proactive coping strategies tended to overall have lower scores on the MMPI than those who use more passive and negative strategies, or who rely

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on external interventions such as medical treatments (Kleinke, 1994). Links between greater emotional distress and low internally-oriented, and/or high external or medically-oriented coping attitudes have been confirmed by other studies (Estlander, 1989; Harkapaa et al., 1989; Tait & Chibnall, 1998).

Correspondence between MPI patient classifications and MMPI scales are evident, lending further support to the idea that personality traits and presence of psychopathology are indicative of specific personality profiles and use of coping strategies. Dysfunctional and Interpersonally Distressed patients, who were described earlier in this study as perceiving a lower sense of life control, were differentiated from Adaptive Copers on the Pd, Pa, Pt, and Sc scales. In addition, the Dysfunctional group had significantly higher levels of depression and demonstrated a neurotic triad profile. Interpersonally Distressed patients, in addition to having a profile comparable to an MMPI "psychopathological" group (elevated Hs, D, Hy, Pd, Pt, and Sc), indicated a greater need for support. It was concluded that those patients with numerous MMPI scale elevations have the most difficulty in coping with pain, and would require extensive psychological intervention to address broader emotional and behavioral issues, in addition to focused pain treatment (Etscheidt, Steger, & Braverman, 1995).

It has even been noted that patients who attend pain clinics emphasize "how difficult it is to cope with the pain and hence how much they need help." Given that hopelessness and helplessness were correlated with pain intensity and behavioral disruption, it has been suggested that a patient's perception that others are available to behave in a supportive way reinforces that patient's expression of pain behavior, and that

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"the adoption of this passive coping style leads to a greater susceptibility to behavioural disruption" (Boston, Pearce, & Richardson, 1990).

In applying this information to the present study, it would be predicted that patients with the greatest degree of emotional distress (highest MMPI scores), would use more passive coping strategies or fail to take responsibility for caring for their pain symptoms. Additionally, it would be predicted that those patients who scored the highest on Hs, Pd, Pa, and Sc would behaviorally demonstrate greater reliance on outside sources of support, exhibit a more external locus of control, endorse a greater sense of helplessness, and place more faith in medical providers and the hope of a "magic cure," than in their personal ability to use effective coping strategies to reduce or deal with pain. It would also be predicted that patients with higher scores on D, Pa, Sc, and Si would exhibit a more passive interpersonal style, exhibit an external locus of control, rely on others to attend to their needs, and fail to behave proactively to manage pain on their own.

In the present study, the Compensation group exhibited elevations on Hs, D, Hy, Pt, and Sc. The Factitious group's elevations occurred on scales Hs, D, Hy, Pd, Pa, Pt, and Sc. Though both groups were described as "pathological," the Pd and Pa elevations unique to the Factitious group suggest that these patients are more emotionally labile, interpersonally sensitive, and lack insight. Individuals such as this have been described as behaving in a passive-dependent, immature manner, seeking attention and sympathy from others, and failing to take responsibility for themselves (Graham, 1993). Therefore, it is reasonable to conclude that individuals in the Factitious group might behave or present in a similar fashion to Kleinke's (1994) medical remedy-reliant group, and

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endorse having much greater faith in the success of medical treatment than in their own abilities to manage pain.

The relevance of this comparison with respect to the present data is that it could be suggested that individuals whose PPI profiles are characterized as Factitious Disorder, the combination of internal motivation and conscious process to assume the sick role for the inherent gratification they receive, are probably unlikely to undertake effective self-management strategies or believe that anything short of a medical "miracle" would be able to reduce their pain. This attitude might be adopted in the effort to convince others that their pain condition is so genuine that it is not amenable to anything less than the most intensive or specialized medical interventions. A Compensation patient, whose PPI factors are the external motivation to receive reinforcement plus an unconscious process in maximizing symptoms, may also be quite likely to behave in a passive-dependent manner when it comes to taking responsibility for improving one's health, in order to maintain whatever reinforcement he or she receives, even if such a patient is not necessarily aware of the impetus of such behavior. Based upon the related research, both of the emotionally distressed groups are likely to demonstrate an external locus of control, demonstrate helplessness, and rely significantly more upon medical interventions and medical providers than upon their own capabilities in dealing with pain.

A complex structural equation modeling study was conducted that examined coping, somatization, and the MMPI in CLBP patients. Cluster analysis replicated the traditional four patient groups: conversion-V, neurotic triad, depressed-pathological, and normals. The relationship "pathways" between somatization, depression, activity level, and coping styles were then examined for each of the groups. Results indicated that

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conversion-V patients' somatic complaints were better predicted by pain severity than depression, and a possible explanation for this pattern was provided. Based on standard interpretations of somatic preoccupation and denial of psychological contributions to pain, the authors suggested that conversion-V patients tend to report less depression because they find their sick role reinforcing. Hence, they subscribe to a "medical conviction," emphasizing physical symptoms and denying psychological distress in order to substantiate the *solely physical* nature of their problem (Riley & Robinson, 1998). This is reminiscent of the explanation offered regarding the failure of this study's Malingering group to conform to the hypothesized configuration, as addressed earlier in the discussion.

The Somatoform, Compensation, Factitious, and Malingering groups in this sample described more non-organic signs than Group V. Chronic pain patients whose illness behavior and symptom report were described as "anatomically incorrect, vague, poorly localized, and exaggerated or disproportionate" to their pain condition were found to lack a perception of self-control or self-efficacy, and hold more maladaptive, dysfunctional, and anxiety-laden cognitions, such as catastrophizing, regarding their pain condition (Reesor & Craig, 1988). Hence, the cognitive perception of oneself as ineffective, unable to cope, and feeling overwhelmed by the pain condition has a positive relationship to the presentation of non-organic signs in some patients. Whether such maladaptive or unrealistic cognitions contribute to the perception of pain as more diffuse and exaggerated and a subsequent expression of non-organic signs, or the experience of overwhelming pain sensations and symptoms leads to a reaction of helplessness and desire to be "taken care of," is beyond the scope of this discussion. However, it is clear

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that illness behavior and subjective descriptions of pain are related to perception of coping abilities, and feeling unable to cope with pain manifests in a helpless, attention-seeking behavioral style. This likely interacts with the motivational process influencing how pain is expressed to caregivers; again relating to the presentation of greater psychopathology and emotional distress in an effort to capture the attention and diligent efforts on the part of medical providers to treat the problem with medical interventions (Boston et al., 1990; Estlander, 1989; Harkapaa et al., 1989). Patients with this attitude will likely present their pain symptoms on the PPI, and psychological symptoms on the MMPI, in a very characteristic manner, whether the behavior is motivated by reinforcement for assuming the sick role, or gaining financial or other compensation, such as time off work or freedom from responsibilities.

With respect to the cognitive coping models, Riley & Robinson (1998) found that coping mediated the relationship between depression and activity level only for the normal group. The conversion-V, neurotic triad, and pathological groups tended to use fear/avoidance strategies. It was suggested that somatic "vigilance" interferes with the conversion-V and neurotic triad patients' use of cognitive coping strategies, and that perception of pain severity, preoccupation with fear of pain, and the tendency to overreact to pain when it occurs, were factors that interfered with the pathological group's activity level. These findings offer support for the notion that different patient groups, characterized by unique MMPI profiles, process the pain experience and subsequently cope with it in very different manners. These underlying personality traits have a striking impact on labeling or identification of symptoms, the subsequent

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presentation and description of symptoms, how patients cope with them, and most importantly, implications for treatment.

Coping strategies and targeted treatment interventions

Given the unequivocal research on the impact of coping strategies on pain management, and the corresponding research on the interaction between personality traits, depression, and choice of coping strategies, it seems apparent that it would be valuable and informative to address pain management and tailor strategies to work within the framework of a general patient "type." This would involve creating a goal-oriented approach to patient psychoeducation, physical therapy, and other modalities of treatment, that respond to those areas of functioning that are most problematic for the patient, as well as capitalizing on those areas of functioning which provide the individual with a sense of control, efficacy, and esteem.

Patients who have demonstrated a personality style of passive dependence and an external locus of control, characterized by clinically elevated Hs and Hy scales, have been described as lacking in self-efficacy, absent of faith in their own ability to influence pain, overreliant on external sources for pain relief, and lacking in insight into their internal emotional influences on pain and disability. Patients such as these may benefit from a very different treatment approach that emphasizes increasing self-efficacy and sense of control, as opposed to a different patient type that endorses an internal locus of control and does not tend to catastrophize. Based on this premise, various treatment guidelines can be developed that are specifically geared toward each type of patient

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identified by the PPI as a Somatoform, Compensation, Factitious, Malingering, or "Group V" patient.

It has been recognized that patients exhibiting the conversion-V pattern may report less depression because they are gratified by the "sick role" identity; their somatic complaints tend to be mediated predominantly by pain severity as opposed to emotional distress. They have also been described as having the utmost assuredness in the notion that their pain experience is completely physical: a concept defined as "medical conviction" by Riley and Robinson (1998). The patients in this sample that most closely fit this profile were the Malingerers. It is likely futile to develop a treatment protocol for a group who has external motivating factors that prompt intentionally-derived symptom presentation; however, the theory behind such protocol guidelines is theory-driven and will be addressed to those patients who are identified as "conversion-V" patients, rather than those definitively determined to be malingering. Patients who focus exclusively on their physical condition, or demonstrate somatic "vigilance" are likely to rely predominantly on medical interventions, and this vigilance has been said to interfere with the employment of cognitive coping strategies (Riley & Robinson, 1998). It is also possible that they lack insight and fail to recognize to recognize the mediating role of their psychological distress in the experience and expression of pain. Hence, a treatment program that emphasizes the use of physiologically-oriented interventions to reduce overall pain severity and manage pain flare-ups, via behavioral strategies, would likely be more appropriate than a cognitively-based approach that addresses maladaptive cognitions, depression, or anxiety. This type of program might emphasize interventions such as physical therapy exercises, stretching, physical activity, diaphragmatic breathing,

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relaxation training, biofeedback, or use of external applications such as a TENS unit or hot and cold packs. This methodology would be geared toward fostering an internal locus of control to combat the conversion-V patient population's lack of control and self-efficacy, and toward providing them with a sense of mastery over their pain, by addressing the component of pain that is most debilitating: pain severity.

Patients who demonstrate attentional preoccupation with pain, anticipatory anxiety and fear of pain, plus escape/avoidance behavior, do so out of fear that physical activity will increase pain and/or tissue damage (and hence pain), thus they avoid activity. The MPI Dysfunctional patient, who was more psychologically distressed, felt a lack of control, lacked adaptive coping mechanisms, and tended to be characterized by avoidance behavior; it has been suggested that an appropriate intervention for these types of patients involves reducing negative cognitions surrounding their expectations of increased pain and damage (Asmundson et al., 1997; Riley & Robinson, 1998).

Conversely, the Somatoform patients, who exhibit clinical elevations on the neurotic triad, tend to be predominantly influenced by somatic symptoms and depression, and their functioning is contingent upon their perception of physical limitations and how severely pain interferes with activity. Though these patients are also described as demonstrating somatic "vigilance," their interpretation of pain is more influenced by depression than by their physical symptoms. They also demonstrate a sense of helplessness, hopelessness, and reliance on medical interventions as a result of their passive coping style. An effective treatment plan for this patient subgroup might have its value in targeting the cognitive influences on pain intensity and functional impairment, such as depression, cognitive distortions, distorted self-perceptions, unrealistic beliefs or

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expectations of self, and lack of control. A cognitive-behavioral treatment protocol that incorporates the aforementioned issues and pain reduction strategies may best serve a patient population whose most debilitating factor in the experience of pain is emotional. In addition, antidepressant medication may be useful (Riley & Robinson, 1998).

The Compensation and Factitious groups, noteworthy for their predominance of pathology, correspond most closely to those patients who demonstrate an external locus of control, rely exclusively on medical interventions while rejecting psychological explanations for symptom variability, and experience more global psychological distress in addition to the physical and emotional interference caused by pain. These patients are also highly likely to have high expectations of their medical providers, are demanding of others with regard to getting their needs met, fail to take responsibility for their own behaviors, and externalize or blame others for their difficulties. These patients have the grimmest prognosis, as their numerous scale elevations, greater overall psychological distress, and devout belief that their pain is amenable to nothing short of a miracle, contribute to a poorer response to treatment and pain creating greater interference with psychosocial and emotional functioning. As a result of this widespread chaos on such patients' lives, a multimodal, cognitive-behavioral treatment program would be suitable for addressing the broad range of difficulties experienced by these patient groups. Though again, as it is questionable how invested in treatment a patient would be whose pain condition provides a host of incentives, these formulations are offered on the basis of how a "psychopathological" patient's treatment needs might best be approached. In addition to cognitive-behavioral interventions that encompass the areas noted for both

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Malingering and Somatoform patients, psychotropic medication may also be warranted, depending on the patient's clinical presentation and severity of symptoms.

Given that any of these patient subgroups may be resistant to treatment due to their motivational processes, adapting interventions to each group is crucial. Boston et al. (1990) comment that cognitive-behavioral treatment has generally been aimed at increasing the use of positive coping strategies. However, on the basis of their findings, they suggest that cognitive interventions might be more effective if they were geared toward *reducing* the frequency of use of *negative* strategies, such as feeling pessimistic about the ability to cope with pain or endorsing an external locus of control and engaging in passive coping, rather than *increasing* frequency of use of *positive* strategies, as pain patients may already be using positive coping strategies that do not address the severity of the pain or have "little overall bearing on the experience of pain." Riley & Robinson (1998) point out the importance of reducing disease conviction and somatic vigilance via multidisciplinary approaches in those patients who engage in those cognitive activities.

Limitations of the Study

The inability to confirm or disconfirm convergent validity between PPI group types and their corresponding MMPI profiles, is in part due to a lack of existence of a well-defined personality profile for particular diagnostic categories; in this case, there is little to no research available on personality traits or other internal features associated with individuals labeled as exhibiting compensation neurosis, factitious disorder, or even malingering. The minimal amount of information on the interaction between somatoform

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disorders and its correlates suggests that individuals with a somatoform disorder had prior pain complaints that predated their current injury (Layne, Miller, Schmucker, Edinger, & Wilkinson, 1997).

One particular limitation of this study is in the failure to demonstrate interrater reliability on Pain Behavior Checklist ratings; all ratings were made by a single psychologist who is the director of all the clinics from which the patient sample was drawn. The lack of an additional rater to provide scores creates a potential confound; without confirmation of reliable ratings, the accuracy of PBC score comparisons between groups may be called into question.

There have been many criticisms of the use of the MMPI in a pain patient population; these will not be reiterated here, but the use of an instrument specifically developed for pain or medical patients, such as the MPI or Millon Behavioral Health Inventory, may have yielded differing results with respect to discrete profile and characteristic differences, and convergent validity. Lastly, Costello et al.'s (1987) P-A-I-N typology has received its own share of rejection from proponents of pain patient classification methodologies.

There are several other methodological limitations of the present study. Patient data were analyzed on the basis on group membership; MMPI, PPI, and demographic variables were compared neither on the basis of gender nor duration of pain. Given that numerous studies have identified important differences with respect to personality profiles and associated factors, such as locus of control and use of coping strategies, noteworthy differences may have emerged had the sample been divided on the basis of these two elements. Lastly, results of the study could have potentially been confounded

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by the fact that all patients were drawn from one particular type of site (independent practice) and were all referred for the same reason to this particular psychologist. Future studies examining the relationship between the PPI and MMPI would improve upon this by sampling subjects from patient populations who have completed the measures as part of an intake battery or treatment protocol, and have been seen at a variety of treatment facilities (multidisciplinary pain clinics, anesthesiology pain clinics, physical therapy, etc.).

Conclusions

As this is the first study ever undertaken to confirm independent groups of pain patients using the Pain Presentation Inventory, additional research is necessary before the clinical and diagnostic utility of the instrument can be established. The construction of the PPI may be such that the criteria it uses to identify patients who have "Somatoform Disorder," "Psychological Factors Affecting Medical Condition" or compensation neurosis, "Factitious Disorder," or as "Malingering" may be quite dissimilar to those diagnostic criteria outlined in the DSM-IV. As the PPI is based predominantly on self-report symptom ratings, rather than clinical review of specifically delineated criteria, there is little doubt that the method by which group membership is determined is unique to the instrument itself; a main purpose is to evaluate minimization and maximization of certain symptoms, endorsement of atypical symptoms, examine the lack of correspondence between pain behavior, report, and physical findings, and subsequently make an assignment on the basis of a "best fit" model. The PPI was not designed to

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substitute as a diagnostic tool, nor do its authors presume to bypass established methods for diagnosis by the use of a self-report measure. As with most assessment instruments, the PPI is intended to supplement clinical interview and other sources of data by providing additional information regarding the presentation of symptoms in a pain population. As the PPI deigns not to replace the DSM-IV as a diagnostic instrument, nor the MMPI-2 as an inventory of personality traits, the dimensions it measures are specific to the symptom complaints of pain patients, and thus reflect pathology of pain and its related emotional experience, as opposed to reflecting pathology of personality or psychological disorder.

In this same vein, malingering may be a different construct with respect to physical symptoms versus psychological symptoms. As stated earlier, malingering is a legal concept, not a psychiatric disorder (Mendelson, 1987). The interpretation of patient behaviors and symptom reports as malingering is subjective and subject to contextual factors, making the determination thereof a complicated process (Dush et al., 1994; Reesor & Craig, 1988). Given the presence of extenuating circumstances and alternative motivations in many pain patients, the PPI is valuable in that it is able highlight atypical patterns of pain complaints that may suggest incentives at work in a patient's presentation. This is strategic information to possess before embarking upon a time-consuming, intensive, expensive treatment program with which a particular type of patient has no intention of being compliant. There remains a great deal more research to be done with the PPI before firm conclusions can be drawn about its ability to usefully classify pain patients.

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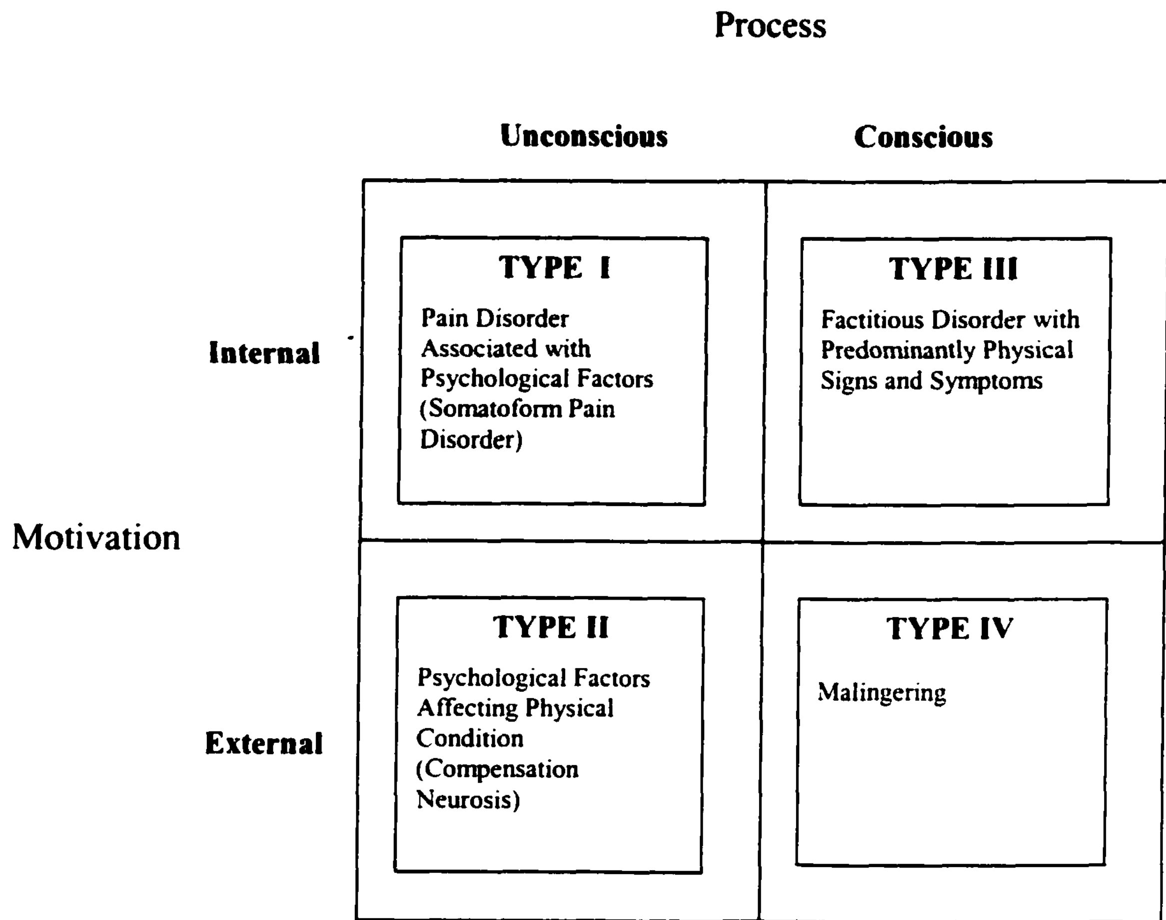

Figure 1

Matrix of PPI Types based on Process and Motivation

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Table 1

Demographic Characteristics

	Somatoform (n=47)		Compensation (n=18)		Factitious (n=23)		Malingering (n=36)		Group V (n=94)		
	X	SD	X	SD	X	SD	X	SD	X	SD	$F_{(4, 213)}$
Age	44.0	10.92	43.11	10.07	38.83	9.69	41.89	8.98	39.94	9.35	1.921
Duration	14.00	19.20	17.72	15.05	16.04	10.06	13.28	14.89	16.26	24.07	0.270
Education	13.26	2.22	12.67	1.78	12.27	2.57	12.28	1.91	12.82	2.03	1.774
PBC	6.17	2.80	5.67	2.74	6.48	3.20	6.25	2.96	4.70	2.33	4.304** [a]
Number of treatments	4.17	1.61	4.94	1.59	4.43	1.75	4.78	1.76	4.30	1.56	1.314
WPR	80.87	12.12	83.78	12.05	80.22	16.95	80.83	15.91	75.26	14.07	2.497
LPR	43.00	17.89	47.67	21.52	32.17	23.81	33.72	23.66	34.47	20.68	6.311*** [b]
CPR	53.94	20.64	53.22	22.15	42.26	26.01	41.58	28.21	41.10	20.18	3.321* [c]

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
a = Group V vs. Somatoform, Factitious, Malingering
b = Group V vs. Somatoform, Compensation
c = Group V vs. Somatoform

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Table 2

Demographic characteristics (continued)

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Gender													21.235***†
M	102	46.8	15	31.9	5	27.8	6	26.1	22	61.1	54	57.4	
F	110	50.5	32	68.1	13	72.2	17	73.9	12	33.3	36	38.3	
Marital status													8.906
Married	127	58.3	22	46.8	14	77.8	12	52.2	24	66.7	55	58.5	
Single	20	9.2	4	8.5	1	5.6	2	8.7	3	8.3	10	10.6	
Divorced	62	28.4	18	38.3	3	16.7	8	34.8	7	19.4	26	27.7	
Other	9	4.1	3	6.4	0	0	1	4.3	2	5.6	3	3.2	
Ethnicity													15.617
Caucasian	162	74.3	30	63.8	13	72.2	15	65.2	28	77.8	76	80.9	
Hispanic	42	19.3	9	19.1	4	22.2	6	26.1	8	22.2	15	16.0	
African-American	9	4.1	5	10.6	1	5.6	2	8.7	0	0	1	1.1	
Other	4	1.8	2	4.3	0	0	0	0	0	0	2	2.1	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

† = Significant differences exist for Somatoform, Factitious, Malingering, and Group V

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Table 3

Characteristics related to pain complaint

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Pain site													23.636
Back	82	37.6	17	36.2	6	33.3	12	52.2	13	36.1	34	36.2	
Lower extremity	23	10.6	4	8.5	0	0	5	21.7	2	5.6	12	12.8	
Upper extremity	30	13.8	8	17.0	1	5.6	1	4.3	3	8.3	17	18.1	
Head/neck	34	15.6	8	17.0	5	27.8	2	8.7	7	19.4	12	12.8	
Multiple sites	29	13.3	7	14.9	5	27.8	2	8.7	7	19.4	8	8.5	
Other	20	9.2	3	6.4	1	5.6	1	4.3	4	11.1	11	11.7	

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Table 3

Characteristics related to pain complaint (continued)

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Pain behavior													13.190
Low	50	22.9	11	23.4	3	16.7	6	26.1	4	11.1	26	27.7	
Moderate	44	20.2	8	17.0	5	27.8	2	8.7	9	25.0	20	21.3	
High	92	42.2	21	44.7	6	33.3	11	47.8	15	41.7	39	41.5	
Dramatic/ inconsistent	28	12.8	7	14.9	3	16.7	4	17.4	6	16.7	8	8.5	
None	3	1.4	0	0	1	5.6	0	0	1	2.8	1	1.1	
Type of injury													11.378
Work-related	130	59.6	26	55.3	13	72.2	10	43.5	23	63.9	58	61.7	
Motor vehicle accident	44	20.2	11	23.4	4	22.2	8	34.8	8	22.2	13	13.8	
Fall	38	17.4	8	17.0	1	5.6	5	21.7	4	11.1	20	21.3	
Other	6	2.8	2	4.3	0	0	0	0	1	2.8	3	3.2	

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Table 3

Characteristics related to pain complaint (continued)

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Previous injury at site of present complaint	55	25.2	17	36.2	1	5.6	3	13.0	14	38.9	20	21.3	12.825* ‡

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

‡ = Significant differences exist for Compensation and Malingering

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Table 4

Psychiatric history

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Pre-injury treatment	107	49.1	27	57.4	8	44.4	17	73.9	17	47.2	38	40.4	10.014* ±
Post-injury treatment	69	31.7	12	25.5	7	38.9	5	21.7	12	33.3	33	35.1	2.860
Therapy	19	8.7	3	6.4	3	16.7	0	0	2	5.6	11	11.7	
Biofeedback	11	5.0	4	8.5	1	5.6	1	4.3	1	2.8	4	4.3	
Diagnostic assessment	7	3.2	0	0	0	0	1	4.3	2	5.6	4	4.3	
Evaluation (no tx pursued)	11	5.0	3	6.4	1	5.6	1	4.3	2	5.6	4	4.3	
Multiple	11	5.0	1	2.1	2	11.1	1	4.3	2	5.6	5	5.3	
Other	9	4.1	2	4.3	0	0	1	4.3	2	5.6	4	4.3	
None	150	68.8	34	72.3	11	61.1	18	78.3	25	69.4	62	66.0	

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Table 4

Psychiatric history (continued)

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Diagnosis related to injury	41	18.8	7	14.9	5	27.8	3	13.0	6	16.7	20	21.3	2.404
History of physical abuse	55	25.2	14	29.8	3	16.7	7	30.4	11	30.6	20	21.3	2.834
History of sexual abuse	19	8.7	9	19.1	17	94.4	2	8.7	5	13.9	3	3.2	12.777* §
Family history	80	37.6	21	44.7	2	11.1	9	39.9	13	36.1	35	37.2	6.196

$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
± = Significant differences exist for Factitious and Group V
§ = Significant differences exist for Somatoform and Group V

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Table 5

Occupational Status and Treatment Modalities Utilized

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Employed													8.828
Yes	93	42.7	25	53.2	5	27.8	13	56.5	10	27.8	40	42.6	
No	125	57.3	22	46.8	13	72.2	10	43.5	26	72.2	54	57.4	
Compensation received													10.785
Disability	78	35.8	18	38.3	10	55.6	5	21.7	12	33.3	33	35.1	
None	115	52.8	23	48.9	6	33.3	14	60.9	17	47.2	55	58.5	
Other	25	11.5	6	12.8	2	11.1	4	17.4	7	19.4	6	6.4	
Medication/ injections	214	98.2	46	97.9	18	100.0	23	100.0	36	100.0	91	96.8	2.422
External applications	214	98.2	46	97.9	18	100.0	22	95.7	36	100.0	92	97.9	1.883
Surgery	84	38.5	8	17.0	8	44.4	8	34.8	15	41.7	45	47.9	13.196* §

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

§ = Significant differences exist for Somatoform and Group V

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Table 6

Current Pain Management

	Total Sample		Somatoform		Compensation		Factitious		Malingering		Group V		
	N = 218		47		18		23		36		94		
	N	%	N	%	N	%	N	%	N	%	N	%	χ^2
Prescription pain medication	146	67.0	35	74.5	12	66.7	15	65.2	23	63.9	61	64.	1.565
Psychotropic medication	99	45.4	22	46.8	12	66.7	7	30.4	19	52.8	39	41.5	6.770
Sedative/ sleep medication	51	23.4	11	23.4	5	27.8	5	21.7	9	25.0	21	22.3	0.338
Alcohol use	139	63.8	23	48.9	15	83.3	16	69.6	22	61.1	63	67.0	8.332
Drug use	4	1.8	0	0	0	0	2	8.7	0	0	2	2.1	7.943
Substance(s) used for pain relief	42	19.3	6	12.8	5	27.8	6	26.1	5	13.9	20	21.3	3.758

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 7

MMPI scores by group

	Somatoform (n=47)		Compensation (n=18)		Factitious (n=23)		Malingering (n=36)		Group V (n=94)			
	X	SD	X	SD	X	SD	X	SD	X	SD	F (4, 213)	Eta squared
L	61.89	13.26	57.33	9.51	58.48	13.76	65.44 [a]	12.16	58.27 [a]	10.45	3.094*	.055
F	57.28	12.30	66.11 [b, c]	19.37	64.35	17.69	52.17 [b]	9.52	56.02 [c]	13.98	4.663**	.081
K	55.15	12.05	49.61 [b]	11.14	48.09 [c]	11.40	58.92 [a, b, c]	9.52	50.94 [a]	10.74	5.475***	.093
Hs	77.30	9.76	78.11	13.98	76.04	11.69	75.03	12.58	72.54	10.31	2.153	.039
D	67.70	12.06	70.78	14.65	73.43	13.56	63.61	11.09	69.04	14.61	2.028	.037
Hy	77.13	13.91	80.94	15.89	76.61	14.46	74.92	15.78	73.17	12.87	1.519	.028
Pd	59.98	11.33	62.50	13.65	67.41 [c, e]	11.08	58.22 [c]	9.35	59.35 [e]	10.96	2.954*	.053
Mf	51.62	10.01	52.89	8.58	52.65	9.32	46.56	8.78	51.81	10.92	2.175	.039
Pa	55.98 [f]	11.67	60.56	15.73	67.00 [c, e, f]	15.52	54.14 [c]	8.85	57.59 [e]	13.84	3.963**	.070
Pt	60.04	11.37	68.22 [b]	14.65	66.57	13.21	56.94 [b]	9.17	60.47	12.77	3.579**	.063

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Table 7

MMPI scores by group (continued)

	Somatoform (n=47)		Compensation (n=18)		Factitious (n=23)		Malingering (n=36)		Group V (n=94)			
	X	SD	X	SD	X	SD	X	SD	X	SD	F (4, 213)	Eta squared
Sc	61.34	10.77	68.89 [b]	16.28	68.87 [c,e]	13.68	57.67 [b,c]	10.31	60.20 [e]	13.87	4.263**	.074
Ma	51.85	9.89	50.94	8.05	51.17	8.18	50.25	9.21	49.33	8.94	0.664	.012
Si	52.51	10.90	55.17	13.67	56.09	12.14	47.39	8.94	51.94	12.44	2.273	.041

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
a = Malingering vs. Group V
b = Malingering vs. Compensation
c = Malingering vs. Factitious
d = Group V vs. Compensation
e = Group V vs. Factitious
f = Factitious vs. Somatoform

Table 8

PPI Scores by group

	I (n=47)		II (n=18)		III (n=23)		IV (n=36)		V (n=94)			
	X	SD	X	SD	X	SD	X	SD	X	SD	F (4, 196)	Eta squared
NOS	64.28	13.26	67.06	12.33	71.04	17.46	65.03	13.81	51.31	9.83	22.299***	.313
PBS	54.51	8.24	53.33	7.87	55.78	9.23	54.94	8.43	50.66	6.58	4.023**	.076
Worst	52.55	8.12	54.83	6.70	52.91	9.50	53.28	8.89	50.23	7.54	2.482*	.048
Least	53.72	7.91	56.06	9.29	49.26	10.28	49.92	10.32	47.70	7.57	7.071***	.126
Present	51.64	9.03	51.50	9.44	46.87	10.96	46.75	11.96	46.55	8.37	3.553**	.068
GPI	54.04	7.85	55.28	9.35	51.61	10.05	51.50	9.58	48.26	6.95	6.760***	.121
ROP	48.49	8.86	47.72	8.70	53.39	8.72	53.06	10.75	52.60	9.42	2.526*	.049
CON	52.91	9.75	51.72	5.38	58.52	12.46	58.06	12.62	54.07	7.54	2.514*	.049
VD	55.30	11.88	58.00	12.27	53.65	13.37	48.94	8.32	46.82	7.46	9.444***	.162

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Table 8

PPI Scores by group (continued)

	I (n=47)		II (n=18)		III (n=23)		IV (n=36)		V (n=94)			
	X	SD	X	SD	X	SD	X	SD	X	SD	F (4, 196)	Eta squared
MIS	55.93	8.76	52.07	6.85	53.67	7.09	53.69	8.76	56.33	8.02	1.541	.030
ATYP	54.00	9.26	58.17	10.88	57.04	11.78	47.69	8.80	47.32	7.18	12.641***	.205
MIN	46.66	9.23	41.33	5.25	42.48	5.20	56.47	12.75	49.07	9.81	9.884***	.168
MAX	50.77	8.43	60.33	18.42	60.61	11.62	47.28	5.56	51.50	10.06	8.671***	.150
Affective/Motivational States												
AD	50.85	8.91	57.00	9.43	61.87	6.96	44.56	8.54	53.02	10.82	10.777***	.180
DD	53.06	8.54	57.17	10.90	55.52	6.77	47.33	11.74	52.04	10.54	3.867**	.073
ID	52.49	8.75	56.78	9.43	61.87	8.70	43.67	7.66	52.21	10.46	11.900***	.195
ANX	50.98	8.34	58.94	11.14	63.26	8.27	45.28	7.15	51.91	9.28	14.693***	.231

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Table 8

PPI Scores by group (continued)

	I (n=47)		II (n=18)		III (n=23)		IV (n=36)		V (n=94)			
	X	SD	X	SD	X	SD	X	SD	X	SD	F (4, 196)	Eta squared
Somatic Symptoms												
ECTO	51.47	9.08	57.06	9.08	57.87	10.35	47.03	9.81	50.81	7.52	7.337***	.131
ENDO	49.68	9.54	57.61	9.74	56.91	7.43	45.00	12.13	49.21	9.89	8.739***	.151
Functional Deficits												
SD	50.47	8.21	56.33	8.79	54.74	5.63	49.14	8.71	52.22	9.83	2.940*	.057
CD	53.23	9.79	59.78	10.11	55.61	9.68	49.19	9.97	51.98	9.65	3.958**	.075
DISEQ	52.55	9.55	52.83	11.35	55.83	7.83	49.28	10.50	47.81	8.21	4.560**	.085
WD	52.77	11.12	56.67	10.08	56.52	8.75	44.94	12.51	51.37	10.28	4.669**	.087
FATIGUE	53.32	8.64	54.33	8.30	55.87	5.85	45.19	12.64	51.01	10.04	4.284**	.080

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

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Table 9

Significant differences on PPI variables, Group V vs. remaining groups

	Somatoform	Compensation	Factitious	Malingering
NOS	0.001	0.001	0.001	0.01
PBS	0.05		0.001	
Worst pain	0.001	0.05		
Least Pain		0.01		
Present Pain	0.05			
GPI	0.001	0.01		
CD		0.01		
AD			0.01	**0.01**
Ecto		0.01	0.05	
Diseq	0.05		0.05	
Endo		0.001	0.05	
ID			0.01	**0.001**
Anx		0.05	0.001	**0.01**
VD	0.001	0.001		
Atyp	0.001	0.001	0.01	
Min		**0.01**	**0.05**	0.01
Max	0.01 0.05			

Note: Bold typeface indicates values where Group V scored significantly higher

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Table 10

Significant differences on PPI variables, Malingerers vs. remaining groups

	Somatoform	Compensation	Factitious	Group V
NOS				**0.01**
Least pain		0.05		
CD		0.01		
AD	0.05	0.001	0.001	0.01
SD		0.05		
DD		0.01		
Ecto		0.001	0.001	
Fatigue	0.05	0.05	0.01	
Withdrawal	0.05	0.01	0.01	
Endo		0.001		
ID	0.01	0.001	0.001	0.001
Anx	0.05	0.001	0.001	0.01
VD	0.05	0.05		
Atyp	0.01	0.001	0.05	
Min	**0.001**	**0.001**	**0.001**	**0.01**
Max		0.001	0.001	

Note: Bold typeface indicates values where Malingerers scored significantly higher

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