Predictors of Posttraumatic Stress Disorder in Chronic Low Back Pain Patients

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LOMA LINDA UNIVERSITY
Graduate School

Predictors of Posttraumatic Stress Disorder
in Chronic Low Back Pain Patients

by

Lorie Tulia DeCarvalho

A Dissertation submitted in partial satisfaction of
the requirements for the degree of
Doctor of Philosophy in Psychology

September 2003
Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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ABBREVIATIONS

ANS: Autonomic Nervous System

APA: American Psychiatric Association

APA: American Psychological Association

CLBP: Chronic low back pain


MPQ: McGill Pain Questionnaire

NCS: United States National Comorbidity Survey

PDS: Posttraumatic stress Diagnostic Scale

PLOC: Pain Locus of Control Scale

PPI: Present Pain Intensity (from McGill Pain Questionnaire)

PRI: Pain Rating Index (perceived pain severity from McGill Pain Questionnaire)

PTSD: Posttraumatic Stress Disorder

STES: Source of Traumatic Experiences Scale

VA: Veterans Administrations
ABSTRACT OF THE DISSERTATION

Predictors of Posttraumatic Stress Disorder in Chronic Low Back Pain Patients

by

Lorie Tulia DeCarvalho

Doctor of Philosophy, Graduate Program in Psychology
Loma Linda University, September 2003
Dr. Janet Sonne, Chairperson

The present study investigated the predictors of posttraumatic stress disorder (PTSD) symptom severity level in patients with chronic low back pain (CLBP). Research questions focused on whether or not patients with CLBP would evidence clinically-significant levels of PTSD, whether or not the intensity and duration of the trauma would predict PTSD symptoms, and whether or not the age of the patient and perceived uncontrollability would positively predict PTSD symptom severity level. Participants included 161 patients receiving treatment for their CLBP from several Southern California chronic pain clinics, as well as major Southern California chiropractic facilities. Data was gathered through self-report measures for perceived pain severity, traumatic experiences, locus of control, and PTSD. Participants were placed into one of the following groups: (1) Pain Only, No Trauma, (2) Pain w/ Non-Back-Related Trauma, (3) Pain w/Back-Related Trauma, or (4) Pain w/ Combined Trauma. Results indicated that approximately 51% of the patients in the CLBP sample evidenced clinically-significant levels of posttraumatic stress disorder symptoms.
In the groups, between 25% and 77% of patients reported clinically-significant PTSD symptoms. Patients with pain and combined trauma exhibited the highest levels of PTSD symptoms in comparison to the other groups. These individuals also evidenced more: pain severity, severe diagnoses, back surgeries, treatments for their CLBP, perceived uncontrollability (external locus of control), and numerous other negative life events. Moreover, age and perceived uncontrollability positively predicted PTSD symptom severity level across all of the groups. Further, pain alone may be a sufficient "trauma" to predict PTSD symptoms in this population. The present study established links between a number of predictors, and a preliminary model was subsequently devised for predictors of PTSD symptom severity level in patients with CLBP. A paucity of research still remains for considering the relationship between CLBP and PTSD. The present study ascertained that both the nature of the trauma, as well as person characteristics must be considered in the assessment, diagnosis, and treatment of patients with CLBP. In addressing all possible predictors, clinicians may promote greater healing at all levels for patients with chronic low back pain.
CHAPTER ONE

Introduction

Overview

In the United States, chronic pain affects literally millions of individuals every year. Chronic low back pain (CLBP) is one of the most common forms of chronic pain; it causes minor to severe disability in its victims. Chronic low back pain is a problem of great significance in terms of the number of persons suffering from it, the complexity of the problem, and its subsequent physical, psychological, social, sexual, and spiritual ramifications.

Indeed, studies have determined that there is a link between chronic pain and posttraumatic stress disorder, one of the most common psychiatric disorders, which often results in long-term problems in multiple areas of patients' lives (Geisser, Roth, Bachman, & Echert, 1996), including increased affective distress and functional disability (e.g. Benedikt & Kolb, 1986). As Geisser, Roth, Bachman, and Eckert (1996) pointed out, however, past studies focusing on PTSD and chronic pain, in general, have failed to examine the factors that place a person at risk for the development of PTSD. The few studies which have been done have focused on the psychological experiences of patients with accident-related or war-injury-related chronic pain (e.g. Buckley, Blanchard, & Hickling, 1996; Geisser et. al., 1996). Further, and more specifically, there is a paucity of research devoted to examining the relationship between chronic low back pain and PTSD.
Outline for the Introduction

The introduction will cover the following areas. First, the review will include an overview of historical views of pain. Second, the prevalence and ramifications of CLBP, medical definitions of chronic pain and CLBP, and the assessment of chronic pain and CLBP will be discussed. Third, a discussion of the psychological experience of chronic pain and CLBP will follow. Fourth, the review will focus on the definition, prevalence, and ramifications of PTSD, which will be followed by a general model of predictors of PTSD. Fifth, the review will examine the relationship between chronic pain and PTSD, which will be followed by a discussion of the predictors of PTSD in patients with chronic pain. Sixth, an overview of preliminary research investigating predictors of PTSD in patients with chronic low back pain is examined. Finally, the review will conclude with the research questions and hypotheses suggested by the review and examined in this dissertation.

Historical Views of Pain

Present-day theories and views of chronic pain fundamentally relate to historical views. While paradigmatic shifts have been seen in the assessment, diagnosis, and treatment of individuals with chronic pain, theoretical views of the past may be seen as affecting present-day assessment, diagnosis, and treatment of individuals suffering from chronic pain conditions. Therefore, the following discussion explores: Mind-body Dualism, Specificity Theory, Sensory Decision Theory, Gate Control Theory, General Systems Theory/ Biopsychosocial Model, and the Multidisciplinary Approach to Pain Management.
**Mind-Body Dualism**

The current etiology and treatment of chronic pain fundamentally relates to the historical emphases on the mind-body connection. The mechanistic approach, or "dualism" originated prior to the Renaissance period. Descartes (1596-1650) ushered in a new paradigm of viewing the human experience when he argued that the mind or 'soul' was separate from the physical body (Gatchel, 1999). Further, Descartes proposed that the mind was a passive, dependent entity, meaning that the mind or 'soul' was incapable of directly affecting either physical or somatic processes (Gatchel, 1999). Damasio (1994) claimed that Descartes' ideas of such a separation between the mind and body "have shaped the peculiar way in which Western medicine approaches the study and treatment of diseases" (p.251). Specifically, psychologically-based problems or contributing factors are often disregarded, while the diseased body part is examined solely as the cause of pain and illness.

This viewpoint soon diminished with the incorporation of Freud's (1856-1939) postulations that there may be an interaction between the psychological and physical factors in different medical conditions (Gatchel, 1999). Shortly thereafter, three landmark theories of pain were founded; these included: Specificity Theory, Sensory Decision Theory, and Gate Control Theory.

**Specificity Theory**

According to Specificity Theory, the body contains pain receptors which transmit sensations of pain directly to the brain (Bernard & Krupat, 1994). This theory neglects the impact of emotions or one's psychological state upon an individual's perception of pain severity (Melzack & Wall, 1965). Therefore, emotions are viewed merely as reactions to sensations of pain and do not directly influence or change the levels of pain.
Sensory Decision Theory

Unlike Specificity Theory, the Sensory Decision Theory (Chapman, 1980) does factor psychological experience into individuals' perception of pain severity. More specifically, cognitive processes, attention to an area of the body, habits, beliefs, expectations, costs, rewards, and memory are believed to control how pain is perceived by the individual. Therefore, each individual may experience pain differently. For example, an individual who focuses on his or her pain more and devotes his or her attention to that area of the body will, according to sensory decision theory, experience more severe pain.

Gate Control Theory

Gate Control Theory, also called "Gate Theory," (Melzack & Wall, 1965) has been a prominent theory for the past couple of decades, as it incorporates both physiology and psychology into its premises. According to this theory, different areas of the spinal cord receive messages from pain receptors, skins receptors, and from descending axons in the brain (Kalat, 1995). Sensations of pain travel from free nerve endings to the brain vis-à-vis specific nerve fibers. Specifically, the C fibers carry messages of dull pain; A-delta fibers carry messages of sharp pain; and A-beta fibers carry messages of light touch. It is possible for all three of these nerve fibers to carry their messages at the same time (Bernard & Krupat, 1994). There is an area of inhibitory neurons in the gray matter of the spinal cord called "the gate," which has the ability to block pain impulses. Pain signals are suppressed when enkephalin (which is an endorphin) blocks substance P (which causes pain) and shuts the gate. Electrical stimulation of the brain or acupuncture have also been known to reduce pain by releasing enkephalins.
Furthermore, C fibers are *inhibitory* to gate neurons, such that impulses traveling along them tend to open the gate. In contrast, A-beta fibers are *excitatory* to the gate neurons, so impulses traveling along them tend to close the gate. The gate will open if impulses in the C fibers are stronger than those in the A-beta fibers. Conversely, according to Gate Control Theory, individuals may physically rub an affected area to reduce pain because the A-beta fibers that carry signals of light touch are stimulated and thereby shut the gate (Marieb, 1989). Psychologically, the gate tends to open when individuals experience anxiety, tension, or when they focus on the pain; conversely, the gate closes when individuals relax or distract themselves from focusing on the pain.

*General Systems Theory/ Biopsychosocial Model of Pain*

Kossman and Bullrich (1997) brought to light a new theory, initially proposed by von Bertalanffy (1969), which stated that the study of general systems necessitated an understanding of the "whole" rather than the sum of parts. This gestalt-like theory led to a shift in former biomedical reductionism as science began to look at human functions in terms of the whole.

By the late 1980s, pain researchers realized that both organic pain and psychogenic pain resulted in an experience of pain. This led to the *Biopsychosocial Model* of pain, which proposed that the assessment and diagnosis of organically-caused pain should incorporate both the physiological and psychological factors that contribute to patients' experiences with pain (Gatchel, 1999).
Multidisciplinary Approach to Pain Management

The Biopsychosocial Model of pain implies a multidisciplinary pain management approach, which assumes that pain must be treated in a holistic manner by professionals in different specialties to address chronic pain patients' problems (Gatchel, 1999). Multidisciplinary pain clinics generally include a cohesive team, consisting of physicians, nurses, physical and occupational therapists, and clinical psychologists. Within this approach, the goal is to reduce patients' pain severity, as well as to functionally restore them in their psychosocial and occupational lives. This dominant model in today's society is an obvious contrast from the dualistic and reductionistic viewpoints of the past. However, it is still evident that many professionals in Western medicine adhere to such views and practice in a non-holistic manner.

Chronic Pain and Chronic Low Back Pain (CLBP)

Prevalence and Ramifications of CLBP in the General Population

Chronic low back pain remains as one of the most common forms of chronic pain and reasons for physician visits on a yearly basis. CLBP affects more than 11.7 million Americans with 2.6 million persons being permanently disabled (Turk & Nash, 1993). Eighty to ninety percent of any given pain population involves cervical or lower back pain (Rosomoff & Rosomoff, 1991). Turk and Nash (1993) reported that 550 million working days and 100 billion dollars are lost annually because of CLBP. Thus, CLBP has been described as the most expensive benign condition in the United States (Mayer et. al.,1987). Overall, complexities remain in medically defining and assessing chronic pain, in general, and CLBP.
Medical Definitions of Chronic Pain and CLBP

Acute pain been defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey, 1979, p. 249). Chronic pain has been medically defined as "a continuum of noxious input, like that of acute pain, but modulated and compounded by the prolonged or recurrent nature of the chronic state, and further complicated by a multitude of economic and psychosocial factors" (Rosomoff & Rosomoff, 1991, p.877). In stark contrast to acute pain, pain that is chronic persists beyond the amount of time which is normal for an injury to heal.

Chronic low back pain (CLBP) may be defined as pain that is experienced in the lumbar spinal region for at least six months (Crue, 1985). In a study of 900 patients referred to an orthopedic clinic for the treatment of CLBP, Waddell (as cited in Waddell and Turk, 1992) found that patients' CLBP could be divided into three groups. Those groups include: (1) Simple Mechanical CLBP (e.g. various forms of CLBP that stem from physical activity), (2) Nerve Root CLBP (e.g. scoliosis, kyphosis, lordosis, and ruptured disks which impinge on the nerve roots of the lower back), and (3) Serious Spinal Pathology (e.g. tumor, infections, or inflammatory conditions).

Medical Assessment of Chronic Pain and CLBP

Medical professionals typically assess pain severity through a physical examination, which includes straight-leg raising, flexion, and other tests which further indicate the functional capabilities of the CLBP patient. The severity of patients' chronic pain is defined by the level of pain reported by the patient, as well as patients' levels of disability, usually quantified by medical staff (Waddell & Turk, 1992).
Waddell and Turk (1992) cited a study by Agre et. al. (1987), who found that there is very low inter-observer consensus among physicians who rate spinal movement and muscular strength in patients with CLBP.

One possible explanation for these discrepancies is that, in general, pain severity is a highly subjective experience, such that a particular degree of pain may be perceived differently by each patient (Waddell & Turk, 1992). However, as Waddell and Turk (1992) stated, physicians do not evaluate how the patient is coping with the perceived pain; instead, physicians tend to rely more upon their clinical impressions. This means that they tend to make comparisons about the patients’ pain levels based upon how much pain seems appropriate for a particular degree of injury or tissue damage. Ultimately, this use of clinical judgement and subjectivity contributes to the dilemma of health care professionals being unable to objectively determine the amount of severity of pain that patients are experiencing.

*The Psychological Experience of Chronic Pain and CLBP*

In its most severe forms, chronic low back pain may cause paralysis and numbness, loss of gross motor control, loss of bowel and bladder control, loss of reflexes in lower limbs, spasticity and degeneration of nerves. Chronic pain most often results in disability, and with chronic pain disability comes a cognitive reevaluation and reintegration of one's belief systems, values, emotions, and feelings of self-worth (Miller, 1990). This process is much like that designated by Elizabeth Kubler-Ross (1969) for death and dying, wherein the person experiences feelings of shock/denial, anger, bargaining, depression, and acceptance.
Shock/Denial

As patients become more anxious from severe CLBP, there may also be other factors which contribute to the disruption in their lives. Wheeler (1995) stated that fear of re-injury and panic may reinforce patients' anxiety, and complicate recovery. Patients with chronic pain and disability may experience deep uncertainty about the meaning of the events and circumstances which occurred and how they are to deal with life from the present onward (Mishel & Braden, 1988). Patients may attempt to deny that they are having such an experience; for example, patients who face dangerous and invasive surgical procedures may experience shock and deny that they are subject to the risks involved.

Anger

As the pain and disability worsen and are unalleviated by various treatment modalities, one suffering from chronic pain may experience anxiety (McCracken, 1993), deep-seated frustration, anger (Miller, 1990), and/or decreased self-efficacy (Altmaier, 1993). These individuals may feel powerless and have a sense of uncontrollability in their situation (Carpenito, 1989).

Bargaining

Individuals with chronic pain tend to believe that they have limited abilities to control their pain, which may result in further physical deactivation, demoralization, and overreaction to nociceptive (nerve-related paths specific to pain) stimulation (Gatchel, 1999; Biedermann, McGhie, Monga, & Shanks, 1987).
The patients' beliefs about the meaning of their pain, as well as their abilities to continue to function despite the pain, are significant cognitive schemas, which will influence individuals' coping abilities (Slater, Hall, Atkinson, & Garfin, 1991). Further, these schemas directly relate to patients' commitment to treatment protocols and acceptance of social support (Turk & Rudy, 1991).

Some chronic pain patients may reach a point where they attribute their pain to their behaviors or personal life decisions; for example, some individuals will blame their self-judged "bad behavior" for their pain, which they view as a punishment from God. Other chronic pain sufferers feel that their pain provides for their moral and spiritual atonement (Hawthorn & Redmond, 1998). When their pain gets to a point of unbearability, many patients with such beliefs will bargain with God or their Higher Power for respite, and in return, they promise to "be good" in the future (Kubler-Ross, 1969).

**Depression**

According to the Diagnostic and Statistical Manual of Mental Disorders (4th edition, Text Revision) (DSM-IV-TR), symptoms of depression incorporate marked changes in mood, diminished interest or pleasure, and vegetative changes (e.g. weight loss or gain; insomnia or hypersomnia, fatigue, psychomotor agitation or retardation). Additionally, individuals who experience depression may have feelings of worthlessness, difficulty concentrating, and may have suicidal ideation, thoughts, or impulses (APA, 2000).

There is a large body of literature which acknowledges that there is a high incidence of depressive symptoms in persons with chronic pain (Turk, 1994; Lindal, 1990; Trief & Carnnicke, 1993).
For example, Schuster and Smith (1994) assessed 101 patients with chronic pain and found that 47% of the patients exhibited significant depressive symptoms. They found that nearly 90% of the patients' depression was explained by symptoms of hopelessness, decreased interest, and sadness. In fact, within the United States, depression is the single most common psychiatric diagnosis in patients with chronic low back pain (Magri, 1987). Further, there is some research evidence that chronic pain patients who scored higher on depressive symptomatology reported greater intensity of perceived pain, more pain behaviors, and pain tended to interfere with daily living more so than in patients experiencing fewer depressive symptoms (Haythornthwaite, Sieber, & Kerns, 1991). It is important to note that the generalizability of this study is questionable due to the sample demographics. Specifically, participants were primarily male patients from a Veterans Affairs medical center. Furthermore, since this was not a longitudinally-designed study, it is not possible to determine the direction of the causality between perceived pain severity and depressive symptoms.

Despite the methodological problems in Haythornthwaite, Sieber, & Kerns' (1991) study, their findings were remarkably similar to those of a more recent study by Burns et. al. (1998), who found that feelings of helplessness decreased as pain severity decreased. This study demonstrated that depression significantly relates to levels of perceived pain.

Similarly, there is a clear relationship between personal control, learned helplessness, anxiety, and chronic pain disability (DelVecchio-Good, Brodwin, Good, & Kleinman, 1992; Abramson, Garber, & Seligman, 1980).
For instance, Lackner, Carosella, and Feurstein (1996) concluded that chronic pain disability and perceived levels of severity of pain correlated negatively with functional self-efficacy, or patients' confidence in their abilities to cope with their pain. Burns et. al. (1998) found that pre- to post-treatment decreases in pain helplessness were related to improvement in pain severity, activity, and downtime. Therefore, extending these findings specifically to patients with CLBP, it appears that patients who experience greater disability and have reduced functional self-efficacy are likely to experience greater psychological distress, which can be in the form of secondary depressive symptoms.

Of paramount importance is the acknowledgement that those suffering from uninterrupted, extreme pain and disability are highly vulnerable to suicidal ideation (Fuerst, 1993; Heller, Flohr, & Zegans, 1989; Ivey, Ivey, & Simek-Morgan, 1993; Jourard, 1971). These individuals may feel guilty and humiliated because they have suicidal ideation (Herman, 1992a). This may lead to passive-avoidant coping strategies, wherein individuals with CLBP utilize wishful thinking and avoidance to cope with their pain (Weickgenant et. al., 1993).

Acceptance

Kubler-Ross (1969) indicated that, eventually, patients who face severe illness, pain, and/or loss reach a point of acceptance. Thus, individuals find peace and resolution in their struggle, which propels them to have enhanced abilities to cope with any difficulties or fears of the unknown. In chronic pain patients, death is not the imminent outcome; therefore, it is possible that these patients (like grieving individuals) will cycle back through the stages of loss at different points in their experience.
This is because acceptance may mean that the patient comes to accept a particular aspect of their condition, but not another at that time. Acceptance can be an ongoing process for many individuals with chronic pain.

Clearly, individuals with chronic pain or chronic low back pain face numerous challenges, namely, the physical pain, disability, the need to have multiple treatments or invasive surgeries, as well as the entire psychological experience, which includes a sense of helplessness and uncontrollability. The process of dealing with ongoing pain, coupled by the feeling of being out of control, relates to the experience of coping with trauma. In fact, posttraumatic stress disorder (PTSD) appears to be a factor in the psychological experience of chronic pain and, specifically, chronic low back pain. For this reason, a discussion follows that incorporates the definition, clinical presentation, prevalence, and ramifications, of PTSD in the general population.

*Posttraumatic Stress Disorder (PTSD)*

**Definition and Clinical Presentation of Posttraumatic Stress Disorder**

Posttraumatic stress disorder (PTSD) is an intense response to experiences which threatened the life or safety of oneself or another. PTSD may result from any intense event that would lead to distress in others; such events may include but are not limited to the following: natural disasters, war, accidents, rape, torture, abuse, and the unexpected death of a loved one. Additionally, it is possible that PTSD results due to one’s inability to assimilate or come to grips with what has occurred because he/she is too overwhelmed by the experience (Hales & Hales, 1995).
Therefore, posttraumatic stress disorder arises as the result of extreme trauma which occurs in an individual's life. Trauma may be defined as: "a disordered psychic or behavioral state resulting from mental or physical stress or physical injury" (Webster, 1990). PTSD is categorically defined in the Diagnostic and Statistical Manual of Mental Disorders (4th edition, Text Revision) (APA, 2000) as a disorder wherein both of the following are present:

(1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or threat to the physical integrity of self or others, and

(2) the person's response involved intense fear, helplessness and horror.

According to the DSM-IV, the individual persistently re-experiences the trauma. This may take on different forms: intrusive images, thoughts, or perceptions; nightmares or night terrors; behaviors or feelings related to the event; psychological and/or physiological reactivity to internal or external cues resembling aspects of the traumatic event.

As a response to the re-experiencing of the trauma, the individual reacts with 1) persistent avoidance (e.g. of thoughts, feelings, conversations, activities concerning the trauma) and 2) arousal (e.g. sleep difficulties, irritability or difficulty controlling anger, difficulties with concentration, hypervigilance, exaggerated startle response). Individuals experience clinically-significant distress or impairment for at least one month. With delayed-onset PTSD, the presentation of symptoms is at least 6 months after the traumatic event took place (APA, 2000).
Prevalence of PTSD in the General Population

Posttraumatic stress disorder has been found to be one of the most common anxiety disorders, having a lifetime prevalence of 5-10% in the general population (Ballenger et. al., 2000). When comparing persons who have experienced different types of traumas in their lives, the lowest prevalence rate was associated with combat (2%), and the highest with sexual assault (14%; (Norris, 1992). Indeed, Kessler, Sonnega, Bromet et. al., (1995) found that the crime of rape had the highest conditional probability of leading to PTSD in both men and women alike.

Ramifications of PTSD in the General Population

The long-term prognosis or outcome of persons with PTSD can vary, depending upon factors like the individual’s social support network; however, it has been determined that approximately 40% of persons do not experience a resolution of symptoms in the long-term (McFarlane, 2000). The U.S. National Comorbidity Survey (NCS) determined that the median duration of PTSD is approximately three years if the individual obtains treatment, yet this estimate neglects the fact that many individuals do not get treatment and could potentially experience more than one traumatic event in their lifetime (Kessler, Sonnega, Bromet, et. al., 1995).

More recent studies indicated that the average duration of a PTSD episode is more than seven years (Ballenger et. al., 2000). Shalev (1996) concluded that there may be a progressive instability of the underlying neurobiological systems, which may lead to a continuation of the disorder. Boscarino (1996) reviewed the medical histories of nearly 1400 male Vietnam veterans about 20 years after being exposed to combat.
He found that veterans with PTSD also had a lifetime prevalence of circulatory, digestive, musculoskeletal, nervous system, respiratory, and nonsexually-transmitted infections post-trauma. Similarly, Ballenger et. al. (2000) concluded that PTSD, along with depression, heads the list in terms of disability resulting in the individual, as well as the financial costs to society.

More specifically, persons with PTSD tend to have difficulties sustaining stable employment, have more relationship strife, and more troubles with the law when compared to non-sufferers of PTSD (Shalev, 2000). PTSD has been associated with misuse of psychotropic medications, illicit drugs, and alcohol, and persons with PTSD also tend to engage in risky behaviors more frequently than non-sufferers (Hearst, Newman, & Hulley, 1986). Additionally, the financial implications of PTSD are significant, with recent estimates in the United States being approximately $1542 per PTSD sufferer every year (Greenberg, Sisitsky, & Kessler, 1999).

Yet another serious ramification of PTSD is its correlation with suicidality. More specifically, PTSD is more strongly associated with suicidal behaviors when compared to other anxiety disorders (Kessler, Borges, & Walters, 1999). In fact, it has been found that the rate of attempted suicide in persons with PTSD is approximately 19% (Hendin & Haas, 1991), which is comparable to the suicide attempt rate with persons experiencing major depressive disorder (Buda & Tsuang, 1981). The next section contains a framework for predictors of PTSD in the general population.
General Model of Predictors of PTSD

Post-traumatic Stress Disorder (PTSD) is caused by external traumatic events; however, not every one who experiences trauma develops PTSD. Therefore, it is important to consider those factors which may predict PTSD. In examining the process which occurs from acute distress to the onset of PTSD, McFarlane and Yehuda (1996) devised a conceptual framework for the development of PTSD in the general population. Essentially, the individual first experiences a trauma, which leads to intrusive memories, and finally results in PTSD. Subsequently, McFarlane and Yehuda identified three factors which have been shown to predict PTSD. They include: (1) the nature of the traumatic event, (2) the characteristics of the traumatized individual, and (3) the nature of the recovery environment.

The nature of the trauma has been implicated as an important component in the development of PTSD in the general population. McFarlane and Yehuda (1996) suggested that "the type of traumatic experience may have a major impact on the long-term course of PTSD" (p. 158). A review of the literature by Shalev (1996) further indicated that the intensity and duration of different types of traumatic events significantly predict posttraumatic stress disorder.

Also incorporated in McFarlane and Yehuda's (1996) framework was the characteristics of the traumatized individual, which may encompass biological, temperamental, experiential, and personality components that are unique to the person. For example, an individual's neurobiological makeup can significantly affect the manner in which he or she tolerates stress. Furthermore, if one's family history contains psychiatric illness, that individual tends to be at greater risk for developing PTSD.
The present research study focused upon the nature of the traumatic event (i.e. intensity and duration of the trauma), as well as person characteristics (age, the individual's perceptions about their pain experience). The following section elaborates upon chronic pain and PTSD, including a discussion of the prevalence, ramifications of PTSD, and predictors of PTSD in patients with chronic pain.

*Posttraumatic Stress Disorder and Chronic Pain*

*Prevalence of PTSD in Patients with Chronic Pain*

Though PTSD has been recognized as “shell shock” and related to wars, especially World War II. (Kizer, 1996), it may occur with *any* serious trauma which involves helplessness and potential loss of one’s physical or mental integrity. In fact, the experience of chronic pain is a traumatic event involving serious injury and/or threat to one’s physical integrity of self, and the person’s response involves fear and helplessness.

Consequently, the prevalence of PTSD has been found to be substantially elevated in patients with chronic pain when compared to the general population (15-35% versus 2%, respectively) (Asmundson, Bonin, Frombach, & Norton, 2000). For example, diagnoses of Posttraumatic Stress Disorder in patients with chronic pain following motor vehicle accidents have been found in numerous studies (Blanchard et. al., 1995; Chibnall & Duckro, 1994; Kuch et. al, 1985; Muse, 1986). Hickling and Blanchard (1992), in a study of patients being treated for chronic headache pain and pain resulting from motor vehicle accidents, found that 50% of the patients met criteria for PTSD.
**Ramifications of Chronic Pain in Relation to PTSD**

Given that patients with severe chronic pain and disability experience repeated endangerment to self, and they witness their own degeneration and disfigurement (e.g. through surgeries), they are significantly at risk for more chronic and severe levels of PTSD symptoms (Kulk et al., 1990). Moreover, patients with chronic pain due to a traumatic injury may be at greater risk for experiencing more PTSD symptoms (Helzer et al., 1987; Pitman et al., 1989; Martini et al., 1990).

**Predictors of PTSD in Patients with Chronic Pain**

Previous studies have been conducted, which have pinpointed certain factors that seem to predict the development of posttraumatic stress disorder in patients with different types of chronic pain. A discussion of these now follows.

**Nature of the Trauma**

*Perceived pain severity.* According to aforementioned empirical findings, the physical experience of severe, unrelenting pain as a result of trauma, relates to the development of PTSD symptoms (e.g. Geisser, Roth, Bachman, and Echert, 1996). Geisser et al. (1996) also found that PTSD symptoms were positively related to increased affective distress, self-report of pain, and functional disability among patients with chronic pain. Geisser et al.'s (1996) findings that severe, unrelenting pain is sufficient to lead to delayed-onset PTSD are very pertinent. However, it is important to note that in Geisser et al.'s study, there was no mention if the control group, which consisted of patients with chronic pain not due to an accident, was assessed at pre-test for PTSD.
The accident-related groups were assessed with a PTSD scale for chronic pain patients who had experienced accidents or injuries; therefore, the non-accident/non-injury control group may not have been adequately assessed for PTSD based on this information. If this were the case, levels of PTSD in patients in the control group were not reported. Furthermore, it is possible that some individuals in the accident-related groups: 1) acquired PTSD symptoms prior to their accidents, or 2) experienced pain which led to PTSD symptoms, as opposed to PTSD symptoms stemming from the trauma of the accident itself. Thus, the question still remained as to whether PTSD symptoms resulted from the experience of chronic pain itself, or if these symptoms resulted from the trauma-the motor vehicle accident.

In another significant study, Schreiber and Galai-Gat (1993) presented a case study of a patient with chronic pain stemming from the loss of an eye. Their case study suggested that uncontrolled and prolonged chronic pain may be a strong enough stressor to lead to the onset of PTSD. This valuable study also supported that accidents or traumatic injuries are not necessary prerequisites for the development of PTSD in chronic pain patients. However, it is important to note that since it was a case study with only one subject, the results of the study are not generalizable.

Moreover, Buckley, Blanchard, and Hickling (1996) found that nagging physical injuries in chronic pain patients may be constant reminders of the trauma, which would maintain or exacerbate PTSD. The authors made an important contribution to an understanding of the relationship between chronic pain and PTSD. Their findings suggest that the presence of an injury could, in itself, maintain or exacerbate PTSD.
Unfortunately, they had a small sample \((n=7)\) for patients with delayed-onset PTSD. Therefore, the power to detect significant effects and to generalize the findings are seriously limited.

*Intensity and duration of the traumatic event(s).* The severity, intensity, and duration of traumatic events have been found to predict PTSD in the general population, as well as in patients with chronic pain secondary to different types of trauma. For example, among post-war veterans, PTSD has been found to be the most common negative outcome, yet not all persons who experienced the trauma associated with combat developed PTSD. As such, Solomon, Laor, and McFarlane (1996) noted that the factors which seemed to predict PTSD were long-term, severe trauma. Thus, more intense traumatic events, experienced for prolonged periods of time, resulted in PTSD in soldiers more often. This finding was similar to that of Sutker et. al. (1995), who concluded that PTSD responses related to the severity of the traumatic experience. In a study of survivors of long-term torture, Basoglu et. al. (1994) found that the perceived severity of the torture experience related to the onset of PTSD symptoms. Further, Shalev (1996) cited numerous studies, which indicated that the intensity and duration of the traumatic event, and the extent of physical injury contributed significantly to the development of PTSD. Other studies have shown that female victims of rape who experienced forceful assaults tended to manifest greater levels of PTSD symptomatology than victims who experienced less forceful assaults (Ballenger et. al., 2000; Layman, Gidzycz, & Lynn, 1996). Additionally, those sexual assault victims who sustained painful physical injuries due to the rape trauma experienced an additive effect upon their symptoms.
Person Characteristics

Perceived uncontrollability of the pain experience. Patients suffering from chronic pain who utilize an internal locus of control tend to believe that their actions and efforts contribute to reduced pain (Crisson & Keefe, 1988). Therefore, individuals with an internal locus, or a decreased sense of perceived uncontrollability, are more likely to be proactive in their efforts to minimize or reduce pain. On the other hand, patients with chronic pain who utilize an external locus of control tend to believe that their own personal efforts will not reduce their pain. They tend to rely on the efforts of powerful others (e.g. physicians, health care providers, friends, family), or luck to bring relief of their pain (Crisson & Keefe, 1988).

Previous research has found that patients who feel that they have greater control over their pain (internal locus) tend to use positive, active, self-directed coping strategies to reduce their pain; consequently, they report less pain when compared to patients with an external locus of control (Crisson & Keefe, 1988; Gibson & Helme, 2000). These individuals tend to experience less psychological distress (Marks et. al., 1986), depression, anxiety, and obsessive-compulsive symptoms (Toomey et. al., 1991).

In stark contrast, other studies have shown that patients who have an external locus of control (chance locus) tend to catastrophize and divert their attention, and they typically report being in more pain (Gibson & Helme, 2000; Toomey et. al., 1991). These individuals tend to experience greater helplessness and are less able to effectively cope with their chronic pain conditions (Crisson & Keefe, 1988; Skevington, 1983). Ballenger et. al. (2000) indicated that uncontrollability in one's situation tended to predict increased levels of PTSD.
Therefore, as perceived uncontrollability in the form of an external locus of control significantly relates to greater perceived pain severity and less effective coping, it may serve as a predictor of increased PTSD symptom severity in patients with chronic pain and chronic low back pain.

Age. Exposure to trauma appears to decrease with age, including certain traumatic events (i.e. physical and sexual assaults; Norris, 1992). However, it is known that aging tends to increase the prevalence of acute and chronic diseases, as well as disabilities (Kemp, 1985). In fact, disability has been commonly accepted as a normal and prevalent characteristic of older age (Ben-Sira, 1991). Since elderly persons are likely to view disease and disability as a normal part of the aging process, they may actually dismiss warning signals (e.g. pain) (Kart, 1981). And, it is possible that many elderly persons internalize societal expectations for degeneration and deactivation, which could lead to many elderly persons assuming that pain and disability are normal aging processes (Ben-Sira, 1991; Kovar, 1980). Some elderly persons may expect to experience the pain and disability, and subsequently have a greater sense of control over their pain experience.

However, in a more recent study, Gagliese and Melzack (1997) examined the beliefs about the relationship between pain and aging in 18-86 year-old individuals who were either pain-free or suffering from chronic pain conditions. Results of the study indicated that there were no significant age differences in beliefs about pain (in the pain-free and the chronic pain samples). The authors concluded that elderly persons were no more likely than younger persons to associate pain with the normal aging process than with organic factors such as tissue damage.
Previous studies have investigated the relationship between internal locus, external locus, and reliance on powerful others and coping in various age groups. Blanchard-Fields and Irion (1988) utilized both global measures of controllability, as well as situation-specific controllability (e.g. threatening and challenging situations). The authors found that, on global measures of control, there were significant age-group differences for reliance on powerful others and external locus of control, with adolescents exhibiting greater reliance on powerful others than middle-aged and older adults. Further, younger individuals exhibited greater global external locus of control when compared to older individuals. For situation-specific controllability (i.e. threatening and challenging situations), individuals did not vary on their use of internal locus, external locus, or reliance on powerful others on the basis of age. However, older adults who perceived being more in control (greater internal locus) in stressful situations were more likely to utilize positive coping strategies. The authors concluded that "older adults are willing to help others benefit from their experiences (altruism), especially in situations they perceive as controllable" (Blanchard-Fields & Irion, 1988, p. 201).

Overall, older persons who have an internal locus of control tend to utilize less escape-avoidance, hostility, and self-blame as coping mechanisms when compared with younger persons (Blanchard-Fields & Irion, 1988). Conversely, older individuals who have an external locus of control in coping with their conditions tend to catastrophize more, thereby having a more difficult time in reducing their pain (Gibson & Helme, 2000).
Contrary to Blanchard-Fields and Irion's (1988) findings that individuals did not significantly differ in their use of external locus, internal locus, or reliance on powerful others in threatening or challenging situations, recent studies have found otherwise. Specifically, studies focusing on individuals coping with health-related problems have demonstrated that the elderly utilize more of an external locus of control as a means of coping with their conditions (Meling, 1995), as well as reliance on powerful others as a means of coping with stressors (Blanchard-Fields and Robinson, 1988). Those with an external locus tend to report more depressive symptoms and pain severity (Gibson & Helme, 2000).

In a recent study, Gibson and Helme (2000) supported previous findings that the elderly suffering from chronic pain exhibited primarily an external locus, as well as a reliance on powerful others. The authors further indicated that the elderly who were over 81 years of age relied even more on an external locus when dealing with chronic pain. The authors concluded that this may be because the elderly hold a more pragmatic view of the world such that they believe many things are out of their personal control. However, the authors added that this stronger external locus of control "would be expected to impact upon psychological and behavioral adjustment to persistent pain and upon the relative efficacy of different modes of treatment" (Gibson & Helme, 2000, p. 381). Thus, limited studies to date have indicated that the elderly tend to have an external locus of control when coping with chronic pain conditions (Gibson & Helme, 2000). However, Gibson and Helme (2000) also stated that elderly persons' "beliefs in internal control remain largely unchanged over the lifespan" (p. 380). Seemingly, further research needs to be done to address this occurrence.
It therefore seems plausible that older adults' greater sense of perceived uncontrollability and external locus of control in dealing with health-related problems and chronic pain, may predict not only greater levels of perceived pain severity, but posttraumatic stress disorder symptom severity level as well.

*Predictors of PTSD Symptom Severity Level in CLBP Patients*

There is a paucity of research regarding those factors which predict PTSD symptom severity level in patients with chronic low back pain. Understandably, it is difficult to ascertain whether or not CLBP leads to PTSD, or if PTSD leads to greater pain in patients with CLBP. However, there is a great deal of support which indicates that the greater the severity of one’s perceived pain, the greater the likelihood is of that individual developing PTSD (e.g. Buckley, Blanchard, and Hickling, 1996; Helzer et al, 1987). Consequently, it may be said that patients with CLBP are at increased risk for developing PTSD.

One study that has been conducted (DeCarvalho, 2001) attempted to determine predictors of posttraumatic stress disorder symptom severity level in patients with chronic low back pain. The present author explored an important question: In patients with CLBP, would a situational trauma predict the development of PTSD, or would the experience of *CLBP itself* predict PTSD? Therefore, the author studied the nature of the traumatic event in patients with CLBP, to determine if it was a specific traumatic event which led to a CLBP injury and pain, or the experience of CLBP itself that predicted PTSD symptom severity level.
Review of Previous Research: Predictors of PTSD Symptom Severity Level

This review will involve an examination of the following: (1) research questions of the study, (2) a review of the categorization or grouping of participants, which will assist the reader in better understanding the results of the study, and (3) a review of the results of the study, which includes: patients' level of perceived pain severity; age, and perceived uncontrollability.

Research Questions in Previous Study

The author's previous study (DeCarvalho, 2001) investigated the specific nature of the traumatic event in patients with CLBP. Specifically, the following questions were asked: (1) Would individuals with CLBP evidence posttraumatic stress disorder symptoms?, (2) In patients with CLBP, what is the trauma which would predict the level of PTSD symptom severity-- the specific traumatic event which led to the lower back pain, any other traumatic event, or would it be the chronic low back pain itself which would be traumatic? (3) In CLBP patients who evidence PTSD symptoms, would the intensity and duration of the trauma predict the level of PTSD symptom severity?

Sample Groupings in Previous Study

The previous study involved 112 chronic low back pain patients between the ages of 20-82 years of age receiving treatment for their CLBP condition. Self-reports of pain intensity, traumatic experiences, and posttraumatic stress disorder symptomatology were utilized. Participants were grouped into four categories in order to further clarify the nature of the traumatic event.
The groups included patients having either: (1) Pain Only, with No Trauma, (2) Pain w/ Non-Back-Related Trauma, (3) Pain w/ Back-Related Trauma, or (4) Pain w/ Combined Trauma. Therefore, Group 1 (Pain Only, No Trauma) consisted of patients who had CLBP but did not experience any type of trauma in the past. Examples of individuals in this group included those with conditions such as arthritis, congenital problems, osteoporosis, or other conditions leading to chronic low back pain. Group 2 (Pain w/ Non-Back-Related Trauma) consisted of CLBP patients who experienced a trauma(s) not specifically related to their back pain. Examples included events such as physical assaults, natural disaster, war, abuse, or rape. Group 3 (Pain w/ Back-Related Trauma) consisted of CLBP patients who experienced a trauma(s) that resulted in injuries directly related to their present CLBP condition(s). Examples of such events included: motor vehicle accidents, falls, and lifting injuries. Finally, Group 4 (Pain w/ Combined Trauma) consisted of CLBP patients who experienced traumatic events which were BOTH non-back-related and back-related.

Results of Previous Study

First, the author (DeCarvalho, 2001) found that the majority (89%) of CLBP patients evidenced some level (mild-severe) of posttraumatic stress disorder symptoms; the average level of PTSD symptom severity across all CLBP patients was at the moderate level. Comparatively, the clinical normative sample, on-average, scored in the moderate-severe range for PTSD symptoms. Second, results indicated that Group 1 (Pain Only, No Trauma) manifested lower levels of PTSD symptom severity than two of the other groups (Pain w/ Non-Back-Related Trauma; Pain w/ Combined Trauma). Yet, patients in Group 1, on average, evidenced clinically-significant levels (moderate) of PTSD symptom severity.
Further, CLBP patients in Group 1 who experienced more severe pain experienced more severe PTSD symptoms. Thus, the experience of the chronic pain in the absence of any other traumatic event was significantly associated with PTSD symptom severity. Third, the author found that the intensity and duration of the trauma did not significantly predict PTSD symptom severity level in these patients.

Limitations and Future Directions

Preliminary research (DeCarvalho, 2001) contained methodological limitations. Even though methods of data collection were improved over the course of the study, the accuracy and comprehensiveness of the data collected early in the study was suspect. Further, group sizes were somewhat heterogeneous. While the results of the study may not be generalizable, valuable information was obtained, which may make a positive contribution to the future assessment, diagnosis, and treatment of CLBP patients.

In addition to the findings already discussed, an additional significant finding was that CLBP patients in Group 3 (Pain w/ Back-Related Trauma) had the lowest levels of PTSD symptoms when compared with the other three groups (Pain Only, No Trauma; Pain w/ Non-Back-Related Trauma; Pain w/ Combined Trauma). Conversely, CLBP patients in Group 2 (Pain w/ Non-Back-Related Trauma) had greater PTSD symptom severity levels than all the other groups (Pain Only, No Trauma; Pain w/ Back-Related Trauma; Pain w/ Combined Trauma), as well as than the clinical norm sample.

The author (DeCarvalho, 2001) concluded that it is possible that the experience of a previous generalized or non-back-related trauma may have augmented the meaning of the patients' pain.
It is also possible that there was an additive or compounding effect which took place when patients experienced chronic low back pain subsequent to this type of trauma. With regard to the lower levels of PTSD symptom severity for patients with back-related trauma, one plausible explanation was that these patients may have felt more in control psychologically in their situation than patients who had experienced a non-back-related trauma who perceived more of a sense of uncontrollability over their situation, which could have potentially increased their levels of PTSD symptom severity.

Another pertinent finding was that CLBP patients in Group 1 (Pain Only, No Trauma) evidenced lower PTSD symptom severity levels than two of the other groups (Pain w/ Non-Back-Related Trauma; Pain w/ Combined Trauma), but greater levels of PTSD symptoms when compared with patients in the Pain w/ Back-Related Trauma group. Group 1 (Pain Only, No Trauma) consisted mainly of persons older than 62 years of age. The author suggested that the age of the patients, as well as a sense of perceived uncontrollability may have related to levels of PTSD symptom severity. In summary, the findings of the author's previous study suggested that the age of the patient and perceived uncontrollability may positively predict PTSD symptom severity in CLBP patients.

*Rationale for the Proposed Research and Research Questions*

Clearly, the ramifications of chronic low back pain and posttraumatic stress disorder take on great significance, in terms of the effects on the individual and society at-large.
The present study proposed to revise the methodology of the previous study in order to correct aforementioned weaknesses, and to re-examine the following questions: (1) whether patients with CLBP, as a whole, would evidence clinically-significant levels of PTSD symptom severity, (2) whether CLBP patients, within each one of the four CLBP groups (Pain Only, No Trauma; Pain w/ Non-Back-Related Trauma; Pain w/ Back-Related Trauma; Pain w/ Combined Trauma), would evidence clinically-significant levels of PTSD symptom severity, which would suggest that the experience of pain alone is a sufficient trauma to predict clinically-significant levels of PTSD symptoms, (3) whether patients in Group 2 (Pain w/ Non-Back-Related Trauma) again would evidence greater mean PTSD symptom severity levels than any of the other groups (Pain Only, No Trauma; Pain w/ Back-Related Trauma; Pain w/ Combined Trauma), and (4) whether the intensity and duration of the trauma would predict the development of PTSD symptom severity. The present study also involved an extension of the previous study by an investigation of an additional question: In CLBP patients, would the age of the patient and perceived uncontrollability positively predict PTSD symptom severity level?

Research Hypotheses

Hypothesis 1

Hypothesis 1 stated that, as a group, patients with CLBP would evidence clinically-significant levels (as defined in method section) of PTSD symptom severity, regardless of the source(s) of the traumatic event(s).
Hypothesis 2

Hypothesis 2 stated that CLBP patients who experienced: (1) pain only, with no trauma, (2) pain with non-back-related trauma, (3) pain with back-related trauma, or (4) pain with combined trauma would evidence clinically-significant levels (as defined in method section) of PTSD symptom severity. Thus, hypothesis 2 predicted that each of the four groups would evidence PTSD symptoms at a clinically-significant level.

Hypothesis 3

Hypothesis 3 predicted that the mean for PTSD symptom severity level would be higher for group 2 than for any of the mean PTSD symptom severity levels for the other groups.

Hypothesis 4

Hypothesis 4 stated that the intensity and duration of the trauma, across all groups, would predict the level of PTSD symptom severity in CLBP patients.

Hypothesis 5

The fifth hypothesis stated that patient age and perceived uncontrollability of the pain experience would positively predict PTSD symptom severity level across all CLBP patients.
Participants were 161 patients receiving treatment for chronic low back pain (CLBP). Participants were recruited from Southern California chronic pain clinics associated with Loma Linda University Medical Center, as well as major Southern California chiropractic facilities, which dealt specifically with chronic low back pain and various other chronic pain conditions.

Patients recruited from Loma Linda University's International Rehabilitation Institute and Physical Medicine and Rehabilitation's Center for Pain Management (n = 75) generally were experiencing greater levels of pain severity, and for many, having treatments from these pain centers were last resorts to find relief from their pain. Patients recruited from major Southern California chiropractic facilities (n = 85), in comparison to the pain centers, tended to have less serious or debilitating lower back conditions, and chiropractic treatments tended not to be their last resort.

The present author first recruited patients from the pain center milieu, followed by chiropractic facilities, thereby being able to determine the number of patients receiving each form of treatment. Yet, in order to ensure full anonymity of patients in the present study, the author did not differentiate individuals (i.e. survey packets not marked) based on treatments received from the pain centers versus the chiropractic centers. Thus, no demographic differences were explored or determined in the present study for the nature of the treatments received to treat CLBP.
Given the varying intensities and severities of patients' low back conditions, it is believed that the sample obtained in the present study was well-representative of persons suffering from chronic low back pain.

All participants were screened to ensure that the following criteria were met: (1) permission of the patient's treating physician, (2) patients were 18 years of age or older, (3) patients had suffered from lower back pain (i.e. lumbar spinal region and below) for 6 months or longer (e.g. Crue, 1985; Haythornthwaite, Sieber, & Kerns, 1991), and (4) the patient gave consent to participate after being fully informed of procedures.

Sample size

Given the number of predictors, and that the sample as a whole would be placed in one of four CLBP groups, careful consideration was given to the number of patients which would need to be recruited in order to have sufficient power to run the analyses in the present study (Cohen, 1996; Tabachnick & Fiddell, 1996). Several rules of thumb were considered, including that of Green (1991), who indicated that the total sample size should be greater than or equal to \(104 + m\) (the number of IVs) and Cohen (1992). The total sample size for the present study \((N=161)\) was determined to be a reasonable number of cases given the number of predictor variables.

Originally, 165 participants were recruited; however, four individuals left major portions or pages of the survey packet blank. These four cases were excluded, which left a total of 161 participants' surveys available for the analyses conducted in the study.
Demographics

Demographic information was collected in order to describe the sample of participants (see Appendix A). Demographic information for the CLBP sample as a whole may be seen in Table 1. Table 1 consists of the gender, age, ethnicity, marital status, and education level of participants in the study.

There were 102 females (63.4%) and 59 males (36.6%) in this sample. Participants were between the ages of 18 and 86 years old ($M = 45.3, SD = 15.09$). In terms of ethnicity, the majority of the individuals ($n = 120, 74.5\%$) were Caucasian/White; the second largest ethnic group in the sample was Hispanic ($n = 23, 14\%$). More than half of the individuals were married ($n = 90, 55.9\%$); further, 19% were divorced ($n = 31$), and 16% of the participants ($n = 26$) were single and had never been married. Participants were generally well-educated, with nearly 33% ($n = 53$) having either a Bachelor's, Master's, or Doctoral degree(s). Another 42% ($n = 67$) of the individuals had graduated from high school. Finally, about 7.5% ($n = 12$) of the individuals were professionals (e.g. physicians, psychologists, attorneys, etc.); 25.5% ($n = 41$) were in White collar professions (e.g. upper management, nursing, marketing, accounting, etc.) and 20% ($n = 32$) worked in Blue collar jobs (e.g. mechanic, plumber, custodian, caretaker, etc.). Nearly 29% ($n = 46$) of the participants were either retired, disabled, or unemployed (see Table 2).
Table 1

Demographic characteristics of CLBP Sample.

<table>
<thead>
<tr>
<th>DESCRIPTIVES</th>
<th>Frequency (n)</th>
<th>% of Sample</th>
<th>Mean, SD</th>
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<td>GENDER</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>MARITAL STATUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>90</td>
<td>55.9</td>
<td></td>
</tr>
<tr>
<td>Single, never married</td>
<td>26</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>7</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>31</td>
<td>19.3</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>3</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Dating/ Engaged</td>
<td>4</td>
<td>2.5</td>
<td></td>
</tr>
</tbody>
</table>

* Mean approximates an AA degree or equiv.

Table 2.

Occupation levels of CLBP sample.

<table>
<thead>
<tr>
<th>OCCUPATION OF PATIENT</th>
<th>Frequency (n)</th>
<th>Percent (%) of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>White Collar</td>
<td>41</td>
<td>25.5</td>
</tr>
<tr>
<td>Blue Collar</td>
<td>32</td>
<td>19.9</td>
</tr>
<tr>
<td>Student</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>Homemaker</td>
<td>18</td>
<td>11.2</td>
</tr>
<tr>
<td>Retired</td>
<td>19</td>
<td>11.8</td>
</tr>
<tr>
<td>Disabled</td>
<td>19</td>
<td>11.8</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>5.0</td>
</tr>
</tbody>
</table>
CLBP Descriptives

Descriptives were collected for patients' lower back conditions, as defined by pain lasting for six months or longer. Questions asked focused upon the following areas: (1) length of time or duration of CLBP, (2) physical diagnosis, and (3) history of back surgery, (4) treatments utilized for CLBP, and (5) efficacy of treatments utilized (see Appendix B). This descriptive information has been presented in Tables 3-4.

Table 3.

Descriptives for CLBP Conditions in Sample.

<table>
<thead>
<tr>
<th>DESCRIPTIVE</th>
<th>Frequency (n)</th>
<th>% of the CLBP sample</th>
<th>Mean, SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of CLBP (mos)</td>
<td></td>
<td></td>
<td>134.59, 1.10</td>
</tr>
<tr>
<td>CLBP Diagnoses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herniated/ Ruptured Disk(s)</td>
<td>51</td>
<td>31.7</td>
<td></td>
</tr>
<tr>
<td>Fracture(s)/ Floating Bone Fragments</td>
<td>9</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>Spondylolisthesis/ Stenosis</td>
<td>37</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Lordosis/ Kyphosis/ Scoliosis</td>
<td>26</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>Arthritis</td>
<td>46</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulged disk(s)</td>
<td>6</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Degenerative Disk(s)</td>
<td>11</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>5</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Failed Back Surgery Syndrome (FBSS)</td>
<td>1</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Ligament/ Vertebral Dysfunction</td>
<td>6</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Arachnoiditis</td>
<td>2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Scar tissue/ Calcium deposits</td>
<td>2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Congenital spinal malformations</td>
<td>1</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Lumbar strains/ sprains</td>
<td>11</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Unknown CLBP Diagnosis</td>
<td>32</td>
<td>19.9</td>
<td></td>
</tr>
</tbody>
</table>
* Percents and frequencies exceed 100% because some patients had multiple diagnoses.
Table 4.

*Treatments Utilized by Patients for Relief of CLBP.*

<table>
<thead>
<tr>
<th>CLBP TREATMENTS UTILIZED BY PATIENTS</th>
<th>Frequency (n) of Sample Using The Treatment(s)</th>
<th>% of Sample Utilizing Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical or Occupational Therapy</td>
<td>103</td>
<td>64</td>
</tr>
<tr>
<td>Chiropractic/Osteopathic Treatments</td>
<td>109</td>
<td>67.7</td>
</tr>
<tr>
<td>Massage Therapy</td>
<td>89</td>
<td>55.3</td>
</tr>
<tr>
<td>Medication(s) to help alleviate low back pain</td>
<td>111</td>
<td>68.9</td>
</tr>
<tr>
<td>Pool therapy program (supervised or on own)</td>
<td>36</td>
<td>22.4</td>
</tr>
<tr>
<td>Spinal nerve blocks/epidurals</td>
<td>43</td>
<td>26.7</td>
</tr>
<tr>
<td>Homeopathic, naturopathic, or vitamins</td>
<td>26</td>
<td>16.1</td>
</tr>
<tr>
<td>Acupressure/Acupuncture</td>
<td>34</td>
<td>21.1</td>
</tr>
<tr>
<td>Craniosacral therapy</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Magnet therapy</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>Yoga, Tai-Chi, or other Exercise program(s)</td>
<td>25</td>
<td>15.5</td>
</tr>
<tr>
<td>Counseling to help cope with CLBP</td>
<td>26</td>
<td>16.1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meditation/Breathing Exercises</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>TENS/Interferential (IF) Units</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>Biofeedback</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Traction/Muscle or Electric Stem Treatments</td>
<td>2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

# TREATMENTS UTILIZED (M= 4.04, SD= 2.45)

Measures

*McGill Pain Questionnaire (MPQ)*

Patients completed the McGill Pain Questionnaire (MPQ) (Melzack, 1975) (see Appendix C)*. The MPQ is a 21-item instrument designed to quantitatively measure patients' pain experiences. The MPQ has good test-retest reliability (70.3% consistency rate) for measuring pain severity in patients suffering from chronic pain (Melzack, 1975).

* The MPQ is not a copyrighted instrument and is therefore included in the appendices of this dissertation.
As the MPQ yields unreliable results when the patient fills out the questionnaire without a thorough explanation of the directions (Melzack, 1975), the graduate student investigator administered the MPQ to all participants in a standardized manner. By doing so, all participants had the directions clearly explained to them, which reduced error and confounding information.

Patients chose descriptive words which described their feelings and sensations of pain at the present moment. The descriptive words have assigned rank values, which were then summed to obtain separate scores for each of the four MPQ subscales (i.e. Sensory, affective, Evaluative, Miscellaneous).

First, the Sensory subscale (set 1-10) consists of items that depict bodily feelings or sensations of pain. Thus, the descriptors encompass properties such as: temperature (i.e. hot, burning, scalding, searing), pressure (pricking, boring, drilling, stabbing, lancinating), tenderness (i.e. tender, taut, rasping, splitting), temporal (i.e. flickering, quivering, pulsing, throbbing, beating, pounding), and spatial properties of the pain (i.e. jumping, flashing, shooting).

Second, the Affective (set 11-15) subscale consists of words relating to the emotional reactions of the patient. Thus, descriptors include properties such as the effect of pain on energy level (i.e. tiring, exhausting), fear or anxiety (i.e. sickening, suffocating, fearful, frightful, terrifying), and perceptions of the pain (i.e. punishing, gruelling, cruel, vicious, killing, wretched, blinding).
Third, the Evaluative (set 16) subscale consists of words that describe patients' overall intensity of the total pain experience (i.e. annoying, troublesome, miserable, intense, unbearable). This subscale may also incorporate the words from the present pain intensity (PPI) scale; however, rank values from the PPI are not summed in as part of the Evaluative subscale itself.

Fourth, the Miscellaneous (set 17-20) subscale consists of extra words that describe other aspects of the patient's experience with chronic pain (i.e. spreading, radiating, penetrating, piercing, nagging, nauseating, agonizing, dreadful, torturing, etc.).

The sum of the rank values for each descriptor in the first 20 items yields a Pain Rating Index (PRI). The total PRI score was used in the present study as a continuous measure of patients' overall level of perceived pain severity. The MPQ subscales were also used in additional analyses.

*Source of Traumatic Experiences Scale (STES)*

The STES is an 11-item instrument, which was developed by the graduate student investigator for the purpose of determining the participants' experiences with trauma (see Appendix D). Patients were asked whether: (1) their lower back pain was related to an injury, (2) they felt a threat of death or serious injury, (3) they felt a threat to their physical or mental integrity, and (4) they felt intense fear, helplessness, or horror. Additionally, participants were asked how long the event lasted which led to their CLBP injury, to rank their feelings of fear, helplessness, and/or horror, and to describe their experience which resulted in CLBP.
The second part of the STES dealt with participants’ experiences with traumatic events, which did not directly result in CLBP. Thus, patients were asked whether: (1) they experienced a threat to their physical or mental integrity, and (2) they felt intense fear, helplessness, and horror. Similarly, participants were asked how long the event lasted, as well as to describe their experience.

As with the author's previous study, the population included CLBP patients: (1) with pain only and no history of trauma, (2) with pain who experienced non-back-related trauma, (3) with pain who experienced back-related trauma, and (4) with pain who experienced both non-back-related trauma and back-related (combined) trauma.

The purpose of the STES was twofold: (1) to rank the intensity and duration of the traumatic event(s), and (2) to separate participants into one of the aforementioned groups. Placement of individuals into one of the four CLBP groups is discussed at the end of the Measures subsection.

Perceived Uncontrollability Item

Found in the Lower Back Pain Descriptives questionnaire, item 5 stated the following: "Of the things you are doing to try to help your chronic low back pain, how well do you feel your pain is controlled?" The response to the item was based on a 4-point Likert Scale, ranging from 1 (Not controlled at all) to 4 (Completely controlled). Responses were then reverse-coded such that higher scores reflected a greater sense of perceived uncontrollability of the patient's part. This item was used as a measure of a general sense of perceived uncontrollability over the pain experience.
The Pain Locus of Control Scale (PLOC)

The PLOC, a 36-item instrument, is a modified version of the Multidimensional Health Locus of Control Scale, which is used to measure patients' attributions or perceptions about their control over their pain (Crisson & Keefe, 1988; Toomey et. al., 1991)*. The scale has been utilized with chronic pain patients to determine if they have an internal or external locus of control in dealing with their pain (Gibson & Helme, 2000). The PLOC has good test-retest reliability (88-95%) and is clinically valid (Main & Waddell, 1991).

Participants responded to items based on a 6-point Likert scale, which ranged from one (strongly disagree) to six (strongly agree). The neutral range was between the Likert values of three (slightly disagree) and four (slightly agree). The 36 items are not summed to yield a total scale score, but rather various items are summed and divided by 12, to arrive at the participants' mean scores for the three PLOC subscales (i.e. Internal Locus of Control, External Locus of Control, Reliance on Powerful Others).

Descriptions of the three PLOC subscales follow.

The Internal Locus of Control subscale (sum of items: 1, 6, 8, 12, 13, 17, 19, 24, 26, 30, 31, 35) reflects individuals' feelings of personal control over their pain, as well as their tendencies to take more pro-active measures toward relieving their pain. An internal locus of control is expressed in the following item: "If my pain gets worse, it is my own behavior which determines how soon I will get relief."

* The PLOC scale was used in this study with written permission of the author; however, in order to honor and preserve copyright privileges, the PLOC is not included in the appendices of this dissertation.
The External Locus of Control subscale (sum of items: 2, 4, 9, 11, 15, 16, 20, 22, 27, 29, 33, 34) indicates that individuals feel very much out of control in coping with their pain. They tend to see luck or fate as being important factors in getting through their experience of pain, and they tend to favor a more passive approach in relieving their pain. A sample item for this locus would be: "No matter what I do, if my pain is going to get worse, it will get worse."

Finally, the Reliance on Powerful Others subscale (sum of items: 3, 5, 7, 10, 14, 18, 21, 23, 25, 28, 32, 36) indicates that individuals feel that relying or depending on certain individuals (e.g. doctors, nurses, family, friends) for help and support is the key to finding relief from their pain. These individuals may frequently visit their physician for pain relief, and they may fall into a habit of letting others do things for them because it is sometimes easier or causes less pain. A sample item of this locus would be: "When my pain is relieved, it is usually because other people (e.g. doctors, nurses, family, friends) have been taking good care of me."

In the present study, the three PLOC subscale scores were utilized as continuous measures of the types of locus of control utilized by the CLBP patients in the sample. The subscales were used in conjunction with the 1 item for perceived uncontrollability to determine if patients' overall perceptions of uncontrollability, as well as the specific locus of control being utilized to cope with CLBP, would predict levels of posttraumatic stress disorder symptom severity.
Posttraumatic Stress Diagnostic Scale (PDS)

Patients completed the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995), a 49-item instrument designed to aid in the diagnosis of PTSD according to DSM-IV criteria*. It also quantifies the symptom severity levels of PTSD and is particularly useful in populations who are at-risk for PTSD. The PDS has good internal consistency ($\alpha = .92$) and test-retest reliability ($r = .74$).

The PDS was normed on individuals ($N= 248$) between the ages of 18-65 who were recruited from treatment and research centers (i.e. VA hospitals, anxiety disorder and PTSD treatment clinics, women's shelters, emergency/ trauma centers) with high frequencies of PTSD in patients. The normed sample also included individuals who were not seeking treatment for PTSD, but who were exposed to traumatic situations (i.e. fire stations, ambulance corps, residential rehabilitation centers). The levels of PTSD symptom severity were established with a population of recent female rape victims.

In part 1 of the PDS, individuals were asked to check off all of the events that they had either experienced or witnessed at some point in their lives. In order to address issues pertaining to the CLBP sample, all participants were also asked the following: "Have you ever considered your lower back pain experience to be traumatic for you?" Affirmative responses to this question were categorized in PDS item 12 (other traumatic event) and listed in item 13 (the description of the event).

* The PDS scale was used in this study with written permission of the author; however, in order to honor and preserve copyright privileges, the PDS scale is not included in the appendices of this dissertation.
In part two of the PDS, individuals were asked to state the traumatic event that was most difficult or bothersome for them to deal with at the time of the interview, as well as patients' sense of fear, helplessness, and/or horror. In part three, responses were measured on a 4-point Likert scale, ranging from 0 (not at all or only 1 time) to 3 (5 or more times per week/ almost always).

The following indicates the range of scores for PTSD symptom severity levels:

- 1-10 Mild
- 11-20 Moderate
- 21-35 Moderate-Severe
- 36-51 Severe

In general, the higher the total score on the PDS, the greater the PTSD symptom severity for the patient. Scores on the PDS were used as the dependent or outcome variable.

*Group Placement Criteria*

Stringent criteria were used to place individuals into one of the four CLBP groups. In particular, there were three central sets of information that were utilized to determine in which group patients belonged.

First, there was item 1 on the STES, which stated, "My lower back pain is related to an injury." This item was labeled 'LBPINJ.' Participants responded to the LBPINJ item with a "yes" (value of 1) or "no" (value of 0). Individuals who gave a "yes" response to LBPINJ were claiming that they had obtained an injury to their lower back.
These individuals were then asked to fill out part one, which dealt with feelings related to their lower back injury. Individuals who gave a "no" response to LBPINJ were asked to skip down to part 2, which related to feelings about non-back-related trauma only.

Second, there were the items related to the two parts (e.g. back-related and non-back-related trauma questions) of the STES, which were labeled as 'IP' (injury pain) and 'TP' (trauma pain), respectively. Participants who had an injury to their lower back were asked to respond to part 1 (IP). Again, "yes" and "no" responses were utilized. It was assumed that individuals who left the items blank to either the IP (items 2, 3, 4) or TP (items 8, 9, 10) sections were denying that they had experienced those feelings related to the trauma. In the database, the blanks were entered in as -9s, which were then used as part of the overall criteria for group placement.

Third, a separate column was entered in the database for participants who stated that the Posttraumatic Diagnostic Scale (PDS) was not applicable to them, meaning that they denied having experienced any trauma in their lives. And, participants received a final summed score for their PTSD symptom severity levels. These were referred to as 'PDSNA' (for PDS was not applicable), which received a "yes" (value of 1) or "no" (value of 0) response and 'PTSDSXSEV' (for the continuous PTSD symptom severity level).

The following incorporates all of the criteria for group placement:

**GROUP J (Pain Only, No Trauma)**

Participants first stated that they had had no injury to their lower back. They then skipped down to part 2, in which they had to deny having experienced any other type of trauma in their lives, or left the items (TP 8-10) blank.
Furthermore, these individuals stated either that the PDS was not applicable to them, or their total PTSD symptom severity score was zero. This set of responses to these items meant that the individual had not experienced trauma. The criteria for Group 1 follow.

- LBPINJ= 0, AND
- TP8 = 0 or TP9= 0 or TP10= 0 or TP8=-9 or TP9= -9 or TP10= -9, AND
- PDSNA= 1 or PTSDSXSEV= 0

GROUP 2 (Pain w/ Non-Back-Related Trauma)

Individuals in this group had not had a lower back injury. However, they had experienced some kind of generalized or non-back-related trauma at some point in their lives. Therefore, they had to first of all deny having experienced a back trauma (LBPINJ= 0), and then affirm that they had experienced a non-back-related trauma. The latter was met by one "yes" response to the TP items (8, 9, or 10). The criteria for Group 2 follow:

- LBPINJ= 0, AND
- TP 8= 1 or TP9= 1 or TP10= 1

GROUP 3 (Pain w/ Back-Related Trauma)

Individuals in Group 3 had experienced only back-related trauma. This means that they had been involved in some event(s) (e.g. car accidents, falls, lifting injuries) that specifically led to their lower back injury and pain. These individuals first had to give a "yes" response to item 1 (LBPINJ). Then, they had to deny having experienced any sort of non-back-related trauma by answering "no" or leaving the TP items (8-10) blank.
It is important to note that there were individuals who stated that they had had a lower back injury (LBPINJ= 1), but then responded with zeros to all of the IP (injury-pain) questions. Thus, these individuals had an injury but did not perceive it as being traumatic to them at the time. Because these individuals were injured, they were still placed in Group 3, as later on it would be possible that the injury could be considered a trauma. The criteria for Group 3 follow.

- LBPINJ=1, AND
- TP 8=0 or TP9=0 or TP10= 0 or TP8= -9 or TP9=-9 or TP10= -9

*Group 4 (Pain w/ Combined Trauma)*

Patients in Group 4 had experienced BOTH non-back-related trauma and back-related trauma. These individuals first responded that they had received an injury to their lower back (LBPINJ= 1). Second, they reported having experienced some type of non-back-related trauma, as evidenced by "yes" responses to one of the TP items (8-10). The criteria for Group 4 follow.

- LBPINJ= 1
- TP8= 1 or TP9= 1 or TP10= 1
Procedure

Patients utilizing treatments provided at major Southern California pain clinics and chiropractic clinics for their CLBP conditions were first approached by their treating physician, in the treatment room, and given a brief description of the study. Such a description resembled the following: "PATIENT'S NAME, we have a Ph.D. candidate here from Loma Linda University who is doing a study on chronic low back pain. She has a questionnaire for patients to fill out that takes about 20 minutes or so to fill out. Would you be willing to talk with her?" At this point, the graduate student investigator approached the patient, introduced herself, gave a brief description of the study, and asked the individual if he or she was willing to hear more. Then, the graduate student investigator reviewed the informed consent form (see Appendix E) with the individual, verified that he/she had no questions, and asked if he/she gave voluntary consent to participate in the study.

After having the patient's consent to be tested, the graduate student investigator reviewed the instructions on each page of the survey packet with the participant and asked the participant if he/she had any questions prior to filling out the survey. The graduate student investigator gave all participants a choice of either filling out the survey themselves, or having the investigator verbally administer the survey. This was done in case of physical, language, reading, or other related limitations, which could prevent participants from completing the survey packet.
Participants were reminded not to put their names anywhere on the survey packet. The graduate student investigator checked on participants every 5-10 minutes to answer any questions. After completing the questionnaire, participants' surveys were immediately placed in a manilla envelope to ensure their privacy. Furthermore, all participants were debriefed and given a debriefing statement to take home with them in case they needed to get in touch with the graduate student investigator, or if they wanted to find out what the results of the study were after its completion (see Appendix F).

Participants' identities were kept completely anonymous in the present study. The following precautions were taken to ensure participants' anonymity. First, all participants were notified that his or her identity would remain anonymous prior to completing the survey. Every participant was asked not to put his or her name anywhere on the survey packet. Second, no survey packet contained any identification number prior to all surveys being returned. Since the graduate student investigator immediately placed all of the completed surveys in the manilla envelope, she was blind to the identities of the participants based on survey responses. Third, survey packets were randomly numbered *only* for the purposes of data entry. Fourth, while health care providers approached the patient, they never saw the survey packets; therefore, participants' anonymity was always maintained.

While filling out the surveys, participants were blind to the specific measurement intents of the study. That is, they were not told that the survey was being used in order to determine whether or not they have symptoms of posttraumatic stress disorder. These precautions were used in order to reduce response sets. Also, all participants were given identical instructions, choice of method of administration, and clarification about any questions every 5-10 minutes during the testing process.
This procedure was designed to ensure that there were no inter-subject differences, which may have affected the way participants completed the survey packet. All participants in the present study were treated in accordance with the American Psychological Association Ethical Principles and Guidelines for research (APA, 2002)

*Operational Hypotheses and Analyses*

**Hypothesis 1**

Hypothesis 1 predicted that patients with chronic low back pain would evidence clinically-significant (PDS scores of 9-51) levels of posttraumatic stress disorder, regardless of the source of trauma.

As the applicability of the PDS to chronic low back pain patients necessitates further study (Foa, 1995), cut-off scores for clinical significance for this sample were determined in a conservative manner. Essentially, PDS scores falling within one standard deviation above and below the mean derived from the normative sample were determined to be clinically-significant. Given the mean and standard deviation for the normative sample (*M* = 23.41, *SD* = 14.68), one standard deviation below and above the normative mean (1 *SD* below = 8.73, 1 *SD* above = 38.09) would begin with PDS scores of 9. Therefore, the range for clinical significance was determined to be PDS scores falling between 9 and 51. This hypothesis was tested with the frequencies and percentages of patients with the different levels of PTSD symptom severity.
Hypothesis 2

Hypothesis 2 stated that CLBP patients who experienced either: (1) pain only, with no trauma, (2) pain with non-back-related trauma, (3) pain with back-related trauma, or (4) pain with combined trauma would evidence clinically-significant levels of PTSD symptom severity.

Levels of clinical significance were determined in the same manner as for hypothesis 1; thus, the range for clinical significance incorporated PDS scores that fell between 9 and 51. Descriptive information was obtained for the PDS, which included the frequencies and percentages of patients for each of the groups, with the different levels of PTSD symptom severity.

Hypothesis 3

Hypothesis 3 predicted that the mean for PTSD symptom severity level would be higher for Group 2 (Pain w/ Non-Back-Related Trauma) than for any of the mean PTSD symptom severity levels for the other groups. First, a one-way ANOVA was conducted to compare the mean PDS scores for the four CLBP groups. Second, post-hoc tests (Bonferroni) were conducted to explore the nature of the group differences.

Hypothesis 4

Hypothesis 4 stated that the intensity and duration of the trauma, across all groups, would predict the level of PTSD symptom severity in CLBP patients. This hypothesis was to be tested with multiple regression. Further discussion of Hypothesis 4 may be found in the Results- Data Screening- section.
Hypothesis 5

The fifth hypothesis stated that age and perceived uncontrollability of the pain experience would positively predict PTSD symptom severity level across all groups. To test this hypothesis, age and perceived uncontrollability (1 item; 3 PLOC subscales) were entered into a standard multiple regression equation.
CHAPTER THREE

Results

Data Screening

All variables (PTSD symptom severity level, age of the patient, perceived uncontrollability of the pain experience [1 item from CLBP descriptives, and three PLOC subscales- internal locus of control, external locus of control, and reliance on powerful others], the intensity of back-related trauma, and the duration of trauma [non-back and back-related], and perceived pain severity [PRI total]) were screened prior to analyses being performed. The continuous variables were screened for the following: (1) missing values, (2) normality, (3) the presence of any outliers, (4) multicollinearity/ singularity of variance, (5) homogeneity of variance, (6) multivariate homoscedasticity of variance, (7) linearity, and (8) mispredicted values. The results of the data screening are discussed below.

Missing Values

PTSD Symptom Severity and age. There were no missing values for PTSD symptom severity or age. All 161 participants were accounted for in both of these variables.

Perceived uncontrollability. For perceived uncontrollability, there were two measures utilized. These included the one item from the CLBP Descriptives (see Appendix B), reading: "Of the things you are doing to try to help your chronic low back pain, how well do you feel your pain is controlled?" as well as the three subscales (i.e. internal locus of control, external locus of control, reliance on powerful others) from the PLOC scale.
For the item asking participants about their sense of control over their pain, there were four individuals with missing values. These participants did not respond to this particular item in the questionnaire.

For the three PLOC subscales, there was only one individual who did not receive a score for the internal locus of control, external locus of control, or reliance on powerful others subscales. This individual did not respond to 21 items in the PLOC scale and skipped multiple items in patterns. One other individual did not respond to seven items, which were also in patterns; however, the PLOC subscale means were computed for individuals with at least eight out of twelve items. The particular items skipped by this individual still resulted in eight or more responses per subscale, thereby allowing this participant to receive scores for all three PLOC subscales.

*Intensity of back-related trauma.* On the Source of Traumatic Experiences Scale (STES), participants were asked to describe the intensity of the event related to their back injury. Participants were asked the following: "On a scale of 0 to 5 (0= not intense, 5= extremely intense), how would you rate the intensity of the threat, fear, helplessness, and/or horror that you experienced?" There was a significant amount of missing data (N=94) for this particular question; thus, 94 individuals did not respond to this item.

While it is difficult to pinpoint the exact reason for such a large number of participants not responding to this item, it is possible that many participants did not answer this particular item because of the way the item was worded. The wording may have been confusing to people, or it may have been too long or too complicated to figure out for some, which may have contributed to or led to many individuals' decisions to not respond to the item.
Duration of trauma (non-back and back-related). Also on the STES scale, participants were asked to specify the duration of their non-back and/or back-related traumas (item #s 11 and 5, respectively). For the duration of non-back-related and back-related traumas, there were also many individuals who did not respond to these items (n=102 and n=101, respectively). Similarly, it is difficult to say for sure what the reason was for so many individuals not responding to these two items. However, while the items were not wordy or long, it is possible that many individuals were confused about the meaning of the question. Specifically, these items asked how long the event lasted (that led to a back injury, if applicable). Based on the responses of some individuals who stated that they had been in a motor vehicle accident, which lasted for years, when generally car accidents take only seconds to occur, it was clear that many individuals interpreted the questions differently. Seemingly, many individuals appeared to answer the questions in terms of how long they had been dealing with the aftermath (i.e. physical, psychological/emotional, social, spiritual, sexual impact) of the event(s). Therefore, it is conceivable that those who chose not to respond to the items did not fully understand what was being asked of them.

Given the large amount of missing data for the intensity and duration of the trauma, these variables were not analyzed. Thus, these variables will not be discussed any further.

Pain severity level. For the pain severity rating (PRI), there was one participant who did not receive a score for pain severity, since that individual completely omitted all 20 items that are used to tabulate the total PRI.
This same individual indicated a present pain intensity (PPI) score of five, signifying that she was in excruciating pain. One other participant also omitted the first 20 items; however, she reported a pain intensity score of zero, meaning that she was experiencing no pain at all. Thus, this participant was given a PRI score of zero as well. Therefore, for pain severity, there was just the one participant who was missing a value for the PRI.

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PTSD symptom severity. Levels of PTSD symptom severity were positively skewed (skew = .925; kurtosis = -.162), with more participants having PTSD symptoms in the mild to moderate ranges (see Figure 1). In fact, the average level of PTSD for participants was in the moderate range (M = 12.6, SD = 12.93). However, “in a large sample, a variable with statistically significant skewness often does not deviate enough from normality to make a substantive difference in the analysis” (Tabachnik & Fiddell, 1996, p. 73).

![Figure 1. PTSD symptom severity level for chronic low back pain patients.](image-url)
**Age.** Age was normally distributed for participants in the sample, with participants' ages ranging between 18 and 86 years of age \((M= 45.28, SD= 15.09)\).

**Perceived uncontrollability.** The distribution for perceived uncontrollability (1 item) was normal. As indicated in Figure 2, approximately 11% of the individuals sampled \((n= 17)\) expressed that they were fully in control of their pain. Many of the participants \((57\%, n= 92)\) in the CLBP sample perceived that they had their pain somewhat under control. About 26% \((n= 41)\) of the individuals perceived that they had their pain slightly under control, while 4% \((n= 7)\) of the participants perceived that they had no control over their pain.

*Figure 2. Perceived uncontrollability (1 item) for CLBP patients.*
The distributions for the three PLOC subscales were examined as well. For each of the three PLOC subscales, a mean was calculated for each participant; thus, the histograms depict the mean distributions for the CLBP sample. The scores fell between the values of one and six, with higher means indicating that participants tended to perceive their CLBP experience from that particular locus of control.

For the Internal Locus of Control subscale, the distribution reflected a slight negative skew (skew = -.250, kurtosis = -.411) (see Figure 3). The average participant fell in the 3.5-4.0 range, which indicated a sense of neutrality on the individuals' parts with regards to internal locus of control.

Figure 3. PLOC Internal Locus of Control Subscale distribution.
The distribution for the PLOC External Locus of Control subscale reflected a positive skew (skew = .710, kurtosis = -.069) (see Figure 4). The mean for this subscale was indicative of participants' tendencies to be in moderate to slight disagreement with statements regarding an external locus of control.

![Figure 4. PLOC External Locus of Control Subscale distribution.](image_url)

Finally, the PLOC Reliance on Powerful Others subscale distribution was negatively skewed (skew = -.683, kurtosis = .367) (see Figure 5). The mean was indicative of participants' sense of neutrality with regards to reliance on powerful others.
Figure 5. PLOC Reliance on Powerful Others Subscale distribution.

Pain severity level (PRI). The distribution for pain severity was also normal, with scores on pain severity ranging from 0 to 71 (maximum score possible = 78) ($M= 30.03$, $SD= 15.46$).

Outliers

Outliers were defined on the basis of cases that met both of the following criteria: (1) those values fell above or below three standard deviations from the mean, and (2) the values were discontinuous from the rest of the data. Such outliers were considered extreme values, which did not fit in well with the data set.
There were no univariate or multivariate outliers for PTSD symptom severity, age, pain severity (PRI), or perceived uncontrollability (1 item). Further, there were no multivariate outliers for the PLOC subscales. There were several univariate outliers for Internal Locus of Control, External Locus of Control, and Reliance on Powerful Others, as seen in Figure 6. However, even though there was discontinuity in the data for Internal Locus and Reliance on Powerful Others, these outliers still fell within three standard deviations of the mean. Thus, these values were retained.

**Figure 6.** Boxplots of PLOC subscales for detection of univariate outliers.
Multicollinearity/ Singularity

For multiple regression, data screening was performed to determine that predictor variables (i.e. age, perceived uncontrollability [1 item; 3 PLOC subscales], perceived pain severity [PRI]) were not too highly correlated with each other (multicollinearity) or too redundant such that one of the predictors was a combination of two or more of the other predictor variables (singularity).

Multicollinearity is evidenced by "a conditioning index >30 and at least two variance proportions >.50 for a given root number" (Tabachnik & Fiddell, 1996, p. 87). Collinearity diagnostics demonstrated that neither multicollinearity nor singularity was present for the predictor variables.

Homogeneity of Variance

The assumption of univariate homogeneity of variance is met when the variability between the grouping variable and the dependent variable is approximately the same (Tabachnick & Fiddell, 1996). Boxplots, bivariate scatterplots, and the 4 to 1 rule (i.e. the group with the largest standard deviation is not more than four times greater than the group with the smallest standard deviation) were utilized to test this assumption (Tabachnick & Fiddell, 1996).

Information obtained from boxplots, bivariate scatterplots of the dependent variable (PTSD symptom severity level) with the grouping variable (CLBP groups), and the 4 to 1 rule indicated that the four CLBP groups were homogeneous in variance. Additionally, a Levene's test was statistically not significant (($3, 157)= 1.676, p= .174$), which further supported that the assumption of homogeneity of variance was met for group membership.
**Multivariate Homoscedasticity of Variance**

The assumption of multivariate homoscedasticity of variance is that the standard deviations of predicted errors approximate the standardized predicted values on the dependent variable (Tabachnick & Fiddell, 1996). The results for multivariate homoscedasticity of variance are shown in Figure 7. The predictor variables appear to approximate homogeneity, as scores both above and below the mean tend to hug the regression line similarly. Therefore, the assumption of multivariate homoscedasticity of variance was also met.

**Scatterplot**

**Dependent Variable: PTSD symptom severity**

![Scatterplot for multivariate homoscedasticity of variance.](image-url)

*Figure 7.* Scatterplot for multivariate homoscedasticity of variance.
Linearity

The assumption of linearity is tested with separate bivariate scatterplots of the dependent variable and each of the predictor variables. Linearity is present when "there is a straight line relationship between two variables" (Tabachnick & Fiddell, 1996, p. 78). Bivariate scatterplots of the dependent variable (PTSD symptom severity) and all of the predictor variables (age, perceived uncontrollability [1 item; the three locus of control subscales], and perceived pain severity [PRI]) indicated that the assumption of linearity was met (see Figures 8-13).

Figure 8. Bivariate scatterplot of age and PTSD symptom severity.
**Figure 9.** Bivariate scatterplot of perceived uncontrollability and PTSD symptom severity.

**Figure 10.** Bivariate scatterplot of PLOC internal locus of control and PTSD symptom severity.
Figure 11. Bivariate scatterplot of PLOC external locus of control and PTSD symptom severity.

Figure 12. Bivariate scatterplot of PLOC reliance on powerful others and PTSD symptom severity.
Figure 13. Bivariate scatterplot of pain severity level and PTSD symptom severity.

**Mispredicted Values**

Figure 14 illustrates that the error variance was both homogeneous and distributed in a fairly linear manner. There was one predicted value at three standard deviations; however, overall, it appears that there were no mispredicted values.
Scatterplot

Dependent Variable: PTSD symptom severity

Figure 14. Scatterplot of regression standardized residuals and regression standardized predicted values.

In sum, the results of the data screening indicated that parametric assumptions were met for the one-way ANOVA and multiple regression.
Data Analyses

Hypothesis 1

To test the first hypothesis that patients with chronic low back pain would evidence clinically-significant (PDS scores of 9-51) levels of posttraumatic stress disorder, regardless of the source of the trauma, descriptive information was obtained for the PDS, which included the frequencies and percentages of patients with the different levels of PTSD symptom severity.

In terms of CLBP patients who did not meet levels of clinical significance for their PTSD symptoms, 25.5% \((n=41)\) of the CLBP patients received No Rating for PTSD symptom severity, meaning that they either: (1) indicated that they had never experienced trauma in the past, or (2) reported that they had not experienced any symptoms of PTSD in the past month. These individuals received scores of zero. Additionally, 24% \((n=47)\) of the CLBP patients fell into the Mild range having reported at least 1 to 8 symptoms of PTSD. Thus, approximately 49.5% of all CLBP patients did not evidence clinically-significant levels of PTSD symptoms.

Exploring the results for CLBP patients who did meet clinically-significant levels of PTSD symptoms, overall, slightly more than 50% \((n = 81)\) of the 161 patients in the sample evidenced clinically-significant levels of PTSD symptom severity. Five percent \((n=8)\) of the patients had PTSD symptom severity in the Upper Mild range (scores of 9 or 10). In addition, over 21% \((n=34)\), 14% \((n=22)\), and about 11% \((n=17)\) of the CLBP patients evidenced PTSD symptom severity in the Moderate, Moderate-Severe, and Severe ranges, respectively (see Table 5). Thus, hypothesis one was supported.
Table 5

Summary Table of Clinically-Significant PTSD Symptom Severity Levels for CLBP Sample.

<table>
<thead>
<tr>
<th>RANGE OF CLINICALLY-SIGNIFICANT PTSD SYMPTOMS</th>
<th>Frequency (n)</th>
<th>% of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Mild (PDS scores of 9-10)</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Moderate</td>
<td>34</td>
<td>21</td>
</tr>
<tr>
<td>Moderate-Severe</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Severe</td>
<td>17</td>
<td>11</td>
</tr>
</tbody>
</table>

Approximately 60% of the sample (n= 96) had experienced at least one chronic PTSD symptom. Finally, about 27% (n= 43) of the individuals had experienced delayed-onset PTSD symptoms, while about 43% (n= 69) reported having PTSD symptoms with normal onset.

Hypothesis 2

Hypothesis 2 stated that CLBP patients in each of the four groups (Pain Only, No Trauma; Pain w/ Non-Back-Related Trauma; Pain w/ Back-Related Trauma; Pain w/ Combined Trauma) would evidence clinically-significant levels of PTSD symptom severity. Levels of clinical significance were determined in the same manner as for hypothesis 1; thus, the range for clinical significance incorporated PDS scores that fell between 9 and 51 (Upper Mild, Moderate, Moderate-Severe, Severe).

Descriptive information was obtained for the PDS, which included the frequencies and percentages of patients for each of the groups, with the different levels of PTSD symptom severity (Table 6).
Table 6 indicates that 24%, 57%, 41%, and 77% of Groups 1, 2, 3, and 4, respectively, evidenced clinically-significant levels of PTSD symptom severity. Thus, hypothesis two was supported.

Table 6

*Summary Table for PTSD Symptom Severity Level for the Four CLBP Groups.*

<table>
<thead>
<tr>
<th>CLBP GROUPS</th>
<th>N</th>
<th>No Rating-Mild* (n, %)</th>
<th>Upper Mild (n, %)</th>
<th>Moderate (n, %)</th>
<th>Moderate-Severe (n, %)</th>
<th>Severe (n, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Only, No Trauma</td>
<td>38</td>
<td>n=29, 76%</td>
<td>n=1, 3%</td>
<td>n=2, 5%</td>
<td>n=4, 11%</td>
<td>n=2, 5%</td>
</tr>
<tr>
<td>Pain w/Non-Back Trauma</td>
<td>35</td>
<td>n=15, 43%</td>
<td>n=4, 11%</td>
<td>n=8, 23%</td>
<td>n=6, 17%</td>
<td>n=2, 6%</td>
</tr>
<tr>
<td>Pain w/Back Trauma</td>
<td>44</td>
<td>n=26, 59%</td>
<td>n=2, 4%</td>
<td>n=7, 16%</td>
<td>n=6, 14%</td>
<td>n=3, 7%</td>
</tr>
<tr>
<td>Pain w/Combined Trauma</td>
<td>44</td>
<td>n=10, 23%</td>
<td>n=1, 2%</td>
<td>n=17, 38%</td>
<td>n=6, 14%</td>
<td>n=10, 23%</td>
</tr>
</tbody>
</table>

* Frequencies and percentages in this column represent CLBP patients with non-clinically-significant levels of PTSD symptoms.

Figure 15 further illustrates the spread of the distribution for PTSD symptom severity levels with boxplots for each of the four CLBP groups.
Figure 15. Boxplots of PTSD Symptom Severity Level and CLBP Groups.

Hypothesis 3

Hypothesis 3 predicted that the mean for PTSD symptom severity level would be higher for group 2 than for any of the mean PTSD symptom severity levels for the other groups. First, a one-way ANOVA was conducted to compare the mean PDS scores for the four CLBP groups. Second, post-hoc tests (Bonferroni) were conducted to explore the nature of the group differences.
Results of the one-way ANOVA revealed that there was a statistically significant difference among the four groups, \( F(3, 160) = 7.401, p < .001 \) (see Table 7). The effect size, or proportion of variance accounted for by group membership was small \( (R^2 = .124; R^2_{adj} = .107) \).

Table 7

*Results of One-Way ANOVA for the CLBP groups.*

<table>
<thead>
<tr>
<th>Tests of Between-Subjects Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable:</strong> PTSD symptom severity</td>
</tr>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td>Corrected Model</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>RGRP</td>
</tr>
<tr>
<td>Error</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Corrected Total</td>
</tr>
</tbody>
</table>

<sup>a</sup> R Squared = .124 (Adjusted R Squared = .107)

Inspection of the means for PTSD symptom severity level indicated that the mean for Group 4 (Pain w/ Combined Trauma) was higher than any of the means for Group 1 (Pain Only, No Trauma), Group 2 (Pain w/ Non-Back-Related Trauma), or Group 3 (Pain w/ Back-Related Trauma) (see Table 8; Figure 16). Group 1 had the lowest mean when compared to the other three groups.
Table 8

Descriptives for CLBP Groups.

<table>
<thead>
<tr>
<th>CLBP Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Only No Trauma</td>
<td>38</td>
<td>6.87</td>
<td>11.03</td>
<td>1.79</td>
<td>3.24 10.50</td>
<td>0</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain with Non-Back-Related Trauma</td>
<td>35</td>
<td>12.54</td>
<td>11.35</td>
<td>1.92</td>
<td>8.65 16.44</td>
<td>0</td>
<td>37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain with Back-Related Trauma</td>
<td>44</td>
<td>11.05</td>
<td>12.16</td>
<td>1.83</td>
<td>7.35 14.74</td>
<td>0</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain with Combined Trauma</td>
<td>44</td>
<td>19.27</td>
<td>13.80</td>
<td>2.08</td>
<td>15.08 23.47</td>
<td>0</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>12.63</td>
<td>12.93</td>
<td>1.02</td>
<td>10.62 14.65</td>
<td>0</td>
<td>48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The CLBP Groups

Figure 16. Mean PTSD Symptom Severity Levels for the CLBP Groups.
Bonferroni post-hoc tests were conducted to explore differences among the four CLBP groups. There was a significant difference between Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -12.40, \( p < .001 \), 95% confidence interval (-19.63, -5.18)]. Furthermore, there was a significant difference between Group 4 (Pain w/ Combined Trauma) and Group 3 (Pain w/ Back-Related Trauma) [mean difference = 8.23, \( p = .011 \), 95% confidence interval (1.27, 15.19)]. Therefore, results indicated that Hypothesis 3 was not supported.

*Hypothesis 4*

As previously discussed, analyses were not conducted for hypothesis 4, given the insufficiency of data available.

*Hypothesis 5*

The fifth hypothesis stated that age and perceived uncontrollability would positively predict PTSD symptom severity level across all groups. To test this hypothesis, age and perceived uncontrollability (1 item; 3 PLOC subscales) were entered into a standard multiple regression equation.

As a set, age and perceived uncontrollability (1 item and 3 PLOC subscales) significantly predicted PTSD symptom severity level \( (R^2 = .154, R^2_{adj} = .125, p < .001) \) (see Table 9). The analysis further indicated that perceived uncontrollability, in the form of an external locus of control, was the only significant predictor of PTSD symptom severity level \([\beta = .381, p < .001, 95\% \text{ confidence interval (2.823, 6.887)}]\).
Thus, this model accounted for over 15% of the variance in PTSD symptom severity level, such that as patients' perceptions of uncontrollability over their pain experience increased, PTSD symptom severity level also increased. Therefore, hypothesis five was partially supported.

Table 9

Results of Multiple Regression for Age and Perceived Uncontrollability.

![Table](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAqAAAAHwCAYAAACzOHAqAAAABGdBTUEAALGPC/xhBqAAAA1S0dEAP8A/wD/oL2hQ5BAEKwVxFF/9hAdAAAAZwAAAJQAJD2AAAAHdioVPh1iAAAAGXRFWHRTb2Z0d2FyZQBBZG9iZSBJbWFnZVJlYWR5ccllPAAAA6VJREFUeNrs3+P/+zn/v/m/us/0m+nSquuJyKf8GcNcC4t6/0H5gAE6K9ZwAAAAASUVORK5CYII=

![Table](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAAqAAAAHwCAYAAACzOHAqAAAABGdBTUEAALGPC/xhBqAAAA1S0dEAP8A/wD/oL2hQ5BAEKwVxFF/9hAdAAAAZwAAAJQAJD2AAAAHdioVPh1iAAAAGXRFWHRTb2Z0d2FyZQBBZG9iZSBJbWFnZVJlYWR5ccllPAAAA6VJREFUeNrs3+P/+zn/v/m/us/0m+nSquuJyKf8GcNcC4t6/0H5gAE6K9ZwAAAAASUVORK5CYII=)

Coefﬁcients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefﬁcients</th>
<th>Standard. Coefﬁcients</th>
<th>95% Conﬁdence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>Age of Patient perceived uncontrollability (1 item)</td>
<td>-2.314E-02</td>
<td>.068</td>
</tr>
<tr>
<td></td>
<td>PLOC Internal Locus of Control</td>
<td>-.360</td>
<td>1.003</td>
</tr>
<tr>
<td></td>
<td>PLOC Reliance on Powerful Others</td>
<td>-.567</td>
<td>1.113</td>
</tr>
<tr>
<td></td>
<td>PLOC External Locus of Control</td>
<td>4.855</td>
<td>1.028</td>
</tr>
</tbody>
</table>

a. Dependent Variable: PTSD symptom severity
Additional Analyses

Given that Group 4 (Pain w/ Combined Trauma) had a significantly higher mean PTSD symptom severity level when compared to Group 1 (Pain Only, No Trauma) or Group 3 (Pain w/ Back-Related Trauma), these differences were further explored with additional analyses to determine potential contributing factors.

Continuous independent variables were tested with parametric tests. Specifically, separate one-way ANOVAs and post-hoc (Bonferroni) were performed to compare the four CLBP groups to the following variables: (1) age, (2) pain severity level (PRI), (3) PLOC external locus of control, (4) duration of CLBP, (5) total number of treatments tried for CLBP, (6) McGill Pain Questionnaire (MPQ) subscales, and (7) total number of CLBP diagnoses.

In addition, non-parametric Chi Square tests were performed on the following dichotomous variables: (1) whether or not the patient had back surgery, (2) the patient's specific CLBP diagnosis, and (3) other traumatic events. Results of these analyses follow in this order.

Parametric Additional Analyses

Age of the patient. Results of the one-way ANOVA revealed that there was no statistically significant difference among the four groups for age, $F(3, 160)= 1.102$, $p=.350$ (see Table 10).
Table 10

Results of One-Way ANOVA for CLBP Groups and Age.

Descriptives

<table>
<thead>
<tr>
<th>Age of Patient</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Only</td>
<td>38</td>
<td>47.18</td>
<td>16.39</td>
<td>2.66</td>
<td>41.80</td>
<td>52.57</td>
<td>23</td>
<td>81</td>
</tr>
<tr>
<td>Pain w/ Non-Back Trauma</td>
<td>35</td>
<td>47.49</td>
<td>14.04</td>
<td>2.37</td>
<td>42.66</td>
<td>52.31</td>
<td>18</td>
<td>86</td>
</tr>
<tr>
<td>Pain w/ Back Trauma</td>
<td>44</td>
<td>42.11</td>
<td>15.93</td>
<td>2.40</td>
<td>37.27</td>
<td>46.96</td>
<td>18</td>
<td>83</td>
</tr>
<tr>
<td>Pain w/ Combined Trauma</td>
<td>44</td>
<td>45.05</td>
<td>13.76</td>
<td>2.07</td>
<td>40.86</td>
<td>49.23</td>
<td>19</td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>45.28</td>
<td>15.09</td>
<td>1.19</td>
<td>42.93</td>
<td>47.63</td>
<td>18</td>
<td>86</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>751.628</td>
<td>3</td>
<td>250.543</td>
<td>1.102</td>
<td>.350</td>
</tr>
<tr>
<td>Within Groups</td>
<td>35694.794</td>
<td>157</td>
<td>227.355</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36446.422</td>
<td>160</td>
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</tbody>
</table>

Pain severity rating (PRI). Results of the one-way ANOVA indicated that there was a statistically significant difference among the four CLBP groups, $F(3, 159)= 5.389$, $p=.001$ (see Table 11). Group 4 (Pain w/ Combined Trauma) had the highest mean ($M= 35.67, SD= 14.76$) when compared to the other three groups. Group 2 (Pain w/ Non-Back-Related Trauma) had the second highest mean ($M= 31.57, SD= 15.20$). Bonferroni post-hoc tests indicated that there was a statistically significant difference between Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -13.12, $p=.001$, 95% confidence interval (-21.97, -4.27)]. Thus, Group 4 evidenced the highest levels of perceived pain severity, as well as the highest levels of PTSD symptom severity when compared to the other three groups.
Table 11

Results of One-Way ANOVA for CLBP Groups and Pain Severity Level.

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>95% Confidence Interval for Mean</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td>Mean</td>
</tr>
<tr>
<td>Total</td>
<td>64.00</td>
<td>71.00</td>
<td>30.031</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>3566.219</td>
<td>3</td>
<td>1188.740</td>
<td>5.389</td>
</tr>
<tr>
<td>Within Groups</td>
<td>34412.624</td>
<td>156</td>
<td>220.594</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>37978.844</td>
<td>159</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PLOC external locus of control. One-way ANOVA indicated that there was no statistically significant difference among the four CLBP groups for external locus of control, $F(3, 157) = .969, p = .409$.

Duration of CLBP. Results of the one-way ANOVA indicated a marginally significant difference among the groups for duration of CLBP, $F(3, 160) = 2.60, p = .055$ (see Table 12). Group 4 (Pain w/ Combined Trauma) had the highest mean for duration of CLBP ($M = 166.41, SD = 148.07$).
Group 2 (Pain w/ Non-Back-Related Trauma) had the second highest mean ($M= 161.51$, $SD= 159.70$), while Group 3 (Pain w/ Back-Related Trauma) had the lowest mean ($M= 97.07$, $SD= 117.14$). Post-hoc (Bonferroni) tests were not significant for any group comparisons.

Table 12

*Results of One-Way ANOVA for Duration of CLBP.*

<table>
<thead>
<tr>
<th>Duration of CLBP in mos</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Only</td>
<td>38</td>
<td>117.47</td>
<td>114.58</td>
<td>18.59</td>
<td>79.81 - 155.14</td>
<td>6</td>
<td>480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Back-Related Trauma</td>
<td>35</td>
<td>161.51</td>
<td>159.70</td>
<td>26.99</td>
<td>106.66 - 216.37</td>
<td>15</td>
<td>720</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back-Related Trauma</td>
<td>44</td>
<td>97.07</td>
<td>117.14</td>
<td>17.66</td>
<td>61.45 - 132.68</td>
<td>6</td>
<td>480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined Trauma</td>
<td>44</td>
<td>166.41</td>
<td>148.07</td>
<td>22.32</td>
<td>121.39 - 211.43</td>
<td>6</td>
<td>675</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>134.84</td>
<td>137.59</td>
<td>10.84</td>
<td>113.43 - 156.26</td>
<td>6</td>
<td>720</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>142989.5</td>
<td>3</td>
<td>47663.157</td>
<td>2.593</td>
<td>.055</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2885772</td>
<td>157</td>
<td>18380.711</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3028761</td>
<td>160</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Total number of treatments tried for CLBP.* A one-way ANOVA indicated that there was a statistically significant difference among the groups for the number of treatments tried for patients' CLBP, $F(3, 156)= 9.374, p<.001$ (see Table 13). Inspection of the means showed that Group 4 (Pain w/ Combined Trauma) had the highest mean for the total number of treatments tried ($M= 5.35$, $SD= 2.77$).
Further, Bonferroni post-hoc tests indicated that there were statistically significant differences between the following: (1) Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -2.66, p<.001, 95% confidence interval (-4.02, -1.31)], (2) Group 4 (Pain w/ Combined Trauma) and Group 2 (Pain w/ Non-Back-Related Trauma) [mean difference = 1.49, p=.027, 95% confidence interval (.11, 2.87)], and (3) Group 3 (Pain w/ Back-Related Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -1.41, p=.038, 95% confidence interval (-2.78, -0.047)].

Table 13

Results of One-Way ANOVA for Total Number of Treatments Tried for CLBP.

<table>
<thead>
<tr>
<th>Descriptives</th>
</tr>
</thead>
<tbody>
<tr>
<td>total number of treatments tried</td>
</tr>
<tr>
<td>Pain Only</td>
</tr>
<tr>
<td>Non-Back-Related Trauma</td>
</tr>
<tr>
<td>Back-Related Trauma</td>
</tr>
<tr>
<td>Combined Trauma</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>total number of treatments tried</td>
</tr>
<tr>
<td>Between Groups</td>
</tr>
<tr>
<td>Within Groups</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
McGill Pain Questionnaire (MPQ) subscales. A one-way ANOVA for the MPQ subscales revealed a statistically significant difference among the groups for the MPQ Sensory subscale, $F (3, 159)= 6.303, p<.001$; the MPQ Affective subscale, $F (3, 159)= 3.203, p=.025$; and the MPQ Miscellaneous subscale, $F (3, 159)= 2.848, p=.039$ (see Table 14). Descriptive information indicated that Group 4 (Pain w/ Combined Trauma) had the highest means, and Group 1 (Pain Only, No Trauma) had the lowest means for all four MPQ subscales. Bonferroni post-hoc tests for the MPQ subscales indicated several significant findings.

First, for the MPQ sensory subscale, there was a statistically significant difference between Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -7.64, $p<.001$, 95% confidence interval (-12.40, -2.88)]. There was also a significant difference between Group 2 (Pain w/ Non-Back-Related Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -5.33, $p=.032$, 95% confidence interval (-10.36, -2.91)]. Second, for the MPQ affective subscale, there was a statistically significant difference between Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -2.38, $p=.019$, 95% confidence interval (-4.503, -2.603)]. Third, for the MPQ miscellaneous subscale, there was a statistically significant difference between Group 4 (Pain w/ Combined Trauma) and Group 1 (Pain Only, No Trauma) [mean difference = -2.41, $p=.032$, 95% confidence interval (-4.68, -1.304)].
Table 14

Results of One-Way ANOVA for MPQ Subscales.

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MPQ sensory subscale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Only</td>
<td>37</td>
<td>13.7027</td>
<td>8.1951</td>
<td>1.3473</td>
<td>10.9703</td>
<td>16.4351</td>
<td>.00</td>
<td>35.00</td>
</tr>
<tr>
<td>Non-Back-Related Trauma</td>
<td>35</td>
<td>19.0286</td>
<td>8.4348</td>
<td>1.4257</td>
<td>16.1311</td>
<td>21.9260</td>
<td>.00</td>
<td>35.00</td>
</tr>
<tr>
<td>Back-Related Trauma</td>
<td>44</td>
<td>18.0227</td>
<td>7.9343</td>
<td>1.1961</td>
<td>15.6105</td>
<td>20.4350</td>
<td>3.00</td>
<td>34.00</td>
</tr>
<tr>
<td>Combined Trauma</td>
<td>44</td>
<td>21.3409</td>
<td>7.4987</td>
<td>1.1305</td>
<td>19.0611</td>
<td>23.6207</td>
<td>8.00</td>
<td>38.00</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>18.1563</td>
<td>8.3813</td>
<td>.6626</td>
<td>16.8476</td>
<td>19.4849</td>
<td>.00</td>
<td>38.00</td>
</tr>
</tbody>
</table>

| **MPQ affective subscale** | | | | | | | | |
| Pain Only | 37 | 2.4595 | 3.3796 | .5556 | 1.3326 | 3.5863 | .00 | 11.00 |
| Non-Back-Related Trauma | 35 | 4.3143 | 3.4622 | .5852 | 3.1250 | 5.5036 | .00 | 13.00 |
| Back-Related Trauma | 44 | 3.9318 | 3.3646 | .5072 | 2.9089 | 4.9548 | .00 | 12.00 |
| Combined Trauma | 44 | 4.8409 | 3.9470 | .5950 | 3.6409 | 6.0409 | .00 | 14.00 |
| Total | 160 | 3.9250 | 3.6317 | .2871 | 3.3580 | 4.4920 | .00 | 14.00 |

| **MPQ evaluative subscale** | | | | | | | | |
| Pain Only | 37 | 2.3514 | 1.5495 | .2547 | 1.8347 | 2.8880 | .00 | 5.00 |
| Non-Back-Related Trauma | 35 | 2.4571 | 1.5018 | .2539 | 1.9412 | 2.9730 | .00 | 5.00 |
| Back-Related Trauma | 44 | 2.3864 | 1.4661 | .2210 | 1.9406 | 2.8321 | .00 | 5.00 |
| Combined Trauma | 44 | 3.0455 | 1.5090 | .2275 | 2.5867 | 3.5042 | .00 | 5.00 |
| Total | 160 | 2.5750 | 1.5195 | .1201 | 2.3378 | 2.8122 | .00 | 5.00 |

| **MPQ miscellaneous subscale** | | | | | | | | |
| Pain Only | 37 | 4.0270 | 3.8549 | .6337 | 2.7417 | 5.3123 | .00 | 15.00 |
| Non-Back-Related Trauma | 35 | 5.7714 | 4.1023 | .6934 | 4.3623 | 7.1806 | .00 | 17.00 |
| Back-Related Trauma | 44 | 5.1364 | 3.8373 | .5785 | 3.9697 | 6.3030 | .00 | 16.00 |
| Combined Trauma | 44 | 6.4318 | 3.5134 | .5297 | 5.3636 | 7.5000 | .00 | 15.00 |
| Total | 160 | 5.3750 | 3.8815 | .3069 | 4.7690 | 5.9810 | .00 | 17.00 |

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MPQ sensory subscale</strong></td>
<td>Between Groups</td>
<td>1207.529</td>
<td>3</td>
<td>402.510</td>
<td>6.303</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>9961.565</td>
<td>156</td>
<td>63.856</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>11169.094</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MPQ affective subscale</strong></td>
<td>Between Groups</td>
<td>121.686</td>
<td>3</td>
<td>40.562</td>
<td>3.203</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>1975.414</td>
<td>156</td>
<td>12.663</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2097.100</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MPQ evaluative subscale</strong></td>
<td>Between Groups</td>
<td>13.641</td>
<td>3</td>
<td>4.547</td>
<td>2.007</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>353.459</td>
<td>156</td>
<td>2.266</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>367.100</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MPQ miscellaneous subscale</strong></td>
<td>Between Groups</td>
<td>124.378</td>
<td>3</td>
<td>41.459</td>
<td>2.848</td>
</tr>
</tbody>
</table>
Total number of CLBP diagnoses. A one-way ANOVA revealed that there were no significant differences among the CLBP groups for the total number of diagnoses, 
\[ F(3, 126) = .899, p = .444. \]

Non-parametric Additional Analyses

Whether the patient had back surgery. Results of a Chi Square analysis indicated that there was a statistically significant difference among the groups for whether or not the patient had back surgery, \[ \chi^2 (3, N = 157) = 8.949, p = .030 \] (see Table 15). The 2 x 4 contingency table indicated that Group 4 (Pain w/ Combined Trauma) had the greatest number of patients who had undergone back surgery.

Table 15
Results of Chi Square Analysis for Whether or Not the Patient Had Back Surgery.

<table>
<thead>
<tr>
<th>Count</th>
<th>The CLBP</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain Only</td>
<td>Non-Back Trauma</td>
<td>Back Trauma</td>
<td>Combined Trauma</td>
<td>Total</td>
</tr>
<tr>
<td>Did the Patient Back Surgery?</td>
<td>Yes</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>33</td>
<td>29</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>38</td>
<td>35</td>
<td>41</td>
<td>43</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>8.949a</td>
<td>3</td>
<td>.030</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.959</td>
<td>3</td>
<td>.030</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>8.495</td>
<td>1</td>
<td>.004</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>157</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.69.
*Patient's specific CLBP diagnoses.* Chi square analysis for CLBP diagnosis revealed that there was a difference that approached statistical significance among the groups for the diagnosis of herniated/ruptured disk(s), $\chi^2 (3, N = 127) = 7.127, p = .068$ (see Table 16). Cross-tabulations and frequencies of the number of patients who had a herniated/ruptured disk(s) in each of the four groups revealed that Group 4 (Pain w/ Combined Trauma) had the greatest percentage of patients with this diagnosis.

Table 16

*Results of Chi Square Analysis for Specific Diagnosis of Herniated/ Ruptured Disk and CLBP Groups.*

<table>
<thead>
<tr>
<th>Herniated/ Ruptured Disk(s)</th>
<th>The CLBP Groups</th>
<th>Pain Only</th>
<th>Non-Back Trauma</th>
<th>Back Trauma</th>
<th>Combined Trauma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniated/ Ruptured Disk(s)</td>
<td>Yes</td>
<td>6</td>
<td>9</td>
<td>14</td>
<td>22</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21</td>
<td>17</td>
<td>19</td>
<td>19</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>27</td>
<td>26</td>
<td>33</td>
<td>41</td>
<td>127</td>
</tr>
</tbody>
</table>

**Chi-Square Tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>7.127</td>
<td>3</td>
<td>.068</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.354</td>
<td>3</td>
<td>.061</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>7.030</td>
<td>1</td>
<td>.008</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>127</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.44.
Other negative life events. In order to explore group differences for various negative life events, Chi Square analyses were conducted on patients' responses to the first 13 items on the Posttraumatic Diagnostic Scale (PDS), which included a list of different events that individuals may or may have not experienced at some point in their lifetimes. It is important to note that patients in ALL of the groups, including group 1 (Pain Only, No Trauma) and group 3 (Pain w/ Back-Related Trauma) may have reported experiencing some negative life events; however, these individuals did not perceive that these negative events were traumatic for them.

Thus, in terms of group placement, patients in Group 1 reported that they did not experience any events that they perceived as being traumatic for them. Patients in Group 2 (Pain w/ Non-Back-Related Trauma) perceived that only those events not related to their lower back condition (i.e. generalized events) were traumatic for them. Patients in Group 3 perceived that those events resulting in their back injuries and pain were traumatic for them. And, patients in Group 4 (Pain w/ Combined Trauma) perceived that both non-back-related and back-related events that they had experienced were traumatic for them.

Results of Chi square analyses indicated statistically significant differences among the CLBP groups for Natural disaster (e.g. tornado, hurricane, flood, major earthquake), \( \chi^2 (3, N = 137) = 11.50, p = .009 \), as well as for Non-sexual assault by a family member or acquaintance, \( \chi^2 (3, N = 137) = 9.175, p = .027 \) (see Tables 17-18). Group 4 (Pain w/ Combined Trauma) had the greatest number of patients who had experienced both of these traumatic events when compared to the other groups.
Additionally, Chi Square analyses revealed four traumatic events that approached statistical significance for group differences, including: (1) serious accident, fire, or explosion (i.e. industrial, farm, car, plane, or boating accident), $\chi^2 (3, N = 137) = 6.454$, $p = .091$, (2) sexual assault by a family member or acquaintance (i.e. rape or attempted rape), $\chi^2 (3, N = 137) = 6.524$, $p = .089$, (3) sexual contact when the patient was younger than 18 with someone who was 5 or more years older than him/her (i.e. contact with genitals, breasts), $\chi^2 (3, N = 137) = 7.412$, $p = .060$, and (4) life-threatening illness, $\chi^2 (3, N = 137) = 7.082$, $p = .069$ (see Tables 19-22). Once again, Group 4 (Pain w/Combined Trauma) had the greatest number of individuals who had experienced these traumatic events in comparison to the other three CLBP groups.

Table 17

*Results of Chi Square Analysis for Natural Disaster and CLBP Groups.*

<table>
<thead>
<tr>
<th>Crosstab</th>
<th>The CLBP Groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain</td>
<td>Only</td>
<td>Non-Back Trauma</td>
<td>Back-Related Trauma</td>
<td>Combined Trauma</td>
</tr>
<tr>
<td>Natural Disaster</td>
<td>No</td>
<td>13</td>
<td>20</td>
<td>33</td>
<td>24</td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>11</td>
<td>5</td>
<td>19</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chi-Square Tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>df</td>
<td>Asymp. Sig. (2-sided)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
<td>11.503\textsuperscript{a}</td>
<td>3</td>
<td>.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>12.633</td>
<td>3</td>
<td>.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.237</td>
<td>1</td>
<td>.627</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a} 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.58.
### Table 18

**Results of Chi Square Analysis for Non-Sexual Assault and CLBP Groups.**

**Crosstab**

<table>
<thead>
<tr>
<th>Count</th>
<th>Non-Back Trauma</th>
<th>Back-Related Trauma</th>
<th>Combined Trauma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-sexual assault by Family Member</td>
<td>19</td>
<td>26</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

**Chi-Square Tests**

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>9.175a</td>
<td>3</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>9.234</td>
<td>3</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>2.003</td>
<td>1</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.66.

### Table 19

**Results of Chi Square Analysis for Serious Accident, Fire, Explosion and CLBP Groups.**

**Crosstab**

<table>
<thead>
<tr>
<th>Count</th>
<th>Non-Back Trauma</th>
<th>Back-Related Trauma</th>
<th>Combined Trauma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious accident, fire, explosion</td>
<td>12</td>
<td>18</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

**Chi-Square Tests**

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.454a</td>
<td>3</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.532</td>
<td>3</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.609</td>
<td>1</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.41.
Table 20

Results of Chi Square Analysis for Sexual Assault by Family Member/ Acquaintance and CLBP Groups.

Crosstab

<table>
<thead>
<tr>
<th></th>
<th>The CLBP Groups</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain Only</td>
<td>Non-Back Trauma</td>
<td>Back-Related Trauma</td>
<td>Combined Trauma</td>
</tr>
<tr>
<td>Sexual Assault by Family Member or Acquaintance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>22</td>
<td>22</td>
<td>35</td>
<td>33</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.524a</td>
<td>3</td>
<td>.089</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.857</td>
<td>3</td>
<td>.077</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.152</td>
<td>1</td>
<td>.696</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.56.

Table 21

Results of Chi Square Analysis for Sexual Contact/ Molestation/ Incest and CLBP Groups

Crosstab

<table>
<thead>
<tr>
<th></th>
<th>The CLBP Groups</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain Only</td>
<td>Non-Back Trauma</td>
<td>Back-Related Trauma</td>
<td>Combined Trauma</td>
</tr>
<tr>
<td>Sexual Contact/ Molestation/ Incest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>23</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>7.412a</td>
<td>3</td>
<td>.060</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.904</td>
<td>3</td>
<td>.048</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.345</td>
<td>1</td>
<td>.246</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.38.
Table 22

Results of Chi Square Analysis for Life-Threatening Illness and CLBP Groups.

<table>
<thead>
<tr>
<th>Count</th>
<th>The CLBP Groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain Only</td>
<td>Non-Back Trauma</td>
<td>Back-Related Trauma</td>
<td>Combined Trauma</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Life-threatening Illness</td>
<td>No</td>
<td>21</td>
<td>20</td>
<td>33</td>
<td>29</td>
<td>103</td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>11</td>
<td>5</td>
<td>14</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>31</td>
<td>38</td>
<td>43</td>
<td>137</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>7.082*</td>
<td>3</td>
<td>.069</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.361</td>
<td>3</td>
<td>.061</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.639</td>
<td>1</td>
<td>.424</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>137</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.20.

Table 23 summarizes the number (n) of patients for each of the four groups who experienced the aforementioned negative life events. It is important to note that there were only 137 patients out of the total 161 patients in the CLBP sample who responded to these items; thus, frequencies are based upon a total of 137 patients.

* Additionally, some CLBP patients may have experienced more than one negative life event.
Table 23

Summary Table of Number of Patients in Each of Four Groups Having Experienced Negative Life Events.

<table>
<thead>
<tr>
<th>CLBP GROUPS</th>
<th>Natural Disaster (n)</th>
<th>Non-Sexual Assault by Family/ Acquain. (n)</th>
<th>Serious Accident, Fire, Explosion (n)</th>
<th>Sexual Assault by Family Member/ Acquaintance (n)</th>
<th>Molest./ Incest (n)</th>
<th>Life-Threat. Illness (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Only</td>
<td>12</td>
<td>6</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Non-Back Trauma</td>
<td>11</td>
<td>5</td>
<td>13</td>
<td>9</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Back Trauma</td>
<td>5</td>
<td>4</td>
<td>15</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Combined Trauma</td>
<td>19</td>
<td>16</td>
<td>28</td>
<td>10</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

Additional Analyses for Person Characteristics

Multiple exploratory bivariate correlation analyses were run across all patients on all predictor variables determined to be person characteristics, including: gender of the patient, age of the patient, perceived uncontrollability, locus of control (external), perceived pain severity, perceived level of impairment (disability), and duration of CLBP. These were also compared to PTSD symptom severity level. Results of the correlation matrix indicated several significant findings (see Table 24).

First, significant positive associations were found for external locus of control and perceived pain severity ($r = .385, p<.001$) and perceived level of impairment (disability) ($r = .402, p<.001$). Second, a significant positive correlation was found for pain severity and perceived level of impairment (disability), ($r = .378, p<.001$).
Third, a significant negative association was found for gender/sex of the patient and perceived level of impairment (disability) ($r = -.175, p<.05$), such that female CLBP patients reported greater levels of impairment (disability). Fourth, a significant positive association was found for age of the patient and duration of CLBP ($r = .494, p<.001$). Finally, the following predictor variables were found to have significant positive associations with PTSD symptom severity: (1) external locus of control ($r = .364, p<.001$), (2) perceived pain severity ($r = .488, p<.001$), and (3) perceived level of impairment ($r = .538, p<.001$).
Table 24

*Correlation Matrices for Predictor Variables.*

<table>
<thead>
<tr>
<th></th>
<th>Perceived Uncontrol</th>
<th>PLOC External Locus of Control</th>
<th>Pain Severity</th>
<th>Level of Impairment</th>
<th>PTSD symptom severity</th>
<th>Sex of Patient</th>
<th>Age of Patient</th>
<th>Duration of CLBP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td>1.000</td>
<td>.004</td>
<td>-.013</td>
<td>.035</td>
<td>-.026</td>
<td>-.024</td>
<td>.076</td>
<td>.046</td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>156</td>
<td>157</td>
<td>129</td>
<td>157</td>
<td>157</td>
<td>157</td>
<td>157</td>
</tr>
<tr>
<td><strong>PLOC External Locus of Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>.004</td>
<td>1.000</td>
<td>.385**</td>
<td>.402**</td>
<td>.364**</td>
<td>-.010</td>
<td>-.118</td>
<td>-.090</td>
</tr>
<tr>
<td>N</td>
<td>156</td>
<td>160</td>
<td>159</td>
<td>132</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td><strong>Pain Severity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>-.013</td>
<td>.385**</td>
<td>1.000</td>
<td>.378**</td>
<td>.488**</td>
<td>-.049</td>
<td>.011</td>
<td>.015</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>159</td>
<td>160</td>
<td>131</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td><strong>Level of Impairment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>.035</td>
<td>.402**</td>
<td>.378**</td>
<td>1.000</td>
<td>.538**</td>
<td>-.175*</td>
<td>.019</td>
<td>.053</td>
</tr>
<tr>
<td>N</td>
<td>129</td>
<td>132</td>
<td>131</td>
<td>132</td>
<td>132</td>
<td>132</td>
<td>132</td>
<td>132</td>
</tr>
<tr>
<td><strong>PTSD symptom severity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>-.026</td>
<td>.364**</td>
<td>.488**</td>
<td>.538**</td>
<td>1.000</td>
<td>-.099</td>
<td>-.094</td>
<td>-.013</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>160</td>
<td>160</td>
<td>132</td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>161</td>
</tr>
<tr>
<td><strong>Sex of the Patient</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>-.024</td>
<td>.010</td>
<td>-.049</td>
<td>-.175*</td>
<td>-.099</td>
<td>1.000</td>
<td>.013</td>
<td>-.042</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>160</td>
<td>160</td>
<td>132</td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>161</td>
</tr>
<tr>
<td><strong>Age of Patient</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>.076</td>
<td>-.118</td>
<td>.011</td>
<td>.019</td>
<td>-.094</td>
<td>.013</td>
<td>1.000</td>
<td>.494**</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>160</td>
<td>160</td>
<td>132</td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>161</td>
</tr>
<tr>
<td><strong>Duration of CLBP in Months</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pearson Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td>.046</td>
<td>-.090</td>
<td>.015</td>
<td>.053</td>
<td>-.013</td>
<td>.042</td>
<td>.494**</td>
<td>1.000</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>160</td>
<td>160</td>
<td>132</td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>161</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Other person characteristics (i.e. marital status, ethnicity, occupation) did not significantly correlate with any variables included in Table 24.
Further correlations were conducted in order to further explore the relationships among person characteristics which were found to predominate in Group 4 (Pain w/ Combined Trauma), including: (1) herniated/ ruptured disk(s), (2) whether or not the patient had back surgery, (3) the total number of treatments the patient had tried for their CLBP, (4) perceived pain severity, (5) PLOC external locus of control, and (6) perceived level of impairment/ disability. These characteristics were also correlated with PTSD symptom severity level. Results of the Pearson R correlation matrix indicated numerous significant associations (see Table 25).

First, herniated/ ruptured disk(s) positively related to the following variables: whether the patient had back surgery \( (r = .482, p < .001) \), total number of treatments tried for CLBP \( (r = .360, p < .001) \), perceived pain severity \( (r = .282, p < .001) \), external locus of control \( (r = .180, p < .05) \), and perceived level of impairment/ disability \( (r = .314, p < .001) \). Therefore, these patients were more likely to have had back surgery for their lower back condition, and they also tended to try more treatments, reported greater levels of perceived pain severity, had an external locus of control, and reported greater levels of perceived impairment/ disability. Herniated/ ruptured disk(s) was positively related to PTSD symptom severity level \( (r = .308, p < .001) \), indicating that patients with this condition were more likely to have higher levels of PTSD symptom severity.

Second, whether or not the patient had back surgery was positively related to the following variables: number of treatments tried \( (r = .389, p < .001) \), perceived pain severity \( (r = .315, p < .001) \), external locus of control \( (r = .240, p < .001) \), and perceived level of impairment/ disability \( (r = .245, p < .001) \). Thus, patients who had had back surgery were more likely to have tried more treatments for their CLBP.
Further, these patients tended to have greater levels of perceived pain severity, more external locus of control, and greater perceived impairment/disability. In addition, back surgery significantly predicted heightened levels of PTSD symptom severity ($r = .288$, $p < .001$).

Third, the total number of treatments tried by the patient for relief of their CLBP was positively related to the following variables: perceived pain severity ($r = .533$, $p < .001$), external locus of control ($r = .177$, $p < .001$), perceived level of impairment/disability ($r = .310$, $p < .001$), and PTSD symptom severity level ($r = .452$, $p < .001$). Thus, patients who had tried more treatments for relief of their CLBP also evidenced greater levels of pain severity, more external locus of control, greater perceived impairment/disability, and greater levels of PTSD symptom severity.

Fourth, perceived pain severity was positively associated with the following: external locus of control ($r = .385$, $p < .001$), perceived level of impairment/disability ($r = .378$, $p < .001$), and PTSD symptom severity level ($r = .488$, $p < .001$), which indicated that patients who reported greater levels of pain severity also had more of an external locus of control, greater levels of perceived impairment/disability, and exhibited more symptoms of PTSD.

Fifth, external locus of control positively correlated with perceived level of impairment/disability ($r = .402$, $p < .001$) and PTSD symptom severity ($r = .364$, $p < .001$), which revealed that patients with an external locus were also more likely to have greater perceived levels of impairment/disability, as well as greater levels of PTSD symptom severity.
Finally, perceived level of impairment/disability was positively associated with PTSD symptom severity level \( (r = .538, p < .001) \), which indicated that those CLBP patients who had greater levels of impairment/disability also tended to be experiencing more symptoms of PTSD.

Table 25

Correlation Matrices for Person Characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Herniated/ Ruptured Disk(s)</th>
<th>Did the Patient Have Back Surgery?</th>
<th>Total # of Treatments</th>
<th>Perc. Pain Severity</th>
<th>PLOC External Locus of Control</th>
<th>Perc. Level of Impairment/ Disability</th>
<th>PTSD Symptom Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniated/ Ruptured</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk(s)</td>
<td>.1000</td>
<td>.482*</td>
<td>.360*</td>
<td>.282*</td>
<td>.180*</td>
<td>.314*</td>
<td>.308*</td>
</tr>
<tr>
<td>Did the Patient Have</td>
<td>.127</td>
<td>.000</td>
<td>.000</td>
<td>.001</td>
<td>.042</td>
<td>.001</td>
<td>.000</td>
</tr>
<tr>
<td>Back Surgery?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of Treatments</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.360*</td>
<td>.389*</td>
<td>.1000</td>
<td>.533*</td>
<td>.177*</td>
<td>.310*</td>
<td>.452*</td>
</tr>
<tr>
<td>Perc. Pain Severity</td>
<td>.127</td>
<td>.157</td>
<td>.157</td>
<td>.156</td>
<td>.156</td>
<td>.129</td>
<td>.157</td>
</tr>
<tr>
<td>PLOC External Locus of</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>.282*</td>
<td>.315*</td>
<td>.533*</td>
<td>1.000</td>
<td>.385*</td>
<td>.378*</td>
<td>.488*</td>
</tr>
<tr>
<td>Perc. Level of</td>
<td>.127</td>
<td>.156</td>
<td>.156</td>
<td>.156</td>
<td>.159</td>
<td>.131</td>
<td>1.60</td>
</tr>
<tr>
<td>Impairment/ Disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Symptom Severity</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.308*</td>
<td>.288*</td>
<td>.452*</td>
<td>.488*</td>
<td>.364*</td>
<td>.538*</td>
<td>1.000</td>
</tr>
<tr>
<td>**: Correlation is</td>
<td>.127</td>
<td>.157</td>
<td>.157</td>
<td>.160</td>
<td>.160</td>
<td>.132</td>
<td>1.60</td>
</tr>
<tr>
<td>significant at the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01 level (2-tailed).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*: Correlation is</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>significant at the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.05 level (2-tailed).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional correlation analyses were conducted for gender, age, education, and all three types of locus of control (external locus, internal locus, and reliance on powerful others). Results indicated significant correlations for the following variables: (1) gender and internal locus of control ($r = .158, p = .046$), such that male CLBP patients were more likely to exhibit an internal locus of control in dealing with their pain, (2) age and reliance on powerful others locus ($r = .202, p = .010$), (3) education and reliance on powerful other locus ($r = -.250, p = .001$), as well as external locus of control ($r = -.269, p = .001$). Thus, the more education the patients had acquired, the less likely they were to rely on powerful others or to evidence the use of an external locus of control in dealing with their CLBP experience (see Table 26).

Table 26

*Correlation Matrices for Gender, Age, Education, and PLOC Locus of Control Subscales.*

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Gender of Patient</th>
<th>Age of Patient</th>
<th>Education Level</th>
<th>PLOC Internal Locus of Control</th>
<th>PLOC Reliance on Powerful Others</th>
<th>PLOC External Locus of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender of Patient</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>1.00</td>
<td>.013</td>
<td>.072</td>
<td>.158*</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>Age of Patient</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>.013</td>
<td>1.000</td>
<td>-.011</td>
<td>-.010</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>Education Level</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>.072</td>
<td>-.011</td>
<td>1.000</td>
<td>.102</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>161</td>
<td>161</td>
<td>161</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>PLOC Internal Locus of Control</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>.158*</td>
<td>-.010</td>
<td>.072</td>
<td>1.000</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>PLOC Reliance on Powerful Others</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>.046</td>
<td>.901</td>
<td>.199</td>
<td>.102</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>PLOC External Locus of Control</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
<td>.086</td>
<td>.202*</td>
<td>-.250**</td>
<td>.244**</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).
Finally, given the results for person characteristics from the correlation matrices, standard multiple regression was conducted in order to determine the predictive value of external locus of control, perceived pain severity, perceived impairment/disability, back surgery, number of treatments tried for CLBP, and herniated/ruptured disk(s). Results of multiple regression revealed that, as a set, these variables significantly predicted PTSD symptom severity level ($R^2 = .442$, $R^2_{adj} = .408$, $p<.001$). The analysis further indicated that perceived level of impairment/disability significantly predicted PTSD symptom severity level ($\beta = .446$, $p<.001$, 95% confidence interval (2.864, 6.588)), such that as patients' perceived levels of impairment/disability increased, PTSD symptom severity level also increased. Further, the number of treatments that the patient tried for relief of their CLBP significantly predicted levels of PTSD symptom severity, [$\beta = .205$, $p=.030$, 95% confidence interval (.109, 2.084)], such that as patients tried more treatments, they also evidenced greater levels of PTSD symptoms.

Thus, perceived uncontrollability (external locus of control), perceived pain severity, herniated/ruptured disk(s), and the patient having had back surgery each significantly predicted PTSD symptom severity when entered into a multiple regression equation separately. However, when the total number of treatments tried for CLBP and perceived impairment/disability were added into the multiple regression equation, the Beta weights of the other variables diminished such that they no longer predicted PTSD symptom severity (see Table 27).
Table 27

Results of Multiple Regression for Predictors.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-4.999</td>
<td>6.691</td>
<td>- .747</td>
</tr>
<tr>
<td>Perceived Impairment/ Disability</td>
<td>4.726</td>
<td>.939</td>
<td>.446</td>
</tr>
<tr>
<td>Perceived Pain Severity</td>
<td>.133</td>
<td>.088</td>
<td>.146</td>
</tr>
<tr>
<td>PLOC External Locus of Control</td>
<td>.727</td>
<td>1.233</td>
<td>.053</td>
</tr>
<tr>
<td>Total # of Treatments Tried for CLBP</td>
<td>1.097</td>
<td>.498</td>
<td>.205</td>
</tr>
<tr>
<td>Herniated/ Ruptured Disk(s)</td>
<td>-1.524</td>
<td>2.382</td>
<td>-.057</td>
</tr>
</tbody>
</table>

[a. Dependent Variable: PTSD symptom severity]

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R Square Change</td>
</tr>
<tr>
<td>1</td>
<td>.665</td>
<td>.442</td>
<td>.408</td>
<td>10.30</td>
<td>.442</td>
</tr>
</tbody>
</table>

[a. Predictors: (Constant), Did the Patient Have Back Surgery?, PLOC External Locus of Control, total number of treatments tried, level of impairment-classification, Herniated/ Ruptured Disk(s), pain rating index total]
CHAPTER FOUR

Discussion

Overview

The prevalence of PTSD has been found to be substantially elevated in patients with chronic pain when compared to the general population (Asmundson, Bonin, Fromback, & Norton, 2000). Research suggests that 50-90% of chronic pain patients exhibit PTSD symptoms (Blanchard et. al., 1995; Chibnall & Duckro, 1994; DeCarvalho, 2001; Hickling and Blanchard, 1992; Kuch et. al, 1985; Muse, 1986). There is a paucity of research, however, regarding those factors that predict PTSD symptom severity in chronic pain patients. The present study was conducted in order to both replicate and extend previous research (DeCarvalho, 2001) that explored the prevalence and potential predictors of PTSD symptom severity in chronic low back pain patients. Based on McFarlane and Yehuda's (1996) conceptual framework for the development of PTSD, this investigation examined specific features of two predictive factors: the nature of the trauma and characteristics of the person experiencing the trauma. Specifically regarding the nature of the trauma, this study addressed the question of whether the experience of pain alone triggered PTSD symptoms or actual external traumatic events (whether associated with the back injury or not) were necessary for such outcomes. And, regarding predictive person characteristics, the patient's age and perceived uncontrollability of the pain experience were examined.
Discussion of Present Findings

Analyses indicated that approximately 51% of all of the chronic low back pain patients assessed for this study evidenced clinically-significant levels of posttraumatic stress disorder symptoms. Furthermore, another 24% of the patients evidenced a mild PTSD symptom severity level, reporting at least 1 to 8 symptoms of PTSD. The findings resembled those of other investigators (DeCarvalho, 2001; Hickling & Blanchard, 1992). Further, the results demonstrated that pain alone appeared to be a sufficient trauma to trigger clinically-significant levels of PTSD symptoms for some patients, supporting the conclusions of Schreiber and Galai-Gat (1993), Buckley, Blanchard, & Hickling (1996), and Geisser et. al. (1996).

Most striking, however, was the finding that of those patients who experienced chronic low back pain, back-related trauma, and other trauma (Group 4), 77% reported clinically-significant levels of PTSD symptoms. Further, as a group, these patients reported the highest levels of PTSD symptom severity compared to other CLBP patients who had not experienced the combination of traumatic events. Additional analyses revealed that patients in the "combined trauma" group also reported greater perceived pain severity, greater sensory (pain, pressure, burning) and emotional distress, more negative perceptions about their CLBP experience, longer duration of CLBP, more herniated/ruptured disks, more back surgeries, and more treatments to try to alleviate their CLBP. Individuals with ruptured disks generally experience pain at the site of the injury, as well as referred pain, which involves the sciatic nerve root (Rosomoff & Rosomoff, 1991). Thus, patients experience a "double dose" of severe pain, which when combined with a longer duration, results in disability.
Such disability may include (but is not limited to): difficulty ambulating or poor gait; paralysis; frequent urination or, in cases of extreme nerve impingement, incontinence; loss of reflex(s), sensory or proprioceptive losses, bilateral foot-drop, rigid and tight muscles, and loss of functional activity (Deyo, 1988). Patients with ruptured disk(s) are also more likely to undergo more back surgery(s).

The experience of surgery incurs fears of death, injury, postoperative pain, and helplessness. Studies with breast cancer surgery patients have indicated that, even one year after surgery, one-third of the patients continued to have insomnia because of intrusive thoughts or images of their illness; one-fifth of the patients had nightmares; 12% continued to meet criteria for PTSD; over 50% had dissociative symptoms (Tjemsland, Soreide, & Malt, 1998). Therefore, Tjemsland, Soreide, and Malt's (1998) study reinforced the importance of addressing fears and experiences associated with surgeries and invasive procedures, as patients generally tend to have long-term symptoms of dissociation, nightmares, flashbacks, panic, and fear.

Previous studies in both the general population, as well as with patients with chronic pain, have indicated that perception of life threat and significant physical impairment were major predictors of the development of PTSD (Blanchard, Hickling, Mitnick, et. al., 1995; Butler et. al., 1999; Helzer et. al., 1987; Kilpatrick et. al., 1989; Martini et. al, 1990; Pitman et. al., 1989), as is the physical experience of severe, unrelenting pain (Geisser, Roth, Bachman, & Echert, 1996). Furthermore, nagging physical injuries may be constant reminders of the trauma, which would maintain or exacerbate PTSD (Buckley, Blanchard, & Hickling, 1996).
It is likely that the multiple traumas (reminders of traumas) experienced by patients in this group had a compounding effect, contributing to the greater levels of PTSD symptom severity.

A noteworthy finding was that many of the individuals in Group 4 had experienced more childhood trauma than those in the other groups. Childhood trauma in the forms of physical, sexual, or psychological abuse has been linked to somatic and behavioral manifestations in adulthood. Moreover, adult survivors of childhood trauma are predisposed to predictable physical and behavioral problems (Scaer, 2001). Examples of physical syndromes include: pelvic, lower back, orofacial, and chronic bladder pain, as well as fibromyalgia, interstitial cystitis, non-remitting whiplash syndromes, and eating disorders. Scaer (2001) added that infants and young children who experienced abuse will have permanent neuronal patterns or procedural memories imprinted in their brains, which may result in long-term personality traits, behaviors, and coping styles for dealing with traumas (Grigsby & Hartlaub, 1994; Perry et. al., 1995). Similarly, Damasio (1994) proposed that memories of emotions and sensations comprise somatic markers, which contribute to future behaviors when faced with trauma.

As an example, when children face continuous, repetitive physical, sexual, and/or emotional abuse, with little hope of being able to escape, they tend to dissociate (van der Hart, van der Kolk, & Boon, 1996). In other words, these children and many adults in traumatic experiences, may partially or totally separate themselves from the event in their minds, as actual physical escape is not possible (Loewenstein, 1993).
Likewise, many female victims of rape essentially freeze or go dead, such that their bodies go limp, they cannot resist the attacker, and they are in an altered state resembling being outside of the experience looking in (Rothschild, 2001). This phenomenon is referred to as "tonic immobility," and it is more common in women and children, whereas the fight or flight response is more common in men (Perry et. al., 1995).

Thus, individuals who were molested or beaten as children or adolescents, or who experienced other significant trauma(s), may be vulnerable to similar traumatic experiences. Women who were raped after experiencing a previous trauma experience a compounding effect, wherein they experience some symptoms of the previous trauma, as well as the present trauma of rape (Warshaw, 1988). Furthermore, many of these women, particularly those who had experienced acquaintance rape, psychologically perceive themselves as damaged goods and blame themselves "because their natural impulses to protect themselves and protest (physical and verbal) were extinguished" (Rothschild, 2000). This is not to place any blame on the victims themselves, but rather to emphasize that it is those behaviors and beliefs that were conditioned, imprinted, or learned as procedural memories that will tend to be utilized again in other traumatic circumstances. Especially when victims of trauma have to face consistent reminders of the event(s), resolution and healing becomes more difficult (Hybels-Steer, 1995), and the so-called 'cycle of trauma' tends to persist.
The patients in Group 4 were clearly the most distressed of those assessed in this study. The compounding effects of multiple traumas merit further investigation. Researchers in the field have noted that some individuals may evidence pre-trauma vulnerability, ensuing from several possible factors, including genetics, family history of mental illness, personality traits such as neuroticism, and previous traumatic experiences (McFarlane & Yehuda, 1996; Shalev, 1996). The vulnerability appears to have both psychological and physiological aspects that contribute to the individual's reaction to an initial traumatic event with sustained hyperarousal, a progressive disruption of their underlying neurophysiology, and a decreased ability to cope with and assimilate the trauma. The result is that the individual then is more susceptible to deleterious effects of subsequent trauma, manifested by increased severity of PTSD symptoms.

The results of this study also supported the hypothesis that two personal characteristics of the CLBP patients, namely age and perceived uncontrollability of their pain, would predict PTSD symptom severity. Older patients and patients who perceived a loss of control tended to experience greater PTSD symptom severity. Moreover, the combination of age and perceived uncontrollability predicted PTSD symptom severity level and therefore replicated previous findings (Blanchard-Fields & Robinson, 1988; Gibson & Helme, 2000; Melding, 1995). Essentially, this meant that as they got older and perceived having a loss of control in their CLBP experience, patients' PTSD symptom severity levels tended to increase.
Clearly, perceived loss of control is a central facet in the experience of trauma. In general, when individuals experience some traumatic event in their lives, their perception of control over their lives is extremely important. Traumatic events tend to overwhelm people to the point of robbing them of a sense of control, connection, and meaning (Herman, 1992b). Put another way, trauma has been said to undermine five basic human needs: "the need to be safe, the need to trust, the need to feel some control over one's life, the need to feel of value, [and] the need to feel close to others" (Rosenbloom & Williams, 1999, p. 3). In fact, "traumatic events are extraordinary, not because they occur rarely, but rather because they overwhelm the ordinary human adaptations to life" (Herman, 1992b, p. 33). The more out of control and helpless an individual feels, the more likely he or she is to develop PTSD.

Previous studies have indicated that there is a clear relationship between personal control, learned helplessness, anxiety, and chronic pain disability (DelVecchio-Good, Brodwin, Good, & Kleinman, 1992; Abramson, Garber, & Seligman, 1980). Furthermore, Lackner, Carosella, and Feurstein (1996) concluded that chronic pain disability and perceived levels of severity of pain correlated negatively with functional self-efficacy, or patients' confidence in their abilities to cope with their pain. Burns et. al.'s (1998) findings that pain helplessness, or a seeming lack of control over one's pain experience, was related to pain severity were supported by the present study. Moreover, individuals who experience more intense reactions subsequent to an initial trauma, especially if they felt a lack of control over the event(s), or if they perceived it as a personal failure, are more likely to develop chronic PTSD (Ballenger et. al., 2000).
In the present study, greater levels of PTSD were evidenced in patients who perceived that their chronic pain was uncontrolled, despite proactive efforts to reduce their pain. Thus, Ballenger et. al.'s (2000) conclusion that the uncontrollability of trauma tends to determine the prevalence and severity level of PTSD was also supported by the findings of the present study.

**Implications of the Present Study**

A major and practical implication of the present study is that it establishes links between multiple factors pertaining to one's experience in dealing with chronic low back pain and any other possible traumas. Essentially, one's person characteristics (e.g. age, personality factors, diminished/ lack of resiliency and optimism, psychiatric history, family history of mental illness) relate to increased susceptibility for the development of psychiatric disorders. Such individuals who then experience some antecedent trauma become more vulnerable should another traumatic event(s) occur. In the present study, persons in group 4 (combined trauma) had experienced more serious accidents, physical assaults by acquaintance, sexual assault/ rape by acquaintance, molestation or incest in childhood, and life-threatening illnesses. These antecedent traumas related to greater levels of PTSD symptom severity in the patients sampled. Finally, when these individuals have more complicated physical involvement (i.e. patients with herniated or ruptured disk(s) and who have undergone surgery), who have tried more treatments to try to alleviate their CLBP, who perceive that they are in greater pain, who are experiencing more physical impairment or disability, and who perceive that they are unable to control their pain and disability are more likely to have the greatest levels of PTSD symptom severity. A schematic representation of this preliminary model may be found in Figure 16.
Figure 16. Preliminary Model: Predictors of PTSD symptom severity level in CLBP patients.
Limitations of the Present Study

The present study should be interpreted with the following limitations in mind. First, the large amount of missing data for the intensity and duration of the trauma, which comprised the nature of the traumatic event (McFarlane & Yehuda, 1996), prevented any analyses from taking place to determine whether or not these variables would again predict PTSD symptom severity level. It is believed that the wording of the instrument for these variables may have resulted in or strongly contributed to the missing data. Second, the design of the present study is cross-sectional; thus, no causal relationship between the variables was implied.

As stated earlier, patients in the present study were first recruited from the pain center environment, followed by the chiropractic treatment milieu. The author did not further differentiate individuals (i.e. survey packets not marked) based on treatments received from the pain centers versus the chiropractic centers. Thus, no demographic differences were explored or determined in the present study for the nature of the treatments received to treat CLBP. Yet, it may be said that, in general, patients in the pain center environment utilize this treatment modality as a last resort after being referred by either their primary physician or another specialist (e.g. orthopedic surgeon, neurologist, neurosurgeon, physiatrists). Treatments in the pain center milieu often involve medication, nerve block series, and surgery. Psychotherapy and other non-allopathic modalities such as acupuncture may also be utilized as adjunctive treatments. It was this author's observation that patients in the pain center milieu seemed to express more negativistic, helpless attitudes, which may be due to a number of factors.
For example, patients in this milieu usually receive a follow-up visit once a month or so, which focuses on stabilization of medication for pain relief; conversely, patients in the chiropractic milieu usually have several visits per week. They may start at 5 visits per week, then 3 times per week until their doctor feels that patients are doing better. It is possible that by having consistent contact with their health care professional, patients in the chiropractic milieu feel that they are more in control of their pain experience. It is also possible that patients in the chiropractic milieu, in general, may not have conditions which necessitate heavy medication or surgical interventions. These questions remain unanswered, and further research is warranted to address these issues in the future.

**Implications for Future Research**

The present research study provided valuable information regarding the impact of the nature of the trauma, as well as person characteristics in the development of PTSD symptoms in patients with chronic low back pain. Further, this study made it clear that it is not enough to generalize the predictors to patients suffering from CLBP, but rather it is necessary to consider that additional factors (i.e. type of trauma, history of trauma/ negative life events) can further impact outcome for each patient. Thus, the nature of the trauma and the characteristics of the person jointly predict the level of PTSD symptoms that these patients will experience.

The present study established the link between multiple factors, and a preliminary model was proposed for predictors of PTSD symptom severity in CLBP patients. Further research is needed to replicate these findings, as well as to determine whether this model holds for patients with different chronic pain conditions.
There remains a lack of measurement instruments for assessing PTSD specifically in the CLBP patient domain. Another possible direction for future research is the development of instrumentation to thoroughly identify CLBP patients who are at greater risk for developing PTSD. As increased pain severity is also sufficient to predict PTSD symptoms in these patients, a thorough assessment of patients' pain experience is needed. Further, it is vital to incorporate the assessment of traumatic experiences in this population.

All in all, a paucity remains in the research for examining the relationship between chronic low back pain and PTSD. However, the author's previous study (DeCarvalho, 2001) and the results of the present study indicate that patients with CLBP, indeed, are at risk for developing clinically-significant levels of PTSD. Further research should continue to address the specific impact of the severity of the pain experience, compared to a situational trauma that resulted in the pain.

The present study further indicated that perceived uncontrollability (external locus of control), perceived pain severity, herniated/ruptured disk(s), and the patient having had back surgery each significantly predicted PTSD symptom severity. However, it was found that patients' perceived level of impairment/disability and the total number of treatments tried for relief of their CLBP, were much stronger predictors of PTSD symptom severity level. Future research should further explore the relationships between these predictors in order to better determine risk factors for PTSD in patients with CLBP.
Implications for Future Treatment

Clearly, the whole experience of CLBP, not only the pain severity or a situational trauma resulting in the pain experience, fundamentally relates to how these patients cope on a day-to-day basis. Further, CLBP patients who become disabled and are unable to do those things that they used to enjoy doing, or to function independently in daily life, appear to be at risk for developing greater levels of PTSD symptom severity. A significant finding was that patients who experienced CLBP without any history of antecedent trauma also developed clinically-significant levels of PTSD symptoms. Thus, patients who perceive that they are in pain may develop PTSD.

Another interesting finding in the present study was the impact of perceived uncontrollability, specifically in the form of an external locus of control. The more out of control patients feel, the more at risk they are for developing PTSD symptoms at greater levels. Patients suffering from CLBP, especially if they are experiencing decreased mobility and greater impairment/disability, may also need to take more medication in order to keep their pain at bay. While not always the case, there are CLBP patients who express not only frustration, but also shame due to their dependency upon narcotics so that they might continue to function in daily life. Seemingly, the dynamic in such cases would involve these individuals feeling more out of control, as they are personally unable to maintain their pain levels without the help of medication or multiple treatments. This increased sense of their pain experience being externalized, or out of their own personal control, strongly contributes to patients' sense of helplessness in dealing with CLBP. And, it is possible that patients' external loci of control only fuel their perceptions of impairment/disability.
Given that the majority of patients in the present study had experienced numerous other traumatic events in their lives, clinicians working with CLBP patients should assess for a history of previous trauma, as well as explore the degree to which patients have worked through or healed from trauma. Patients should therefore be assessed with a thorough intake that incorporates any possible trauma, as well as a thorough pain assessment that incorporates levels of physical functioning, severity and duration of pain, impairment/disability, number of treatments the patient has tried, diagnosis, whether or not the patient has had surgeries in the past, the patient's locus of control, and history of trauma (negative life events).

Psychological treatments for patients with CLBP should incorporate means of helping these individuals to feel more in control of their pain experience. This is particularly true of patients who endorse greater pain severity, as well as for older patients, as they are more likely to utilize an external locus in coping with their pain and disability. In general, treatment of CLBP patients should be holistic in nature, and should occur at the client's pace or according to his or her level of readiness. As such, these patients may have a greater sense of control over their experience, and they can better attribute therapeutic gains to their own efforts. By setting short-term, attainable, realistic goals, these individuals may begin to feel that they are making strides toward healing or management of their pain. Thus, biofeedback, stress management, and visualization techniques, with the therapist acting as a coach or guide, may benefit the patient, since he or she is ultimately in control.
Of course, when patients do not experience immediate or significant relief from their pain, treatments should revolve around minimizing their feelings of shame, failure, helplessness, and hopelessness. Cognitive-behavioral therapy can further increase patients’ sense of control as they discover that they are only human, which may give them permission to fail or make slower therapeutic gains than they had hoped.

For some patients, working through underlying past experiences may facilitate greater coping abilities in dealing with CLBP. For other patients, it may become necessary to work on a specific traumatic event. And, for others, as was found in the present study, the experience of pain itself may serve as the traumatic event; for these individuals, looking at the various components of their experience with pain is the prime directive. The important thing is that both the presence of any underlying and/or present trauma, as well as the pain experience in its entirety be addressed for each individual patient. By doing so, it is hoped that patients will be less vulnerable to the development of clinical PTSD.

As progress is made in the field of pain management, much more attention needs to be given to the impact of patients' beliefs, thoughts, perceptions, feelings, and life experiences, in addition to their physical levels of pain and impairment. Clearly, the assessment and treatment of patients with chronic low back pain involves not only the nature of the trauma, but person characteristics as well. By incorporating both of these facets into treatment with CLBP patients, their physical as well as psychological pain may be ameliorated.
It is also hoped that these patients may be spared the experience of posttraumatic stress disorder. Ultimately, as health care and mental health care providers working with these patients address the person's experience in its entirety, improvements for the individual suffering from chronic low back pain, as well as society at-large, can be accomplished.
References


Appendix A

CHRONIC LOW BACK PAIN SURVEY

DEMOGRAPHICS

1. Sex: Female____ Male____

2. Age:____

3. Occupation:__________________________

4. Please check the highest education level which you have attained:

   ___ high school diploma/GED
   ___ vocational/trade school
   ___ college degree(s)
   ___ graduate school masters degree(s)
   ___ doctorate (e.g. M.D., Ph.D., D.M.D., D.V.D.)__________________________
   ___ other_________________________

5. Are you presently (please check ONLY ONE):

   Married_____                              Divorced_____                      
   Single, never married_____                Separated____                       
   Widowed_____                              Other (please specify)______

6. Please check your ethnicity:

   Caucasian/White_____                      African American_____              
   Hispanic_____                             Native American_____               
   Asian American_____                       Other (please specify)____________
Appendix B

LOWER BACK PAIN DESCRIPTIVES

1. I have had lower back pain for: ______ years and ______ months
   - If you have had lower back pain for less than 1 year, please indicate how many months it has been since you started having lower back pain.
   - If you have had lower back pain for more than 1 year, please indicate how many years AND months it has been.

2. My physician(s) has/have diagnosed me as having one or more of the following condition(s).
   (PLEASE NOTE: You may check off more than one if it applies to you).
   ______ Herniated/ruptured disk(s)
   ______ Fracture(s)/ floating bone fragments
   ______ Spondylolisthesis or stenosis (narrowing of disk canal)
   ______ Lordosis/ Kyphosis/ Scoliosis
   ______ Arthritis
   ______ other (please specify) __________________________

3. Have you had back surgery? ______ yes ______ no

4. Which of these treatment(s) have you tried in the past, or are you having right now to help your chronic low back pain? (PLEASE NOTE: You may check off more than one if it applies to you).
   ______ Physical therapy or occupational therapy
   ______ Chiropractic or osteopathic treatments
   ______ Massage therapy
   ______ Medication(s) to help alleviate your pain
   ______ Pool therapy program (supervised or on your own)
   ______ Spinal nerve blocks
   ______ Homeopathic, naturopathic, or vitamin treatments
   ______ Acupressure or acupuncture
   ______ Craniosacral therapy
   ______ Magnet therapy
   ______ Yoga, Tai-Chi, or other similar exercise program(s)
   ______ Counseling to help you deal with your experience with lower back pain
   ______ Other (Please list) __________________________

5. Of the things you are doing to try to help your chronic low back pain (question #4), how well do you feel your pain is controlled? (PLEASE CIRCLE).

   0 Not controlled  1 Slightly Controlled  2 Somewhat Controlled  3 Completely Controlled
   At all
Appendix C

MPQ

Please put a check mark next to the ONE WORD for each number that BEST describes your chronic low back pain RIGHT NOW. Please leave out any number categories that don't describe your experience.

1. ___FLICKERING___QUIVERING___PULSING___THROBBING___BEATING___POUNDING
2. ___JUMPING___FLASHING___SHOOTING
3. ___PRICKING___BORING___DRILLING___STABBING___LANCINATING
4. ___SHARP___CUTTING___LACERATING
5. ___PINCHING___PRESSING___GNAWING___CRAMPING___CRUSHING
6. ___TUGGING___PULLING___WRENCHING
7. ___HOT___BURNING___SCALDING___SEARING
8. ___TINGLING___ITCHY___SMARTING___STINGING
9. ___DULL___SORE___HURTING___ACHING___HEAVY
10. ___TENDER___TAUT___RASPING___SPLITTING
11. ___TIRING___EXHAUSTING
12. ___SICKENING___SUFFOCATING
13. ___FEARFUL___FRIGHTFUL___TERRIFYING
14. ___PUNISHING___GRUELLING___CRUEL___VICIOUS___KILLING
15. ___WRETCHED___BLINDING
16. ___ANNOYING___TROUBLESOME___MISERABLE___INTENSE___UNBEARABLE
17. ___SPREADING___RADIATING___PENETRATING___PIERCING
18. ___TIGHT___NUMB___DRAWING___SQUEEZING___TEARING
19. ___COOL___COLD___FREEZING
20. ___NAGGING___NAUSEATING___AGONIZING___DREADFUL___TORTURING

Please CIRCLE the word that best describes your lower back pain most of the time:

0 1 2 3 4 5
NO PAIN MILD DISCOMFORTING DISTRESSING HORRIBLE EXCRUCIATING
Appendix D

SOURCE OF TRAUMATIC EXPERIENCES (STES)

PART ONE: Trauma related to your chronic low back pain.

This section relates to trauma related to the event(s) which led to your lower back being injured. Please check YES or NO for each of the statements below as it applies to your experience.

1. YES____ NO____ My lower back pain is related to an injury.

IF YOU ANSWERED “NO” TO ITEM #1, PLEASE SKIP DOWN TO PART TWO.

2. YES____ NO____ When I was injured, I experienced or witnessed something that involved actual or threatened death or serious injury.
3. YES____ NO____ When I was injured, I felt a threat to my physical or mental integrity, or that of someone else.
4. YES____ NO____ When I was injured, I felt intense fear, helplessness, or horror.
5. How long did the event which led to your CLBP last?_______________
6. On a scale of 0-5 (0= not intense; 5= extremely intense), how would you rate the intensity of the threat, fear, helplessness, and/or horror that you experienced?______________
7. Please briefly explain how you were injured:

PART TWO: Trauma unrelated to chronic low back pain.

This section relates to any other traumas which do NOT relate to your lower back. Please check YES or NO for each of the statements below as it applies to your experience.

7. YES____ NO____ In the past, I had an experience unrelated to my lower back condition wherein I experienced or witnessed something which involved actual or threatened death or serious injury.
8. YES____ NO____ In the past, I had an experience unrelated to my lower back condition wherein I felt a threat to my physical or mental integrity, or to that of someone else.
9. YES____ NO____ In the past, I had an experience unrelated to my lower back condition wherein I felt intense fear, helplessness, or horror.
10. How long did the event (described in items 7-9) last?_______________
11. Please describe the situation(s) in which you answered “YES” to items 7-9 above.________________________________________________________
INFORMED CONSENT

The Physical and Emotional Effects of Chronic Low Back Pain

Purpose

You are invited to be in this study because you have chronic low back pain. The goal of the study is to gather information that will help health care providers to better meet the needs of individuals suffering from chronic lower back pain.

Procedure

If you are willing to participate, you will answer some questions in a questionnaire, which should take you about 30 minutes to complete while you are waiting to see your doctor. In the questionnaire, you will be asked questions about yourself, some questions regarding any injuries or upsetting events, and how your back pain affects your daily life.

Risks

There is a minimal possibility that you may experience some uncomfortable feelings when answering some of the questions, which ask you to describe your experience with chronic low back pain. You will be given an opportunity to talk about any reactions with the graduate student investigator right after you finish the questionnaire.

Benefits

You will probably not receive any benefit from participating in this study. However, your participation will help health care professionals to understand more about how chronic low back pain affects patients. It will help health care professionals to best provide for the needs of patients with chronic low back pain.

Participants' Rights

Your participation in this study is completely voluntary. You have the right to stop responding to the questions in this survey at any time. If you decide to stop, you may give your questionnaire to the graduate student investigator or the receptionist at the front desk.
Anonymity

All of the information that is collected in this study will be kept strictly anonymous. So, please do not put your name anywhere on the questionnaire packet, or on the informed consent form.

No personal identification codes will be used in this study, and your personal identity will not be disclosed. Any publication or presentation resulting from this study will refer to the entire group of people who filled out this questionnaire.

Additional Costs/Reimbursement

There is no cost to you for participating in this study, nor any reimbursement for your effort.

Impartial Third Party Contact

If you wish to contact an impartial third party not associated with this study regarding any concerns or complaints that you may have, please feel free to contact the Office of Patient Relations at Loma Linda University Medical Center, Loma Linda, CA 92354, phone (909) 558-4647 for information or assistance.

Informed Consent Statement

Once you have read the contents of this informational letter, your completion of the survey will indicate your voluntary consent to participate in this study. This consent does not waive your rights, nor does it release the investigators, institution, or sponsors from their responsibilities. You may call the graduate student investigator, Lorie T. DeCarvalho, M.A., M.S. (Ph.D. Candidate) or the faculty advisor, Janet Sonne, Ph.D., at Loma Linda University, Department of Psychology during routine office hours at (909) 558-8710 if you have additional questions or concerns. Please keep this letter for your future reference.
Participant Debriefing Script

Dear Participant:

Thank you again for your participation in this study. You have just filled out a questionnaire. I would like to let you know why this information is needed for this study.

The first two pages you filled out were general questions about yourself, so that we can get a better idea of the background of all persons participating in this study. Second, you answered questions about your pain, which involved you telling me words that described your experience with chronic low back pain. This was done in order for us to get an idea of how much pain you are currently experiencing. Next, you answered questions about any difficult experiences you may have had in your life. The PDS was another measure of how your pain may be affecting you emotionally, and it asks about symptoms of post-traumatic stress disorder. Finally, you answered questions on the PLOC, which looks at how much control you feel you have over your pain right now.

The purpose of this study is to see how chronic pain affects individuals’ overall physical and emotional well-being.

I would like to remind you that your identity is anonymous on this survey. No one, including myself, will ever know who you are based on your responses to this questionnaire because you were asked not to put your name anywhere, and no number is being used to identify your survey packet. Therefore, you can feel safe in knowing your identity cannot be connected to the questions you answered.

Again, if you have any questions, concerns, or comments about this survey, please contact the graduate student investigator, Lorie T. DeCarvalho, M.A., M.S. (Ph.D. candidate) or the faculty advisor, Janet Sonne, Ph.D. at Loma Linda University's Department of Psychology at (909) 558-8710. If either person is unavailable, please feel free to leave a message with your first name and telephone number. You may keep this page for your future reference.

If you have any questions about your physical condition, please talk to your physician.

Thank you so much for your time and participation in this study. Your participation may help healthcare professionals to better meet the needs of patients with chronic low back pain.

Best wishes.