RELATIONSHIP BETWEEN FEAR-AVOIDANCE BELIEFS QUESTIONNAIRE (FABQ) SCORES AND ACUTE LOW BACK PAIN TREATMENT

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DEDICATION

I would like to thank the members of my Graduate Committee for their guidance during my pursuit of completing my thesis. I would also like to thank my parents and brother for their continued support and unconditional love.

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by

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Each year, millions of individuals are afflicted with low back pain. Clinical researchers have a growing concern that patients' acute pain will develop into chronic pain, partly because of their fear-avoidance beliefs often resulting in them not returning to work (George, 2006; Pincus, 2002). The aims of this present study were as follows: a) to examine if FABQ risk criteria was significantly related to risk criteria with the ALBP

algorithm; b) to examine the differences in patients' fear-avoidance beliefs scores and their return-to-work status; c) to examine the relationship between FABQ scores and scores on other psychosocial pain measures; d) to examine the FABQ scores for those who completed treatment, compared to those who did not complete treatment; and e) to examine the differences in FABQ scores from pre-treatment to one-year follow-up. The risk criteria with the ALBP algorithm was significantly related to risk criteria on the FABQ-W, but not significantly related to risk criteria on the FABQ-PA. Patients who returned to work tended to have lower FABQ scores than patients who did not return to work.

Findings indicated that patients who had higher fear-avoidance beliefs (high FABQ scores) were more likely to have obstacles that prevented them from returning to work. Also, patients with higher fear avoidance beliefs tended to perceive their overall health status as poor. Patients who were classified as 'adaptive copers' tended to have lower FABQ scores than patients classified as 'dysfunctional' which indicates patients classified as 'adaptive copers' utilize healthier coping skills. No significant difference was found between those who completed treatment and those who did not complete treatment. Additionally, patients tended to have higher fear-avoidance beliefs at pre-treatment than at one-year follow-up indicating some potential benefits of treatment. Overall, patients who tended to have high fear-avoidance beliefs were more likely not to return to work, have more obstacles when trying to return to work, perceived their overall health status as poor, and were less likely to utilize healthy coping, hence their avoidance behavior.

TABLE OF CONTENTS

PRIOR PUBLICATIONS

Perish, M., Haggard, R., Buelow, A., Ingram, J., and Gatchel, R. (2009). Comorbidity of Musculoskeletal Injury Pain and PTSD. *Practical Pain Management, 9*, 22-33.

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ALBP	Acute Low Back Pain
CLBP	Chronic Low Back Pain
CBT	Cognitive Behavioral Therapy
EI	Early Intervention
EI/W	Early Intervention + Work Transition
FABQ	Fear-Avoidance Beliefs Questionnaire
FABQ-PA	Fear-Avoidance Beliefs Questionnaire Physical Activity subscale
FABQ-W	Fear-Avoidance Beliefs Questionnaire Work subscale
HCP	Health Care Practitioners
HR	High Risk
LBP	Low Back Pain
LR	Low Risk
MPI	Multidimensional Pain Inventory
NI	Non-Intervention
NI/W	Work Transition
ORQ	Obstacles to Return-to-Work Questionnaire
SF-36	36-item Short Health Form Survey
SPS	Stanford Presenteeism Scale

CHAPTER ONE
Introduction

Melzack and Wall (1965) developed the Gate-Control Theory of Pain which demonstrated the interaction among biological factors, emotions, and cognitions. These specific interactions affect how an individual experiences pain. These researchers found that pain is not simply experienced by biological transmissions going directly to the brain from the periphery (e.g., skin), but is much more complex. For example, the spinal cord, more specifically the dorsal horn, functions as a ‘‘gate’’, which monitors the transmission of nerve impulses from peripheral fibers to the central nervous system. Sensory input is evaluated and pain may be altered before the “gate” opens or closes. Sensory transmission is determined by activity of both large-diameter fibers (A-beta fibers) and small-diameter fibers (A-delta and C) by the descending influences of the brain. Increase or decrease of sensory input determines functionality of the gate.

Melzack and Wall’s gate-control theory model was expanded by Melzack and Casey (1968). They postulated that subjective experiences are actually associated with three systems of nociceptive stimulation: sensory-discriminative, motivational-affective, and cognitive-evaluative. These researchers suggested that an individual’s pain experiences involve much more complicated central nervous system interactions with one’s cognition, sensory and behavioral experiences. The Melzack and Casey (1968) model is uniquely important because it stresses how significant the interaction of psychosocial and physiological factors are in further understanding appropriate evaluation and treatment of patients who are experiencing pain. Moreover, this model is

also important because of the increasing prevalence of individuals experiencing pain in the United States and throughout the world.

Gatchel (2001) demonstrated that approximately 70% of the population in the United States of America will most likely be affected by back pain at least once in their lives. Pain may be time-limited and eventually subside, but some pain may be more serious, requiring the utilization of healthcare systems. According to Gatchel (2001), pain management centers are sought by approximately 176,850 patients in the United States each year and eighty percent of all physician visits are due to pain complaints. Pain affects people by limiting their activities of daily living. Pain has an impact on society by increasing number of disability claims, increased costs in healthcare, and losses in work force production. Each year in the United States, approximately $125 billion is spent on the treatment of chronic pain. Understandably, it is important for our healthcare system to continually address access to medical care, cost, work production and improve healthcare treatment of chronic pain.

Gatchel's (1991; 1996) three stage model proposes a developmental process of chronic pain. According to Gatchel's model, Stage 1 occurs when the perception of pain is recognized by the individual and normal emotional states (e.g., fear and anxiety) are aroused. These emotional states protect and guide individuals so that treatment is sought if pain worsens, and treatment is not sought if pain subsides. The normal healing time for individuals with low back pain is two to four months. If the pain has not subsided within this time frame, Stage 2 is activated (Gatchel et al., 1991; Gatchel, 1996). In Stage 2, pain transitions from acute to potentially chronic pain. Stage 2 consists of the development of the perceived pain being worsened by exacerbation of behavioral and psychosocial issues

(Gatchel et al., 1991; Gatchel et al., 1996). When appropriate biopsychosocial treatment is not provided, acute pain usually develops into chronic pain. The biopsychosocial model (Turk & Monarch, 2002) also addresses physiological, psychological, and behavioral issues. Stage 3 is considered to be chronic pain. It is important for comprehensive interdisciplinary interventions to take place when an individual has acute pain in order to prevent chronicity of pain.

Gatchel et al. (1991 and 1996) stated that treatment interventions should focus on both physiological and psychosocial symptoms in order to identify possible reasons that pain may become exacerbated. Even during the acute phase of pain, it is important to focus on comprehensive interventions, which have been shown to reduce the likelihood of the development of chronic pain. Fortunately, the utilization of the biopsychosocial approach is becoming more widespread in treating individuals suffering from chronic pain (Gatchel, Peng, Peters, Ruchs & Turk, 2007).

The biopsychosocial model helps clinicians have a clearer understanding of the etiology, assessment, and appropriate treatment for acute and chronic pain (Gatchel et al., 2007). This model combines expertise and knowledge from areas of biology, physiology, sociology, and psychology. Pain was previously considered to be solely the result of a physical onset (e.g., back is injured from exercising). We now know that the experience of pain is not only a physical but psycho-physiological experience -- a subjective experience which is influenced by cognitive styles, such as negative or positive thinking, psychological or emotional states, cultural influences, and genetic predispositions. Earlier researchers have also investigated similar postulations.

Loeser's (1982) model, for example describes a concept of pain associated with four dimensions: 1) nociception, which involves nerve stimulation that signals painful stimuli to the brain; 2) pain, which is more of a subjective experience in which the input is transduced through current psychological conditions, genetics, prior experiences, and environmental (sociocultural) influences; 3) suffering, which consists of the emotional responses to pain, such as fear; and 4) pain behaviors, which are the reactions to pain, or what people do when they are suffering, such as avoiding certain activities.

Feelings such as fear and avoidance beliefs that influence cognition have become specific areas of research interest, particularly in relation to low back pain (Coudeyre et al., 2007). Marshall and Murphy (2008) estimated that 60% to 80% of people will experience low back pain sometime during their lifetime. Some patients may believe that increased physical activity or specific work activity will exacerbate their medical problems and their low back pain. Subsequently, these patients fear and then avoid participating in any activity which they believe will exacerbate their pain (George, 2006; Pincus, 2002). These patients' thinking becomes distorted. As a result, no plan of action is taken which may eventually lead to chronic pain and result in disability (Vlaeyen, Jong, Geilen, Heuts, Breukelen, 2002).

CHAPTER TWO
Review of the Literature

FEAR-AVOIDANCE BELIEFS AND LOW BACK PAIN

Researchers have utilized the Fear-Avoidance Beliefs Questionnaire (FABQ) to assess patients' fear-avoidance beliefs about their acute low back pain (ALBP) or chronic low back pain (CLBP) (Fritz, George & Delitto, 2001). The FABQ is a measure used to predict whether patients who may have the propensity to develop CLBP (Waddell et al., 1993). The FABQ can be used by practitioners to determine whether or not to offer an intervention to reduce fear-avoidance beliefs in patients experiencing acute or chronic pain (George, Fritz & McNeil, 2006). According to Keeley et al. (2008), fear-avoidance beliefs predict disability, an individual's time off work, and health care utilization. Fear persuades one to escape from the object of threat, resulting in avoidance behavior which occurs not as a response to pain, but in anticipation of pain. Fear-avoidance beliefs topics addressed below include: (a) the effect of fear-avoidance beliefs on low back pain; (b) psychosocial factors; and (c) prevention and intervention techniques for low back pain.

The Effects of Patients' Fear-Avoidance Beliefs on their Low Back Pain

Fear-avoidance beliefs present themselves early in patients with low back pain (Al-Obaidi et al., 2005). The fear-avoidance model consists of two extreme responses to pain: the confronter (the adaptive response), and the avoider (the non-adaptive response). (Buer & Linton, 2002). Confronters view the pain as temporary; thus, they are able to confront the pain and are most likely motivated to return to work. In contrast, the avoider fears that pain will increase due to certain activities; and therefore, avoids activities that they believe will exacerbate physical and psychological distress (Buer & Linton, 2002). Patients who are experiencing pain may begin to fear pain and in turn avoid any physical

activity or work that may appear harmful. Patients who are considered confronters are classified as low risk patients because they confront pain instead of avoiding it, therefore lessening the likelihood of developing a medical disability. Patients who are considered avoiders are classified as high risk patients because they avoid activities they believe will worsen their pain condition, and increase the probability of developing a medical disability. Generally, patients who develop chronic pain have commonly exhibited significant decreases in physical activity.

Grotle, Vollestad and Brox (2006) found that fear-avoidance beliefs for physical activity among patients with CLBP were usually predictive of disability, but not pain, at one-year. The fear-avoidance beliefs for physical activity of patients with ALBP were usually predictive of both pain and disability. According to the fear-avoidance model, the higher the level of pain, more thoughts of fear develop, causing avoidance of activities resulting in disability (George et. al, 2006). Vlaeyen and Linton (2000) state that fear-avoidance beliefs are important factors resulting in the "deconditioning syndrome." Deconditioning syndrome refers to the immobilization of muscles or joints by reduced physical activity, thus worsening the condition which may result in developing a disability.

Pain-related fear has also been studied in relation to age. Cook, Brawer and Vowles (2006) found there were significantly higher levels of pain-related fear among middle-aged patients than among older, chronic pain patients (age 55 and older). Older, chronic pain patients may expect to experience pain when they reach a certain age; therefore, they anticipate the experience of pain, whereas middle-aged patients may not have expected to experience pain because of their age.

Patients may fear that doctors or significant others do not believe that they are experiencing pain, and therefore will not receive the proper medical care needed for their pain (Gatchel et al., 2007). Some pain patients may feel that they will be labeled exaggerators or complainers by physicians, family members, friends, or employers (Gatchel et al., 2007). Others may assign these labels because the person experiencing pain may have had unsuccessful responses to different types of treatment. Therefore, pain patients may stop complaining about their painful experiences by avoiding certain activities they believe exacerbates pain in order to evade the negative label given by others.

Keeley et al. (2008) indicated that fear-avoidance beliefs in CLBP patients were associated with diminished sense of control over experiencing pain, and pain behaviors (e.g., avoidance of pain) were avoided in order to decrease patients' anxiety about pain. Al-Obaidi et al. (2000) suggested people tend to be sensitized to their pain from past experiences of pain, memory of pain, and recurrence of pain. Their anticipation of pain reoccurrence influenced the intensity of fear. In turn, anticipation stimulated even more fear-avoidance behaviors.

Return-to-work issues among patients with fear-avoidance beliefs are quite complex. Some researchers such as Linton, Vlaeyen, Ostelo (2002) found that medical doctors have suggested patients should only return to work when their condition is completely healed because this is safer than going back to work early and potentially getting re-injured before the pain has subsided. Other researchers such as Vlaeyen and colleagues (1995) suggest that returning to work early may actually lessen the likelihood of a patient becoming disabled. Vlaeyen et al. (1995) found that individuals experiencing

pain, who have not returned to work in the expected time frame, may develop avoidance behaviors of painful stimuli, enjoy increased attention from others, may experience increased or diminished pain, and may develop a disability. Further, approximately 50% of those individuals who do not return to work within 7 weeks will likely not return to work at 6 months.

Health Care Practitioners' Fear-Avoidance Beliefs

There is a growing attentiveness in regard to fear-avoidance beliefs among health care practitioners (HCPs). HCPs' beliefs have been studied because they have an effect on the type of advice and treatment administered to individuals experiencing pain. In addition, patients' experience of pain may be influenced by their HCPs' behavior towards pain. Sometimes, HCPs may inadvertently support patients' irrational concerns related to pain, thus potentially causing long-term problems (i.e., disability). For example, in a study by Linton, Vlaeyen and Ostelo (2002), doctors who were audiotaped during primary care visits did not usually inquire about what activities patients were avoiding because of pain. HCPs are heavily involved in providing information and the primary care of pain patients. Inadvertently, they may actually contribute to more fear, affect attitudes, and prompt more avoidance behavior in their patients (Coudeyre, et al., 2007).

The FABQ has been adapted in some research in order to administer the questionnaire to HCPs (e.g., the directions were adapted to instruct the HCPs on how to rate themselves on the FABQ), but the questions remained the same (Coudeyre et al., 2006). The fear-avoidance beliefs of HCPs have been shown to influence fear-avoidance beliefs of their patients with low back pain. The higher the HCP scores on the FABQ, the higher the patients' FABQ scores (Coudeyre et al., 2006). The higher HCPs scored on the

FABQ, the more HCPs advised their patients with low back pain to limit physical activities related or not related to work (Coudeyre et al., 2006). According to one study, HCPs with higher scores on FABQ-Physical Activity subscale (FABQ-PA) were most likely to recommend their patients with ALBP reduce maximum bearable activities, and patients with CLBP be given sick leave during painful episodes (Bishop, Thomas and Foster 2007). HCPs with higher scores on FABQ-Work subscale (FABQ-W) were more likely to recommend patients with ALBP receive sick leave, and patients with CLBP reduce physical activity.

Researchers have suggested that medical advice and treatment aimed at unexplained restrictions of activity and rest are likely to cause or even reinforce an increase in fear-avoidance beliefs, exacerbation of pain, and result in disability (Waddell et al., 1993). Interestingly, Linton and colleagues (2002) found that physical therapists were more convinced than medical doctors that the treatment received by patients with low back pain would be successful, even if the patients were currently experiencing pain and partaking in exercises that caused additional pain. Physical therapists were less convinced that a patient's injuries were in direct relation to pain intensity, but believed instead, that patient's injuries were a result of movements and activities.

Linton et al. (2002) investigated gender differences as it relates to fear-avoidance beliefs and HCPs effect, and found that female medical doctors were more likely to believe that they could foresee who would develop pain chronicity. Female HCPs were also more likely to be convinced that patients should not partake in monotonous work such as repeatedly carrying heavy items. However, if someone had complaints about

pain, male HCPs believed that the injury was more of a serious nature. Again, HCPs' own fear-avoidance beliefs had a significant impact on patients' fear-avoidance beliefs.

Psychosocial Factors

Many chronic pain patients have emotional factors that influence the maintenance of unhealthy coping mechanisms. Fear-avoidance beliefs may be one of the most important psychosocial factors that transform ALBP to CLBP (Cleland, Fritz & Brennan, 2008). Gatchel et al.'s (2008) study found that daily activities were negatively affected by the rise in psychosocial deficits (i.e., fear of pain, anxiety) among low back pain participants who developed chronicity. Other researchers have also postulated that patients exhibit many maladaptive psychological behaviors or cognitive distortions, such as pain catastrophizing, emotional distress, fear of pain, and anxiety sensitivity (Grotle, 2006; Poiraudeau, 2006; Thomas & France, 2007).

Catastrophizing is an unhealthy coping mechanism that is generally described as having an exaggerated orientation towards painful stimuli and the experience of pain (Pincus et al., 2002). Catastrophic thoughts about low back pain can cause patients to experience severe anxiety about their pain (Coudeyre et al., 2006; Wessels et al., 2007). Catastrophic thoughts about disabling pain and low back pain often lead individuals into fear or avoidance of physical activities or work-related activities (Coudeyre et al., 2006). According to the Fear of Movement Model, catastrophic thoughts contribute to the development of chronic low back pain among some patients (Wessels et al., 2007). High levels of fear in low back pain are associated with a cognitive state (catastrophizing), in which negative interpretations about the meaning of pain develop, suggesting activity will exacerbate low back pain (Coudeyre et al., 2007). Psychosocial factors such as

catastrophic thoughts have a severe negative impact on physical functions as often occurs with CLBP. The fear of movement or re-injury is influenced by negative thinking, particularly catastrophizing, according to the fear-avoidance model (Cook, Brawer & Vowles, 2006). Preventing disability among CLBP patients might be possible with early identification of catastrophizing and fear of movement re-injury (Vlaeyen et al., 1995). Subsequently, the negative consequences of chronic pain can include depression, anger, anxiety, isolation, and a plethora of other emotional symptoms (Gatchel et al., 2007).

Emotional Distress

Emotional distress is a major psychosocial factor that contributes to CLBP. According to Grotle et al. (2006), emotional distress is actually a stronger predictor of CLBP and disability than are fear-avoidance beliefs. The Grotle et al. (2006) research suggests that one possible reason for emotional distress being a stronger predictor of CLBP is it includes somatization, anxiety, and depression, whereas fear-avoidance beliefs focus mainly on anxiety related to low back pain. Patients experiencing pain may receive various laboratory tests and treatments to alleviate their experience of pain. Sometimes, these efforts are proven ineffective as patients may become doubtful, hopeless, irritated, and frustrated with the medical system (Gatchel et al., 2007). Pain patients who are not getting relief from their painful episodes may also become hostile with family and friends, the health care system, and with themselves (Gatchel et al., 2007).

Anger

Many patients experience several different emotions in relation to fear and avoidance. For example, patients may have fear-avoidance beliefs, but experience anger instead of fear. Though some chronic pain patients may present themselves as calm

individuals, 88% acknowledged feelings of anger (Corbishley, Hendrickson, Beutler & Engle, 1990). Moreover, chronic pain patients may perceive themselves as having no support, thus inciting feelings of anger towards family members or the health care system (Gatchel et al., 2007). Indeed, Okifuji et al. (1990) reported that approximately 98% of patients who were referred to a multidisciplinary pain rehabilitation center had felt some type of anger. Anger is socially undesirable and, therefore some patients may not admit feelings of anger to their physicians (Gatchel et al., 2007).

The issue of anger presents similar questions about the direction of the relationship, as does the issue of depression, because researchers are trying to discern whether the cause of pain is anger, or the cause of anger is pain. According to Pilowsky and Spence (1976), outpatient medical patients were found to be more open to express their anger compared to chronic pain patients. Similarly, another study found that chronic pain patients inhibited their anger more than pain-free healthy patients (Franz, Paul, Bautz, Choroba and Hildebrandt 1986). It is also common for patients with pain to deny their anger. There is a difference between expressing anger and being aware of anger. Automatically expressing anger is considered an expression and acknowledging feelings of anger is considered awareness. Other pain patients may have a difficult time recognizing or reporting angry feelings because they may not accurately identify their feelings of anger (Gatchel et al., 2007).

Gender differences related to anger and chronic pain have been addressed in the literature. Important differences in the response to pain have been found between males and females (Unruh, 1996). Some studies have found that, in general, women have more anger than men (Hashida & Mosche, 1988); while still other studies found that men

generally have more anger than women (Fischer, Smith, Leonard & Fuqua, 1993); and other studies have not found any gender differences (Stoner & Spencer, 1987). In addition, there may be a portion of women who overtly express their anger, and a portion of men who are more aware of their anger than women (Gatchel et al., 2007).

Anger can become an obstacle for motivation and acceptance. Anger may even prevent certain individuals from receiving the proper pain management treatment because of physician refusal to treat the patient. Overall, patients may become noncompliant with pain treatment because of their anger towards their own pain, and this may result in worsening their condition. Avoidance of pleasurable activities because of fear of re-injury may incite anger in some patients.

It may be that the fear-avoidance model is too specific to predict disability, and the focus could be more on depression or anger as a co-existing psychosocial factor playing a role in chronicity. Although pain-related fear can lead to possible levels of pathology or distress, Sieben et al. (2005) believe certain degrees of avoidance and fear of pain can be beneficial to those patients in their acute recovery stage. This occurs by facilitating tissue healing during the first few days, and reducing the awareness of tissue injury or the perception of the painful stimulus. The fear-avoidance model may be insufficient when utilized alone to explain the shift to CLBP. Sieben et al. (2005) further indicated that pain-related fear may only be beneficial to predict outcome (e.g., chronicity), whereas negative affect and depressed mood may be more of a vulnerability factor for chronic pain.

Depression

No direct causal relationship has been demonstrated between depression and chronic pain; however, some patients may become depressed if they are afraid to participate in certain activities in order to avoid the re-experience of pain. Through various epidemiological studies, chronic pain and depression have been shown to have a strong association. Dersh and colleagues (2006) reported that 40%-50% of chronic pain patients suffer from depressive disorders. The relationship between depression and chronic pain is cyclical (Rudy, Kerns & Turk, 1988). Studies have appeared to support the idea that pain causes depression, and depression apparently begins after the onset of a painful experience (Brown, 1990). Jarvik et al.'s (2005) study showed pain patients who had depressive episodes were 2.3 times more likely to develop back pain, compared to those patients who did not have a depressive disorder at intake.

Depression may not affect all chronic pain patients. For example, it has been suggested that the manner in which patients perceive the effects of pain on their lives and the ability to take control over their pain are viewed as the two factors that mediate the relationship between depression and pain (Turk, Okifuji and Scharff 1995). Patients who believe they will continue to function and who maintain power over their lives, are less likely to become depressed (Gatchel et al., 2007). Although the relationship between pain and depression is not totally clear, both are manageable. The ability to diminish fear-avoidance beliefs may have a benefit in reducing depression if patients begin to believe that they will overcome their pain.

Prevention and Intervention Techniques for Low Back Pain

Interestingly, Linton et al. (2005) found that over a seven-month period of receiving fair to high amounts of health care which included visits to a specialist/hospital, physician, physical therapist, and/or an alternative care provider, LBP patients did not improve, nor were there any reductions in their frequency of sick leave. Their findings suggested that treatment was not successful. However, these findings were gathered from self-report measures that have not yet been established as reliable instruments. Therefore, the treatment may not have fully probed and treated the patients' issues with pain. Linton et al. (2005) stated that the biomedical model does not focus on the possible psychosocial processes that could have sustained or exacerbated patients' issues with pain. However, through treatment using the biopsychosocial model, patients' issues with pain could be addressed through psychological contexts that have effects on pain, such as fear and avoidance, catastrophizing, and depression (Linton et al., 2005).

Different types of intervention programs may help reduce fear-avoidance beliefs which, in turn, reduce the likelihood of patients developing CLBP. Buer and Linton (2002) indicate that important targets for early intervention are fear-avoidance beliefs and catastrophizing which can be measured by using a self report measure, the pain and catastrophizing scale (PCS) developed in 1995 by Sullivan, Bishop, and Pivik. Therefore, identifying high fear-avoidance beliefs and catastrophizing will help clinicians develop early interventions for such patients.

Research studies have also focused on the prognosis of fear-avoidance beliefs in conjunction with payor type (i.e., workers' compensation). According to Cleland et al. (2008), individuals who were injured on the job (receiving workers' compensation

benefits) had a poorer prognosis as defined by the FABQ than those who were not. In other words, the individuals who do not receive workers' compensation improved more rapidly through physical therapy, than those who received workers' compensation. According to Cleland et al. (2008), the FABQ-W cutoff score of >29 usually determines poor prognosis of individuals receiving workers' compensation. If replicated, this cutoff score may be utilized for the multidisciplinary team to identify those patients with a cutoff score of >29 on their initial encounter in order to start an intervention or prevention program to reduce the likelihood of the development of CLBP. Fear-avoidance beliefs should be recognized in the acute stage before the beliefs become fixated in order to better prevent chronicity (Waddell et al., 1993).

George et al. (2003) also found that patients with lower fear-avoidance beliefs who received fear-avoidance based treatment appeared to have more disability than the patients that received traditional care treatment. Their findings suggest that fear-avoidance-based treatment may only be appropriate for those patients with high fear-avoidance beliefs. Patients with lower fear- avoidance beliefs who receive fear-avoidance beliefs treatment may be more prone to disability than patients that receive standard care treatment. Therefore, it may be unnecessary to provide educational materials that encourage confronting to patients who already view their pain as temporary. The additional information may be an unhealthy distraction rather than reinforcement for the patients who are considered confronters of pain (low fear-avoidance beliefs). However, the reasons for this finding are still unclear.

According to George and colleagues (2003), fear-avoidance-based treatment differs from the traditional treatment approach by fostering pertinent education to their

patients and it encourages patients to take an active role in recovery. Instead of the traditional approach of encouraging patients with low back pain to be less active, the fear-avoidance based treatment encourages patients to be as active as they can without overdoing any type of physical activity. These researchers further found that patients with higher fear-avoidance beliefs who received the fear-avoidance based treatment had less disability than the patients that received traditional care treatment.

Exercise Treatment

Exercise is an intervention that some health care practitioners often recommend to those with low back pain. Elfving and colleagues (2007) state that therapy including exercise, directed towards reducing fear-avoidance beliefs, might be helpful in promoting a healthy alternative to disability caused by low back pain. Additionally it was shown that exercising most days of the week for 30 minutes, involving moderate intensity of physical activity was a healthy coping skill. Many clinical settings use multidisciplinary modalities which include exercise regimens in order to reduce the interference of fear-avoidance thoughts in patients who are experiencing low back pain (Wessels et. al, 2007). High fear-avoiders seem to benefit from exercise programs. According to Moffett and colleagues (2004), at 12 month follow-up, patients with high fear-avoidance scores randomized into their exercise fitness program were 3 times more likely to report reduced disability compared to the patients randomized into traditional HCP care.

Exposure Treatment

Boersma et al. (2004) utilized exposure treatment for pain-related fear and avoidance. Exposure involved a gradual confrontation with activities of daily living which previously triggered catastrophizing and avoiding the activities. Boersma et al.

(2004) found that exposure treatment produced decreases in rated fear and avoidance beliefs, in conjunction with significant increases in function. Crombez et al. (1999), suggested that the most effective treatment for individuals suffering from fears and phobias is graded exposure.

Cognitive-Behavioral Therapy

Cognitive behavioral therapy (CBT) may help to cognitively restructure fear-avoidance beliefs. CBT has been utilized to alter or modify thinking errors by helping patients reframe negative self-statements into positive self-talk in order to decrease emotional distress (Linton et al., 2005). Fear-avoidance beliefs can be modified by applying CBT, in which patients change their beliefs about pain, thereby changing feelings to reduce their avoidance behaviors (Linton et al., 2005). Cognitive strategies are successfully utilized through CBT in order to help individuals experiencing pain develop and learn better ways of coping with or accepting pain. Linton and Nordin's (2006) five-year follow-up study found that a control group of patients with pain, who did not receive a CBT intervention (compared to a randomized group who received a CBT intervention), had overall worse health and quality of life, were less active, and experienced significantly higher levels of pain. CBT is being utilized by more multidisciplinary pain management programs in order to encourage and help individuals become aware of more ways to reduce or manage pain (Linton and Nordin, 2006).

Summary

The gate-control theory of pain was developed by Melzack and Wall (1965) and expanded by Melzack and Casey (1968). These researchers proposed that pain was not explicitly biological in nature, but included social and psychological factors as well.

Researchers became interested in the development of acute to chronic pain from the biopsychosocial perspective. Gatchel (1991; 1996) proposed a developmental process of chronic pain suggesting that if pain has not healed within two to four months and biopsychosocial treatment is not sought, then the development of chronic pain begins.

More specifically, growing interest from the psychosocial spectra involves the topic of fear-avoidance beliefs. These beliefs involve fear of experiencing pain, thus avoiding specific activities to prevent pain. The FABQ has been utilized to measure a patient's level of fear-avoidance beliefs and used more specifically to predict the likelihood of patients who will develop CLBP (Waddell et al., 1993). Patients who score high on the FABQ have a propensity to develop CLBP because muscles and/or joints are usually weakened through avoidance of certain physical activities. These patients are considered to be high risk or avoiders because they view their pain as permanent. Other patients are considered low risk or confronters because they view their pain as temporary. Many psychosocial factors such as fear-avoidance beliefs play a role in the experience of pain. Patients may become angry, depressed, and emotionally distressed when experiencing pain and, as a result, sometimes avoidance behavior emerges. Researchers have utilized different types of treatments such as exercise treatment, exposure treatment, and cognitive behavioral therapy treatment to address fear-avoidance beliefs in relation to pain.

RATIONALE

More insight into possible interventions for the prevention of disability may be accomplished by examining the fear-avoidance beliefs of patients with acute low back pain (ALBP) and chronic low back pain (CLBP). A number of psychosocial measures

have been addressed in the literature. Some researchers have shown that, the higher the score on the FABQ, the more likely a patient will generate a poor prognosis. The Stanford Presenteeism Scale (SPS) measures how an individual with an illness performs at work. The present study examined whether there was a relationship between high fear-avoidance beliefs and low productivity at work in individuals with low back pain. The Obstacles to Return-to-Work Questionnaire (ORQ) measures psychosocial and physical risk factors in relation to pain at work. This present study examined whether participants' with high fear avoidance beliefs produced more obstacles (e.g., psychosocial and physical risk factors) when attempting to return to work. The 36-item Short Health Form Survey (SF-36) measures a person's perceived physical and mental health status, and was employed by this researcher to determine if those with high fear avoidance beliefs had poorer perceived physical and mental statuses. The Multidimensional Pain Inventory (MPI) measures the effects of pain on ones' daily activity of living, pain intensity, and perception of pain. This study also examined whether participants with lower fear-avoidance beliefs were likely to have less pain intensity and healthier perceptions of pain.

The Hypotheses of this study were as follows:

Hypothesis I: FABQ risk criteria were expected to be significantly related to risk criteria as determined by the ALBP algorithm. For example, high risk (HR) ALBP patients were expected to be also classified as high risk on the FABQ, whereas low risk (LR) ALBP patients were expected to be classified as lower risk on the FABQ.

Hypothesis II: The FABQ scores were expected to be higher for patients who had not returned to work, relative to those who had returned to work.

Hypothesis III: FABQ scores were expected to be positively correlated with Obstacles to Return to Work Questionnaire scores (ORQ assesses psychosocial and physical risk factors for pain in the workplace).

Hypothesis IV: FABQ scores were expected to be positively correlated with Stanford Presenteeism Scale scores (SPS measures performance at work in relation to an illness).

Hypothesis V: FABQ scores were expected to be negatively correlated with SF-36 scores (SF-36 measures perceived health status- mental and physical welfare).

Hypothesis VI: Patients classified as 'adaptive copers' on the MPI were expected to have lower FABQ scores than patients classified as 'dysfunctional' on the MPI (MPI measures the effects of pain on daily living, pain intensity, and perception of pain).

Hypothesis VII: The FABQ scores were expected to be higher for patients who did not complete treatment, compared to patients who completed treatment.

Hypothesis VIII: The FABQ scores were expected to be higher at pre-treatment than at one-year follow-up.

CHAPTER THREE
Methodology

Participants

Private practice groups, area physicians, insurance carriers, advertisements, and flyers were utilized to recruit participants. Referrals were made from the following: the group practice--Orthopedic Associates in Lewisville, Texas and Concentra Medical Clinics located throughout the Dallas/Fort Worth Metroplex, the low back insurance workers database through a partnership with the Liberty Mutual Center for Disability Research, advertisements were placed in the Dallas Observer, a community newspaper, and flyers were distributed across the campus of The University of Texas Southwestern Medical Center at Dallas (UT Southwestern).

Participants between the ages of 18-65, who had an onset of ALBP no more than 3 months prior to entering the study, qualified for the study. Participants were included in the study if they experienced persistent daily pain when performing their normal activities from the time of initial onset of pain to the time of intake into this study. In addition, participants qualified for the study if they had been experiencing a decreased ability to perform normal job requirements due to their ALBP. As defined by two or more episodes of disabling pain during the last two years, participants must have had no other history of episodic CLBP. Additionally, at the time of the initial evaluation, participants were excluded if they were in need of surgery or had a physical condition that exacerbated pain.

Procedure

Participants were offered $25 to complete an initial screening evaluation packet which included a payment voucher, an informed consent, HIPAA consent form, basic

demographic information screening form, and a screening algorithm that identified risk-status for developing chronic low back pain (Gatchel et al., 2003). As a part of a larger study, participants were randomized into one of four intervention groups: 1) Early intervention plus workplace transition (EI/W); 2) Early intervention alone (EI); 3) Workplace transition only (NI/W); and 4) No early intervention plus no workplace transition (NI). Participants were then contacted and offered $50 after completion of the initial screening packet for further participation in the study evaluation process. Participants who agreed to continue participation were given a baseline evaluation that included more detailed demographic information, vocational status (Stanford Presenteeism Scale; SPS; Koopman et al., 2002; Obstacles to Return to Work; ORQ; Marhold et al., 2002) and symptoms (including fear) of pain disability (Fear Avoidance Beliefs Questionnaire; FABQ; Waddell et al., 1993).

At post-treatment, six months-post-intake, and nine months-post-intake, follow-up data were collected for each participant. Participants were also offered an additional $50 at one-year following the initial date of intake to participate in a follow-up evaluation in which the aforementioned baseline measures were repeated. Participants were asked to indicate their current return-to-work status (returned to work or did not return to work) at each follow-up point. Doctoral-level clinical psychologists, Masters' level clinicians, pre-doctoral clinical psychology interns or masters students from the Rehabilitation Counseling Psychology program at UT Southwestern conducted the baseline and one-year follow-up evaluations at The Eugene McDermott Center for Pain Management, UT Southwestern Medical Center at Dallas, and at the Spine Center at UT Southwestern.

The early intervention (EI) protocol for those participants randomized into the EI/W and EI groups consisted of the following: a maximum of 9 physical therapy sessions customized to the needs of the patient; physician examination of participants at intake and discharge, including additional visits as needed; a maximum of 9 behavioral medicine sessions (45 minute sessions that consisted of biofeedback and pain management following a specific study protocol); and a minimum of 2 interdisciplinary team conferences at intake and at discharge, including additional conferences if needed.

The workplace transition component protocol for the participants who were randomized into the EI/W and NI/W groups consisted of a maximum of 6, 45-minute sessions, and a minimum of 1 case management session. The 6 sessions focused on assisting participants by using problem-solving skills training in directly addressing and adjusting any possible occupational blockage that may prevent return to work. Participants were provided manualized workbooks that taught these problem-solving skills.

Depending on the number of sessions in the participant's treatment plan and group assignment, treatments were projected to be administered over a 4-10 week period. Licensed professionals in their respective fields administered all treatments. All persons administering treatment in this study were employed by The Eugene McDermott Center for Pain Management, The University of Texas Southwestern at Dallas, and/or The University of Texas at Arlington. The Institutional Review Board (IRB) of both the University of Texas Southwestern Medical Center at Dallas and The University of Texas at Arlington reviewed and monitored the research protocol. In compliance with IRB

requirements on research involving human participants, all research personnel completed training.

Instruments and Outcome Measures

36-Item Short Form Health Survey Summary (SF-36; Ware, Snow, Kosinski & Grandeck, 1993). The SF-36 is a 36-item self-report questionnaire. It consists of two summary scales: the Mental Component Score (MCS) and the Physical Component Score (PCS). MCS measures a participant's perceived mental health status and PCS measures a participant's perceived physical health status. A greater sense of control over mental and physical well-being is indicated by higher ratings on the MCS and PCS, respectively.

Work Information Form. This form examined participants' current vocational status. Questions on the form consisted of whether they had been taken off work duty since their back injury, had their employer made any modifications or accommodations since they had returned to work, and as a result of their back injury how many days of work had they missed. In addition, participants were asked if, as a result of their back pain or injury, they were currently receiving workers' compensation or did they currently have pending litigation or a personal injury claim.

Obstacles to Return to Work Questionnaire (ORQ; Marhold, Linton & Melin, 2002). The ORQ is a 55-item questionnaire based upon epidemiological studies pertaining to psychosocial (e.g., low social support) and physical (e.g., heavy work) risk factors for pain in the workplace. According to Marhold et al. (2002), the participants' perceptions about return-to-work and working are influenced by their actual recovery and returning to work. The ORQ was designed to evaluate those beliefs and perceptions by determining participants' scores on ten dimensions: depression, pain intensity, difficulties

at work return, physical workload and harmfulness, social support at work, worry due to sick leave, work satisfaction, family situation and support, and perceived prognosis of work return. In addition, a total score on the ORQ was calculated. A higher score on the ORQ indicates a generally poorer prognosis in relation to return-to-work.

Stanford Presenteeism Scale (SPS; Koopman et al., 2002). In reference to work, presenteeism, much like absenteeism, results in a loss in productivity. Presenteeism refers to employees being present at work, but not performing to the best of their ability due to an illness. Therefore, there is a loss in productivity. The SPS uses a Likert Scale from one to five points, each item ranging from *Strongly Agree* to *Strongly Disagree*. The SPS is a six-item measure that assesses the relationship between presenteeism, health problems, and productivity. The SPS total score can range from 6 to 30 after the sum of the 6-items is calculated. Higher scores on the SPS indicate increased presenteeism and lower performance at work, and lower scores indicate lower presenteeism and high performance at work.

Fear Avoidance Beliefs Questionnaire (FABQ; Waddell, Newton, Henderson, Somerville & Maine, 1993). The Fear Avoidance Beliefs Questionnaire (FABQ) describes patients' self reports on their fear of pain and ways they avoid certain behaviors to evade low back pain. The FABQ includes 16 items, with 2 subscales (physical activity and work). Each item is on a rating scale of 0 (*completely disagree*) to 6 (*completely agree*), with higher numbers indicating more fear avoidance beliefs (Fritz et al., 2001). The physical activity subscale (FABQ-PA) includes 4 items, with the score ranging from 0-24. The work subscale (FABQ-W) includes 7 items, with the score ranging from 0-42. The FABQ subscales are sometimes more effective separately, depending on whether or

not the patient was injured at work. High levels of internal consistency and test-retest reliability have been shown in the FABQ subscales (Cleland et al., 2008). Strong reliability was reported (r =.74) for the all items on the questionnaire (Waddell et al., 1993).

West Haven-Yale Multidimensional Pain Inventory (MPI; Kerns, Turk & Randy, 1985). The MPI is a 56-item inventory that was developed and normed specifically for chronic pain patients. The MPI consists of three sections. The first section includes the following topics: 1) negative feelings; 2) support from significant others; 3) the effects of pain on activities of daily living, family relationships, and social activities; 4) perceived control; and 5) severity of pain and amount of suffering. The second section inquires about patients perceptions about how their significant others react to their pain. The third section evaluates a patient's level of activity in several areas. The results yield a specific coping style, such as "adaptive" or "dysfunctional". The MPI has internal consistency reliability ranging from .70 to .90, and test-retest reliability ranging from .62 to .91. Correlation with various measures was utilized to assess validity and it appears to be sufficient (Kerns et al., 1985).

Design and Statistical Analysis

Participants were randomized into 4 intervention groups (EI/W, EI, NI/W, NI). They were compared at baseline to evaluate if HR ALBP patients would be classified as high risk on the FABQ and if LR ALBP patients would be classified low risk on the FABQ. The risk status of ALBP participants was determined by an algorithm developed by Gatchel, Polatin and Mayer (1995), to identify which ALBP patients were at HR for developing CLBP. This algorithm was developed in order to target those patients for the

early-intervention program. In this initial study, the interdisciplinary early-intervention program was implemented to prevent the progression of ALBP to CLBP for the patients that would most benefit from such treatment. Gatchel and colleagues (Gatchel et al., 2003) then demonstrated the effectiveness of the early-intervention program for HR ALBP patients by showing a decreasing number of pain and disability related outcomes compared to treatment as usual. In addition, the usefulness of the algorithm and targeted-intervention program was further validated in the initial study by the patients who were identified as LR who showed no significant symptoms or indications of chronic disability at one-year follow-up.

Researchers have sought to identify cut-off scores on the FABQ that would identify pain patients at-risk for a poor outcome. Cleland et al. (2008) found that a cut-off score of 29 and above on the FABQ-W was most predictive of poor prognosis for patients with work, related LBP. Although the risk criteria for the FABQ-PA have not been established, Klaber-Moffett and colleagues (2002) recommended a cut-off score of 13 and above on the FABQ-PA based on a median split of baseline scores was most predictive of poor outcomes for pain patients. Also, they found that patients with CLBP more likely benefitted from an exercise program instead of standard care if they scored above the aforementioned cut-off score. Therefore, based on past research, the current study identified patients who scored 29 and above on the FABQ-W as high risk, and patients who scored 13 and above on the FABQ-PA as high risk.

For the current study, participants were evaluated, and those deemed HR-Acute under the ALBP algorithm were examined. Patients classified as HR-Acute involved those that were considered to be more at risk for developing CLBP and whose onset of

pain consisted of no more than 4 months before intake into the study. In addition, this study examined the two groups out of the four intervention groups who actually received an intervention (EI/W group and EI group). Participants were compared at baseline to evaluate the relationships between: FABQ scores and ORQ scores; FABQ scores and SPS scores; FABQ scores and SF-36 scores; and FABQ scores and MPI classification. In addition, the following demographic variables were examined: age, gender, race, and marital status.

The distributions of scores on the various outcome measures were evaluated at intake. Chi-square analyses were utilized to determine equality between EI/W and EI groups for gender, race, and marital status. An independent samples t-test was used to determine equality between EI/W and EI groups for age. Chi-square analyses were utilized to examine if HR ALBP patients were also classified as high risk on the FABQ, and whether LR ALBP patients were classified as low risk on the FABQ. An independent samples t-test was used to determine if the FABQ scores were higher for patients who did not return to work compared with patients who did return to work. Correlational analyses were utilized to test the following hypotheses: FABQ scores were expected to be positively correlated with ORQ scores; FABQ scores were expected to be positively correlated with SPS scores; FABQ scores were expected to be negatively correlated with SF-36 scores. An independent samples t-test was utilized to test if patients classified as 'adaptive copers' on the MPI would have lower FABQ scores than patients classified as 'dysfunctional' on the MPI. An independent samples t-test was also utilized to test if participants who did not complete treatment had higher FABQ scores than those who did

complete treatment. A paired samples t-test was utilized to test if the FABQ scores were higher at pre-treatment than one-year follow-up.

CHAPTER FOUR
Results

Demographic Variables: Descriptive Analyses

At the time of this study, a total of 994 participants had been screened for participation. Of the 994 participants screened, 234 participants completed the FABQ at baseline, and a total of 69 participants completed the FABQ at both baseline and one-year follow-up. Out of the 234 participants, 92 participants who were randomized into the EI and EI/W groups received the FABQ at baseline, and a total of 36 participants who were randomized into the EI and EI/W groups received the FABQ at both baseline and one-year follow-up. The demographic variables for the 92 patients are presented in Table 1. Males comprised 47.8% of the sample, and females comprised 52.2% of the sample. The majority of the sample was Caucasian (53.3%), while the remaining proportions were: African American (31.5%), and Other ethnicities (15.2%). The mean age of the sample was 42.42 years old, and ranged from a minimum of 18 years old to a maximum of 65 years old. The majority of the sample was married or living together as married (46.7%). A total of 31.5% were single, 17.4% were divorced or separated, 1.1% was widowed, and 3.3% did not endorse a specific marital status. Risk status according to Gatchel et al.'s (1995) algorithm revealed that of the 234 participants who completed the FABQ at baseline, 81.5% were classified as HR and 18.5% were classified as LR. Table 2 shows the breakdown of HR and LR patients in both the ALBP and FABQ groups.

The baseline demographic variables for the 92 patients in each of the EI/W and EI groups are presented in Table 3. The continuous or categorical nature of each of the demographic variables determined whether to use Chi-square or independent samples t-test procedures to evaluate demographic differences between EI/W and EI groups at

baseline. There were no significant differences between the EI/W and EI groups for age, t (89) = -1.21, p = .23, for gender, χ^2 (1, N = 92) = 2.73, p = .10, for race/ethnicity, χ^2 (1, N = 92) = .70, p = .72, or for marital status, χ^2 (1, N = 92) = 1.34, p = .72.

Results of Hypothesis Testing

ALBP Algorithm and FABQ Risk Criteria

Chi-square analyses were conducted to examine whether FABQ risk criteria were significantly related to risk criteria determined by the ALBP algorithm. Hypothesis I stated HR ALBP patients were expected to be classified as high risk on the FABQ, and LR ALBP patients were expected to be classified as low risk on the FABQ. Hypothesis I was not supported for the FABQ-PA, but was supported for the FABQ-W. There was no significant relationship found between the FABQ-PA risk criteria and ALBP algorithm, χ^2 (1, N = 230) = 1.46, p = .23. Although no significant relationship exists, as seen in Table 4, the HR ALBP group was observed to have a higher FABQ-PA score (μ = 21.34, σ = 6.56) than the LR ALBP group (μ = 18.53, σ = 7.28). A significant relationship was found between the FABQ-W risk criteria and ALBP algorithm, χ^2 (1, N = 227) = 23.05, p < .05. As seen in Table 3, the HR ALBP group was classified as high risk on the FABQ-W (μ = 31.62, σ = 18.56). Likewise, the LR ALBP group was classified as low risk on the FABQ-W (μ = 13.97, σ = 13.93).

Return-to-Work Status and FABQ Scores

An independent samples t-test was conducted to examine whether there was a difference in FABQ scores for those who returned to work compared with those who did not return to work. Hypothesis II was supported, which expected that patients who did not return to work would have higher FABQ scores than patients who returned to work.

A significant difference was found for FABQ-PA scores, t (86) = 2.17, $p < .05$. As seen in Table 5, the patients who returned to work tended to have lower FABQ-PA scores (μ = 19.63, σ = 6.75) than patients who did not return to work (μ = 23.12, σ = 6.89). There was also a significant difference in FABQ-W scores, t (86) = 4.77, $p < .05$ for the two return-to-work groups. As seen in Table 5, patients who returned to work tended to have lower FABQ-W scores (μ =22.06, σ = 16.90) than patients who did not return to work (μ = 41.30, σ = 20.44). The time since the onset of pain was also assessed for patients who returned to work (n = 63) and patients who did not return to work (n = 25) to evaluate whether the onset of pain was the cause of significant differences found between the return to work groups. Further examination into the return to work groups revealed that no significant difference was found for the time of pain onset between the two return-to-work groups, t (86) = 1.67, p = .10. As seen in Table 5, the typical time of pain onset for those who did not return to work was 3 months and the typical time of pain onset for patients who did return to work was 1 month.

FABQ Scores in Relation to ORQ Scores

Correlational analyses were conducted to examine the relationship between FABQ scores and ORQ scores. As seen in Table 6, Hypothesis III was supported, which expected FABQ scores to be positively correlated with ORQ scores (μ = 117.69, σ = 48.87). In addition, significant relationships were found between the FABQ-PA and the ORQ, r (90) = .33, $p < .05$, and there were significant correlations between the FABQ-W and the ORQ, r (90) = .64, $p < .05$. These findings suggest that a greater number of fear-avoidance beliefs were related to a poorer prognosis in relation to returning to work.

FABQ Scores in Relation to SPS Scores

Correlational analyses were conducted to examine the relationship between FABQ scores and SPS scores. Hypothesis IV was not supported, which expected FABQ scores to be positively correlated with SPS scores. However, as seen in Table 6, there was a significant negative correlation found between FABQ-PA scores and SPS scores, r (87) = - .40, p <. 05. The negative correlation between FABQ scores and SPS scores (μ = 18.36, σ = 5.82) suggested that the more fear-avoidance beliefs, the more productive patients were at work.

FABQ Scores in Relation to SF-36 Scores

Correlational analyses were conducted to examine the relationship between FABQ scores and SF-36 scores. Hypothesis V was supported, which expected that FABQ scores would be negatively correlated with SF-36 scores. Significant negative correlations were found between the FABQ-PA and the Mental Composite of the SF-36, r (88) = -.24, p < .05, and significant correlations were found between FABQ-W and the Mental Composite of the SF-36, r (88) = - .32, p < .05. Moreover, significant correlations were found between FABQ-PA and the Physical Composite of the SF-36, r (89) = -.52, p < .05, and significant negative correlations were found between FABQ-W and the Physical Composite of the SF-36, r (89) = -.42, p < .05. The Mental Composite score (μ = 47.60, σ = 12.18) and Physical Composite score (μ = 34.30, σ = 8.12) are presented in Table 6. These findings suggest that there is a relationship between patients having high fear-avoidance beliefs and perceiving their health status poorly.

FABQ Scores and MPI Classifications

An independent samples t-test was conducted to examine if FABQ scores were significantly related to classifications on the MPI. Hypothesis VI was supported which stated patients classified as 'adaptive copers' on the MPI were expected to have lower FABQ scores than patients classified as 'dysfunctional' on the MPI. Significant differences were found between FABQ-PA scores for the patients in the two MPI classifications, t (46) = - 2.08, $p < .05$. The patients who were classified as 'adaptive copers' tended to have lower FABQ-PA scores ($\mu = 20.66$, $\sigma = 6.16$) than patients classified as 'dysfunctional' ($\mu = 25.71$, $\sigma = 4.15$). Significant differences were found between FABQ-W scores for the patients in the two MPI classifications, t (46) = - 3.08, $p < .05$. As presented in Table 7, patients classified as 'adaptive copers' tended to have lower FABQ-W scores ($\mu = 24.76$, $\sigma = 18.90$) than patients classified as 'dysfunctional' ($\mu = 40.52$, $\sigma = 19.07$).

Treatment Status and FABQ Scores

An independent samples t-test was conducted to examine whether there was a difference in FABQ scores between those participants who completed treatment and those who did not complete treatment. Hypothesis VII was not supported, which expected FABQ scores to be higher for patients who did not complete treatment ($n = 34$), relative to those who completed treatment ($n = 58$). No significant differences were found for FABQ-PA scores between patients who completed treatment ($\mu = 19.57$, $\sigma = 7.33$) and patients who did not complete treatment ($\mu = 22.39$, $\sigma = 6.01$), t (89) = 1.88, $p = .06$. Additionally, no significant differences were found for FABQ-W scores between patients who completed treatment ($\mu = 26.60$, $\sigma = 19.98$) and patients who did not complete

treatment (μ = 29.91, σ = 20.36), *t* (89) = .75, *p* = .45. As seen in Table 8, there were a total of 29 patients out of 34 who gave reasons for treatment incompletion: the majority of the patients (*n* = 13) dropped out of treatment because of scheduling issues, and some patients (*n* = 11) were discharged because they were non-compliant with multiple disciplines.

Pre-Treatment and One-Year Follow-up

A paired samples t-test was conducted to examine whether there was a difference in FABQ scores at pre-treatment and one-year follow-up. Hypothesis VIII was supported which expected that FABQ scores would be higher at pre-treatment than one-year follow-up. There were significant differences between FABQ-PA scores at pre-treatment compared with one-year follow-up, *t* (125) = -20.95, *p* < .05. As seen in Table 9, FABQ-PA scores were found to be higher at pre-treatment (μ = 20.59, σ = 6.98) than one-year follow-up (μ = 16.43, σ = 8.97). A significant difference was found between FABQ-W scores at pre-treatment and one-year follow-up, *t* (126) = -11.34, *p* < .05. FABQ-W scores were also higher at pre-treatment (μ= 27.80, σ = 20.07) than one-year follow-up (μ = 17.50, σ = 20.75).

CHAPTER FIVE
Discussion

Previous studies (Brox et al., 2008; Waddell et al., 1993) have demonstrated the usefulness of determining if a patient is experiencing fear-avoidance beliefs in relation to pain. Studies have shown that participants who score higher on the FABQ usually exhibit more avoidance behaviors and have poorer prognoses (Keeley et al., 2008). Researchers have described fear as a thought that causes one to feel uneasy about partaking in certain activities resulting in avoidance behavior (Brox et al., 2008). These fear-avoidance beliefs hinder patients from actively coping with their pain. In essence, since a person fears the future experience of pain and avoids certain physical or work activities to lessen the likelihood of experiencing pain, these beliefs cause muscles and joints to become "deconditioned" because of disuse (Vlaeyen & Linton, 2006). Consequently, if one's muscles and joints are not strengthened or reconditioned, this potentially causes the development of CLBP, and eventually a disability.

Researchers have utilized the FABQ to identify patients who tend to have higher fear-avoidance beliefs in order to develop the appropriate prevention and/or intervention programs to lessen the likelihood of developing a disability (Buer & Linton, 2002). The purpose of this present study was to examine if FABQ risk criteria were significantly related to risk criteria with the ALBP algorithm. It also examined if patients who had not returned to work had higher FABQ scores than patients who returned to work. The relationships between the FABQ and other psychosocial pain measures were also assessed. In addition, the current study examined if interdisciplinary low back pain treatment would help reduce fear-avoidance beliefs in the ALBP population.

Demographic Variables

The initial population of patients screened for the ALBP study consisted of 994. From this population, 92 patients who were randomized in EI/W and EI groups were administered the FABQ at baseline. Of these 92 patients, 36 patients were given the FABQ at one-year follow-up. As seen in Table 1, the average patient was married or living with their partner as if they were married, Caucasian, female, approximately 42-years-old, with HR ALBP status. There were no statistically significant differences for age, gender, race/ethnicity and marital status between EI/W and EI groups. The purpose of evaluating EI/W and EI groups was to see if demographic variables were normally distributed. Therefore, all analyses were conducted once the current sample was found to representative of the low back population at large.

ALBP Algorithm and FABQ Risk Criteria

One of the goals of this current study was to examine if FABQ risk criteria were significantly related to risk criteria with the ALBP algorithm. No significant relationship was found between the ALBP algorithm and the FABQ-PA risk criteria. This finding suggests that the algorithms do not match. However, the risk criteria for determining who is considered high risk and low risk on the FABQ-PA are not yet well established. This finding supports the issue of researchers continuing to develop a cut-off score on the FABQ-PA to identify patient risk status. Analyses revealed that HR ALBP patients tended to be classified as high risk on the FABQ-W, and that LR ALBP patients tended to be classified as low risk on the FABQ-W. These findings are important because they signify that the patients who scored high on the FABQ-W were classified as HR ALBP,

and those who scored low on the FABQ-W were classified as LR ALBP. These findings support both the ALBP HR-LR algorithm and the FABQ-W risk criteria. Further the current study affirms past research on the ALBP algorithm and FABQ-W risk criteria stating that certain cut-off scores predict the likelihood of an individual developing chronic low back pain. Therefore, utilizing the ALBP algorithm and/or the FABQ-W risk criteria to identify those participants who are at risk for developing CLBP would be beneficial for identifying who should receive treatment.

Return-to-Work Status and FABQ Scores

This study examined whether or not FABQ scores were different for those patients who did not return to work and those who did return to work. There was a significant difference in FABQ scores for those who returned to work and those who did not return to work. This finding supported Hypothesis II stating that patients who returned to work tended to have lower FABQ scores than patients who did not return to work. This may suggest that patients who believed that their pain was temporary (low FABQ scores, low risk patients) were not afraid to partake in certain physical activities at work therefore, were more willing to return to work. Consequently, those who viewed their pain as damaging or those who avoided certain physical activities because of their fear of experiencing further pain were the patients who most likely did not return to work. As seen in Table 5, although patients who did not return to work had an earlier onset of pain than patients who did return to work, no significant difference existed between the return-to-work groups for the time of pain onset. Both return to work groups received baseline measures on an average of at least a day apart.

FABQ Scores in Relation to ORQ Scores

This study hypothesized that the higher a patient's score on the FABQ, the higher their score would be on the ORQ. Findings revealed a positive correlation between FABQ and ORQ scores, which indicates that the higher FABQ scores, the higher ORQ scores. Higher scores on the ORQ suggest that persons may view their pain as more of an obstacle to overcome in order to return to work. The reason could be that patients who have higher fear-avoidance beliefs (high FABQ scores) will most likely have more obstacles (not only physical, but psychosocial obstacles as well) that will prevent them from returning to work. Those patients with lower fear-avoidance beliefs may have less psychosocial stress about returning to work because they more likely do not view their pain as threatening or a major obstacle to overcome.

FABQ Scores in Relation to SPS Scores

The present study hypothesized that the higher a patient's FABQ score, the higher his/her SPS score would be. Higher scores on the SPS suggest those patients who returned to work show less productivity at work because of their experience of pain. A significant relationship was found between the SPS and both subscales of the FABQ (FABQ-W and FABQ-PA). There was a negative correlation between the SPS and the FABQ, which suggests that the higher a score on the FABQ, the lower their SPS score. These findings imply that those patients who have high fear-avoidance beliefs regarding activity at work are the same patients with greater productivity at work. This finding could mean that patients with high fear-avoidance beliefs may feel comfortable doing their assigned task at work if it does not involve body movement that they know will not exacerbate their pain. These findings may also indicate that having activities at work

could prove to be a healthy distraction from fear-avoidance beliefs. Consequently, those who have higher fear-avoidance beliefs appear to have greater productivity and perform better at work.

FABQ Scores in Relation to SF-36 Scores

This study also hypothesized that higher scores on the FABQ would be related to lower scores on the SF-36. In other words, the lower a patient's score on the SF-36, the more likely patients would perceive their health status as poor, and would have higher fear-avoidance beliefs. If patients do not view their health as good or improving then, most likely, they will believe their pain will not subside, resulting in higher FABQ scores and lower SF-36 scores. Interestingly, there were significant negative correlations found between the FABQ (physical activity and work subscale) and the SF-36 (mental and physical composites). Therefore, the higher the FABQ scores, the lower the SF-36 scores. These findings suggest that there is a significant relationship between the way patients perceive their health and their fear-avoidance beliefs. Thus, patients who have high fear-avoidance beliefs may also perceive their overall health status as poor.

FABQ Scores and MPI Classifications

This study examined if lower FABQ scores were related to a classification of 'adaptive coper' on the MPI, and whether higher FABQ scores were related to a classification of 'dysfunctional' on the MPI. It was expected that patients who did not anticipate or fear experiencing painful stimuli were most likely able to cope in a healthy manner with other stressors in their life. Significant differences were found between the MPI classifications and FABQ scores. This finding suggests that patients who scored higher on the FABQ were the patients classified as 'dysfunctional' on the MPI. In other

words, patients with higher fear-avoidance beliefs utilized more unhealthy coping skills and, hence, their avoidance behavior. Patients classified as ‘adaptive copers’ on the MPI tended to have lower FABQ scores than patients classified as ‘dysfunctional’ on the MPI, which suggests that patients with lower fear-avoidance beliefs may have healthier coping skills than patients with higher fear-avoidance beliefs.

Treatment Status and FABQ Scores

This study examined if there was a difference in FABQ scores between patients who completed ALBP treatment and patients who did not complete ALBP treatment. No significant difference was found between ALBP treatment completers and ALBP non-completers. However, the reason for not completing ALBP treatment was examined. Out of the 34 patients who did not complete treatment, 29 gave various reasons why they did not complete ALBP treatment. Again as seen in Table 7, the majority of the patients who did not complete ALBP treatment dropped out early from the study because of scheduling issues. Therefore, findings may actually be due to the fact that the non-completers appeared to drop out of the study due to unrelated issues to fear-avoidance beliefs.

Pre-Treatment and One-Year Follow-Up

This study examined whether there was a difference in FABQ scores between pre-treatment and one-year follow-up. Significant differences were found for the FABQ (both FABQ-PA and FABQ-W) scores. Therefore, these findings indicate that patients tended to have higher fear-avoidance beliefs at pre-treatment than one-year follow-up. Such results indicate that ALBP treatment may have helped lower patient’s fear-avoidance beliefs. Patients, via treatment, may have started to believe that their pain would not be

worsened with activity because they had to complete certain physical activities in ALBP treatment.

Limitations and Directions for Future Research

During the course of conducting this study, various limitations presented themselves. The results of the analyses were most likely affected by the small sample size. Replication of this study in the future should be done, with a more sufficient baseline and one-year follow-up sample size. To increase the sample size for analysis, focus should be placed on generating more patients to be randomly assigned to an intervention group (EI/W and EI). Due to difficulties with data collection, many one-year follow-ups were not completed. Therefore, focus of the study should not only be recruiting patients for baseline, but also ways to maximize patient's participation at one-year follow-up.

Although the findings may reflect the characteristics of individuals who seek ALBP treatment, these findings may also have been limited regarding ethnicity. There was a sample of predominantly Caucasian patients. A lack of ethnically and socially diverse participants may have limited findings of this current study. Future recruiting could be conducted in a variety of communities and healthcare environments. A psycho-educated component focused on fear-avoidance beliefs could be implemented in future ALBP studies to examine its effectiveness. Results may have been different if a focus of ALBP treatment was dedicated to specifically reducing fear-avoidance beliefs. However, traditional interdisciplinary treatment demonstrated to effectively reduce fear-avoidance beliefs.

Once patients are identified as having high fear-avoidance beliefs, treatment could include physical activities with the consideration of the extent of injury, to counteract avoidance behaviors which hopefully will instill more hope and diminish fear-avoidance beliefs. More research on incorporating psychoeducation on fear-avoidance beliefs in biopsychosocial treatments is needed to evaluate its effectiveness.

Conclusion

Significant findings showed fear-avoidance beliefs are psychosocial factors that are important to examine with patients at risk for developing a chronic pain condition or disability. The current study also examined the use of the FABQ to assess fear-avoidance beliefs role in acute low back pain. Findings showed that fear-avoidance beliefs do play a pivotal role in the prognosis of an individuals' experience with pain. Patients who tended to have high fear-avoidance beliefs were more likely to not return to work, have more perceived obstacles when trying to return to work, perceive their overall health status as poor, and were less likely to utilize healthy coping---they develop fear-avoidance behavior.

Although these were significant and expected findings, there were findings that showed no relationship with high fear-avoidance beliefs --- productivity at work and treatment completion. The results of the current study also demonstrate the importance of how fear-avoidance beliefs contribute to a pain condition. The utility of the ALBP algorithm for identifying patients who are more at risk for developing low back pain was demonstrated in the current study to be effective. More research is needed to accurately identify other patient populations that would benefit best from early assessment

administering the FABQ in order to better determine those patients who are at risk for developing chronic pain and a disability.

TABLE 1

Demographic Variables for Patients who received the FABQ at Intake

Variables	(*n*= 92)
Age:	
Mean	42.42
Range in Years	18-65
Gender (%):	
Male	44 (47.8)
Female	48 (52.2)
Ethnicity (%):	
Caucasian	49 (53.3)
African American	29 (31.5)
Other	14 (15.2)
Marital Status* (%):	
Single	29 (31.5)
Married/Living Together as Married	43 (46.7)
Divorced or Separated	16 (17.4)
Widowed	1 (1.1)
Treatment Groups (%):	
EI/WT	44 (47.8)
EI	48 (52.2)

*Missing data from total.

TABLE 2

Number of Participants in each HR/LR ALBP and HR/LR FABQ groups

		FABQ-W Risk Status		Total
		LR	HR	
ALBP Risk Status:	HR	34	131	165
	LR	33	29	62
Total		67	160	227

		FABQ-PA Risk Status		Total
		LR	HR	
ALBP Risk Status:	HR	23	143	166
	LR	13	51	64
Total		36	194	230

TABLE 3

Demographic Variables for EI/W and EI groups (Baseline Only)

Variables			(*n*= 92)
	EI/W	**EI**	**Total**
Age :	44	48	92
Gender (%):			
Female	25 (56.8)	19 (39.6)	44
Male	19 (43.2)	29 (60.4)	48
Ethnicity (%):			
Caucasian	22 (50.0)	27 (56.3)	49
African American	14 (31.8)	15 (31.3)	29
Other	8 (18.2)	6 (12.5)	14
Marital Status* (%):			
Single	15 (35.7)	14 (29.8)	29
Married/Living Together	19 (45.2)	24 (51.1)	43
Divorced/Separated	8 (19)	8 (17)	16
Widowed	0 (0)	1 (2.1)	1

*Missing data from total.

TABLE 4

Chi-square of HR/LR ALBP algorithm and HR/LR FABQ groups

FABQ-PA	*n*	μ	σ	χ^2	*df*	*p*
ALBP Risk Status:				1.46	1	.23
High Risk	166	21.34	6.56			
Low Risk	64	18.53	7.28			
FABQ-W	*n*	μ	σ	χ^2	*df*	*p*
ALBP Risk Status:				23.05	1	.00*
High Risk	165	31.62	18.56			
Low Risk	62	13.97	13.93			

TABLE 5

Independent Samples T-test for Return-to-Work (RTW) Status

RTW	*n*	μ	σ	*t*	*df*	*p*
FABQ-PA:				2.17	86	.03*
No	25	23.12	6.89			
Yes	63	19.63	6.75			
Missing	4	n/a	n/a			
Total	92	n/a	n/a			
FABQ-W:				4.77	86	.00*
No	25	41.30	20.44			
Yes	63	22.06	16.90			
Missing	4	n/a	n/a			
Total	92	n/a	n/a			

RTW (in months)	*n*	*μ*	*t*	*df*	*p*
Onset of Pain:			1.67	86	.10
No	25	2.60			
Yes	63	.90			

TABLE 6

Pearson r correlations with Psychosocial Pain Measures

Measures	*n*	μ	σ	*r*	*p*
ORQ:	90	117.69	48.87		
FABQ-PA	92	20.59	7.00	.33	.01*
FABQ-W	92	27.80	20.07	.64	.00*
SPS:	87	18.36	5.82		
FABQ-PA	92	20.59	6.96	-.40	.00*
FABQ-W	92	18.36	5.82	-.45	.00*
Mental Composite (SF-36):	89	47.60	12.18		
FABQ-PA	92	20.59	7.48	-.24	.02*
FABQ-W	92	27.80	12.18	-.32	.00*
Physical Composite (SF-36):	90	34.30	8.12		
FABQ-PA	92	20.59	6.98	-.52	.00*
FABQ-W	92	27.80	20.07	-.42	.00*

TABLE 7

Independent Samples T-test for MPI

MPI	*n*	μ	σ	*t*	*df*	*p*
FABQ-PA:				-2.08	46	.04*
Adaptive Coper	41	20.66	6.16			
Dysfunctional	7	25.71	4.15			
FABQ-W:				-3.08	46	.00*
Adaptive Coper	41	24.76	18.90			
Dysfunctional	7	40.52	19.07			

TABLE 8

Independent Samples T-test for Treatment Completers/Non-Completers

Study Status	*n*	μ	σ	*t*	*df*	*p*
FABQ-PA:				1.88	89	.06
Not completed	34	22.39	6.01			
Completed	58	19.57	7.33			
FABQ-W:				.75	89	.45
Not completed	34	29.91	20.36			
Completed	58	26.60	19.98			

Non-Completers	*n*	*%*
Reasons:		
Scheduling Issues	13	44.8
Non-compliant with Multiple disciplines	11	37.9
Good Results	2	6.9
Not interested	3	10.3

TABLE 9

Paired Samples T-test Pre-treatment to One-year follow-up

Phase of study	*n*	μ	σ	*t*	*df*	*p*
FABQ-PA:				-20.95	125	.00*
Baseline (Intake)	92	20.59	6.98			
12M Follow-Up	36	16.43	8.97			
FABQ-W:				-11.34	126	.00*
Baseline (Intake)	92	27.80	20.07			
12M Follow-Up	36	17.50	20.75			

APPENDIX A

FABQ **Name:**_____ **Date:**_____

Below are some beliefs and expectations that patients often have about their pain. For each item below, please circle the number from 0 to 6 to indicate how much you agree or disagree with each statement.

	Completely Disagree			Unsure			Completely Agree
1. My pain was caused by physical activity.....	0	1	2	3	4	5	6
2. Physical activity makes my pain worse.....	0	1	2	3	4	5	6
3. Physical activity might harm my back.....	0	1	2	3	4	5	6
4. I *should not* do physical activities which (might) make my pain worse.....	0	1	2	3	4	5	6
5. I *cannot* do physical activities which (might) make my pain worse.....	0	1	2	3	4	5	6

The following statements are about how your normal work might affect your back pain. For each item below, please circle the number from 0 to 6 to indicate how much you agree or disagree with each statement.

	Completely Disagree			Unsure			Completely Agree
6. My pain was caused by my work or by an accident at work.....	0	1	2	3	4	5	6
7. My work aggravated my pain.....	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain.....	0	1	2	3	4	5	6
9. My work is too heavy for me.....	0	1	2	3	4	5	6
10. My work makes or would make my pain worse....	0	1	2	3	4	5	6
11. My work might harm my back.....	0	1	2	3	4	5	6
12. I *should not* do my normal work with my present pain.....	0	1	2	3	4	5	6
13. I *cannot* do my normal work with my present pain.....	0	1	2	3	4	5	6
14. I cannot do my normal work until my pain is treated.....	0	1	2	3	4	5	6
15. I do not think that I will be back to my normal work within 3 months.....	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to work.....	0	1	2	3	4	5	6

APPENDIX B

Name: _____ **Date:** _____

ORQ

For the following questions, please mark the number that best describes how you feel about each statement based on the choices provided. For those on full-time sick leave, please think back to the last time you worked when responding to statements about your work/workplace.

1. How often do you think about your pain?	0 never	1	2	3	4	5	6 always
2. How depressed have you felt during the last week?	0 never	1	2	3	4	5	6 always
3. How depressed have you felt, on average, during the last three months?	0 never	1	2	3	4	5	6 always
4. How often do you feel that it is difficult to start activities?	0 never	1	2	3	4	5	6 always
5. How much pain have you had in the last week?	0 never	1	2	3	4	5	6 always
6. How much pain have you had, on average, during the last three months?	0 never	1	2	3	4	5	6 always
7. How often have you been in pain during the last three months?	0 never	1	2	3	4	5	6 always
8. How much does your pain prevent you from engaging in activities in your daily life?	0 never	1	2	3	4	5	6 always
9. On return-to-work/increase in work time, fatigue will be a problem for me.	0 do not agree at all	1	2	3	4	5	6 agree completely
10. Increased ache will be a problem for me on return-to-work/increase in work time.	0 do not agree at all	1	2	3	4	5	6 agree completely
11. After work I won't have the energy to do anything but rest.	0 do not agree at all	1	2	3	4	5	6 agree completely
12. I have spent less time with friends and acquaintances since I went on sick leave.	0 do not agree at all	1	2	3	4	5	6 agree completely
13. I have had to give up leisure activities	0	1	2	3	4	5	6

14. I am too sick/disabled to work professionally.	0 do not agree at all	1	2	3	4	5	6 agree completely
15. Life feels meaningless when I don't have energy to do anything after work.	0 do not agree at all	1	2	3	4	5	6 agree completely
16. I have to rest when my pain increases.	0 do not agree at all	1	2	3	4	5	6 agree completely
17. My work demands physical effort.	0 do not agree at all	1	2	3	4	5	6 agree completely
18. I have too much to do at work.	0 do not agree at all	1	2	3	4	5	6 agree completely
19. I won't be able to reduce my sick leave since my work demands so much physical effort.	0 do not agree at all	1	2	3	4	5	6 agree completely
20. My work is the cause of my pain.	0 do not agree at all	1	2	3	4	5	6 agree completely
21. The repetitive movements (for example with arms and hands) that my work contains aggravate my pain.	0 do not agree at all	1	2	3	4	5	6 agree completely
22. My work is detrimental to my health.	0 do not agree at all	1	2	3	4	5	6 agree completely
23. If I had had another kind of job I would never have gotten any pain.	0 do not agree at all	1	2	3	4	5	6 agree completely
24. One day at my job contains many heavy work tasks.	0 do not agree at all	1	2	3	4	5	6 agree completely
25. My job supervisor has understanding for my pain problem..	0 do not agree at all	1	2	3	4	5	6 agree completely
26. There are often conflicts at my workplace.	0 do not agree at all	1	2	3	4	5	6 agree completely
27. My job supervisor tries to support me and make things easier for me at the workplace..	0 do not agree at all	1	2	3	4	5	6 agree completely
28. My work place has a tense atmosphere.	0	1	2	3	4	5	6

	do not agree at all						agree completely
29. I get a long well with my work colleagues.	0 do not agree at all	1	2	3	4	5	6 agree completely
30. It feels bad that my work colleagues don't understand my pain.	0 do not agree at all	1	2	3	4	5	6 agree completely
31. I worry about what my work colleagues think about my sick leave.	0 do not agree at all	1	2	3	4	5	6 agree completely
32. It feels bad that I get so far behind at work when I'm on sick leave.	0 do not agree at all	1	2	3	4	5	6 agree completely
33. I have to work hard when I get back/increase work time to make up for everything I missed during sick leave.	0 do not agree at all	1	2	3	4	5	6 agree completely
34. I really enjoy my work.	0 do not agree at all	1	2	3	4	5	6 agree completely
35. My work tasks are boring.	0 do not agree at all	1	2	3	4	5	6 agree completely
36. My job is varied and stimulating.	0 do not agree at all	1	2	3	4	5	6 agree completely
37. I would like to change work tasks.	0 do not agree at all	1	2	3	4	5	6 agree completely
38. What I do outside the job hours feels more important than my work.	0 do not agree at all	1	2	3	4	5	6 agree completely
39. I feel bored by my work.	0 do not agree at all	1	2	3	4	5	6 agree completely
40. The drawback to working is that I don't have time for other things.	0 do not agree at all	1	2	3	4	5	6 agree completely
41. I find my work schedule unsatisfactory.	0 do not agree at all	1	2	3	4	5	6 agree completely
42. When I work I have too little time for my family/friends.	0 do not agree at all	1	2	3	4	5	6 agree completely
43. I can stand my pain thanks to the	0	1	2	3	4	5	6

support of my family/friends.	do not agree at all						agree completely
44. It's hard to find the energy to work since my family situation/social situation is bad.	0 do not agree at all	1	2	3	4	5	6 agree completely
45. Since my children take up so much energy, it's hard to find the strength to work.	0 do not agree at all	1	2	3	4	5	6 agree completely
46. I feel that my family/friends have understanding for my situation.	0 do not agree at all	1	2	3	4	5	6 agree completely
47. When I am in pain, my family/friends think of something to do to make me forget my pain.	0 do not agree at all	1	2	3	4	5	6 agree completely
48. When I am in pain, my family/friends can't stand being around me.	0 do not agree at all	1	2	3	4	5	6 agree completely
49. I need to stay home because of my family situation	0 do not agree at all	1	2	3	4	5	6 agree completely
50. How much chance do you think there is that you could return-to-work/increase your work time?	0 no chance	1	2	3	4	5	6 very big chance
51. How do you think it's going to be to return-to-work/increase your work time?	0 not at all difficult	1	2	3	4	5	6 very difficult
52. How convinced are you that you will recover?	0 not at all convinced	1	2	3	4	5	6 completely convinced
53. How much chance is there that you will be able to return-to-work/increase your work time within six months?	0 no chance	1	2	3	4	5	6 very big chance
54. How do you feel when you think about your possibilities for returning to work/increasing your work time?	0 not at all optimistic	1	2	3	4	5	6 very optimistic
55. How do you feel when you think about your possibilities to manage without medical assistance in the future?	0 not at all optimistic	1	2	3	4	5	6 very optimistic

APPENDIX C

SPS **Name:**_____ **Date:** _____

Directions: Below we would like you to describe your work experiences in the **past month**. These experiences may be affected by many environmental as well as personal factors and may change from time to time. For each of the following statements, please circle one of the following responses to show your agreement or disagreement with this statement in describing *your* work experience.

Please use the following scale:

Circle:
1 if you ***strongly disagree*** with the statement
2 if you ***somewhat disagree*** with the statement
3 if you are ***uncertain*** about your agreement with the statement
4 if you ***somewhat agree*** with the statement
5 if you ***strongly agree*** with the statement

	Strongly Disagree	*Somewhat Disagree*	*Uncertain*	*Somewhat Agree*	*Strongly Agree*
1. Because of my back pain, the stresses of my job were much harder for me to handle.	1	2	3	4	5
2. Despite having my back pain, I was able to finish hard tasks in my work.	1	2	3	4	5
3. My back pain distracted me from taking pleasure in my work.	1	2	3	4	5
4. I felt hopeless about finishing certain work tasks, due to my back pain.	1	2	3	4	5
5. At work, I was able to focus on achieving my goals despite my back pain.	1	2	3	4	5
6. Despite having my back pain, I felt energetic enough to complete all of my work.	1	2	3	4	5

APPENDIX D

Name_____ Date_____

MULTIDIMENSIONAL PAIN INVENTORY

Instructions. An important part of our evaluation includes examination of pain from **your** perspective. You know your pain better than anyone, so the information you give is very helpful in planning a treatment program for you.

Please read each question carefully and then do your best to answer each one. **Do not skip any questions.** If there is a question that you think does not apply to you, please **circle the number** of that question. After you have completed the questionnaire, check your responses to make sure that you have answered each question. Please use the last page to add any additional information or comments that you think would be of help to us in better understanding your pain problem.

A. Some of the questions in this questionnaire refer to your "significant other." A significant other is a person with whom you feel closest. This includes anyone that you relate to on a regular or infrequent basis. It is very important that you identify someone as your "significant other." Please indicate below who your significant other is (check one):

- Spouse
- Partner/Companion
- Housemate/Roommate
- Friend
- Neighbor
- Parent/child/other
- Relative
- Other (please describe):_____

B. Do you currently live with this person? YES NO

When you answer questions in the following pages about "your significant other," always respond in reference to the specific person you just indicated.

SECTION 1

This part asks questions to help us learn more about your pain and how it affects your life. Under each question is a scale to mark your answer. Read each question carefully and then **circle a number** on the scale under that question to indicate how that specific question applies to you. An example may help you to better understand how you should answer these questions.

EXAMPLE

How nervous are you when you ride in a car when the traffic is heavy?

0	1	2	3	4	5	6
Not at all Nervous						Extremely Nervous

Please continue on next page

If you are not at all nervous when riding in a car in heavy traffic, you would want to circle the number 0. If you are very nervous when riding in a car in heavy traffic, you would then circle the number 6. Lower numbers would be used for less nervousness, and higher numbers for more nervousness.

Please answer the following questions:

1. Rate the level of your pain at the **present moment**.

0	1	2	3	4	5	6
No Pain						Very intense pain

2. In general, how much does your pain interfere with your day-to-day activities?

0	1	2	3	4	5	6
No Interference						Extreme interference

3. Since the time your pain began, how much has your pain changed your ability to work? (____ Check here, if you are not working for reasons other than your pain).

0	1	2	3	4	5	6
No change						Extreme change

4. How much has your pain changed the amount of satisfaction or enjoyment you get from taking part in social and recreational activities?

0	1	2	3	4	5	6
No change						Extreme change

5. How supportive or helpful is your significant other (this refers to the person you indicated above) to you in relation to your pain?

0	1	2	3	4	5	6
Not at all Supportive						Extremely Supportive

6. Rate your overall mood during the past week.

0	1	2	3	4	5	6
Extremely low						Extremely high

7. How much has your pain interfered with your ability to get enough sleep?

0	1	2	3	4	5	6
No interference						Extreme interference

8. On the average, how severe has your pain been during the last week?

0	1	2	3	4	5	6
Not at all severe						Extremely severe

9. How able are you to predict when your pain will start, get better, or get worse?

0	1	2	3	4	5	6
Not at all able to predict						Very able to predict

Please continue on next page

10. How much has your pain changed your ability to take part in recreational and other social activities?

0 1 2 3 4 5 6

No change Extreme change

11. How much do you limit your activities in order to keep your pain from getting worse?

0 1 2 3 4 5 6

Not at all Very Much

12. How much has your pain changed the amount of satisfaction or enjoyment you get from family related activities?

0 1 2 3 4 5 6

No change Extreme change

13. How worried is your spouse (significant other) about you because of your pain?

0 1 2 3 4 5 6

Not at all worried Extremely worried

14. During the <u>past week</u> how much control do you feel you have had over your life?

0 1 2 3 4 5 6

No control Extreme control

15. On an average day, how much does your pain vary (increase or decrease)?

0 1 2 3 4 5 6

Remains the same Changes a lot

16. How much suffering do you experience because of your pain?

0 1 2 3 4 5 6

No suffering Extreme suffering

17. How often are you able to do something that helps to reduce your pain?

0 1 2 3 4 5 6

Never Very often

18. How much has your pain changed your relationship with your spouse, family, or significant other?

0 1 2 3 4 5 6

No change Extreme change

19. How much has your pain changed the amount of satisfaction or enjoyment you get from work?

(_____ Check here if you are not presently working)?

0 1 2 3 4 5 6

No change Extreme change

20. How attentive is your spouse (significant other) to you because of your pain?

0 1 2 3 4 5 6

Not at all attentive Extremely attentive

21. During the <u>past week</u>, how well do you feel you've been able to deal with your problems?

0 1 2 3 4 5 6

Not at all Extremely well

Please continue on next page

22. How much control do you feel you have over your pain?

0	1	2	3	4	5	6
Not control at all						A great deal of control

23. How much has your pain changed your ability to do household chores?

0	1	2	3	4	5	6
No change						Extreme change

24. During the past week, how successful were you in coping with stressful situations in your life?

0	1	2	3	4	5	6
Not at all successful						Extremely successful

25. How much has your pain interfered with your ability to plan activities?

0	1	2	3	4	5	6
No change						Extreme change

26. During the past week how irritable have you been?

0	1	2	3	4	5	6
Not at all irritable						Extremely irritable

27. How much has your pain changed your friendships with people other than your family?

0	1	2	3	4	5	6
No change						Extreme change

28. During the past week how tense or anxious have you been?

0	1	2	3	4	5	6
Not at all tense or anxious						Extremely tense & anxious

SECTION 2

In this section, ~~we are~~ interested in knowing how your spouse (or significant other) responds to you when he or she knows you are in pain. On the scale listed below each question, **circle a number** to indicate how often your spouse (or significant other) responds to you in that particular way when you are in pain.

PLEASE ANSWER ALL OF THE 14 QUESTIONS.

1. Ignores me.

0	1	2	3	4	5	6
Never						Very often

2. Asks me what he or she can do to help.

0	1	2	3	4	5	6
Never						Very often

3. Reads to me.

0	1	2	3	4	5	6
Never						Very often

Please continue on next page

4. Gets irritated with me.

0	1	2	3	4	5	6
Never						Very often

5. Takes over my jobs or duties.

0	1	2	3	4	5	6
Never						Very often

6. Talks to me about something else to take my mind off the pain.

0	1	2	3	4	5	6
Never						Very often

7. Gets frustrated with me.

0	1	2	3	4	5	6
Never						Very often

8. Tries to get me to rest.

0	1	2	3	4	5	6
Never						Very often

9. Tries to involve me in some activity.

0	1	2	3	4	5	6
Never						Very often

10. Gets angry with me.

0	1	2	3	4	5	6
Never						Very often

11. Gets me pain medication.

0	1	2	3	4	5	6
Never						Very often

12. Encourages me to work on a hobby.

0	1	2	3	4	5	6
Never						Very often

13. Gets me something to eat or drink.

0	1	2	3	4	5	6
Never						Very often

14. Turns on the T.V. to take my mind off my pain.

0	1	2	3	4	5	6
Never						Very often

Please continue on next page

SECTION 3

Listed below are 19 daily activities. Please indicate how often you do each of these by circling a number on the scale listed below each activity. Please complete all 19 questions.

1. Wash dishes.
0 1 2 3 4 5 6
Never Very often

2. Mow the lawn. (_____ Check here if you do not have a lawn to mow.)
0 1 2 3 4 5 6
Never Very often

3. Go out to eat.
0 1 2 3 4 5 6
Never Very often

4. Play cards or other games.
0 1 2 3 4 5 6
Never Very often

5. Go grocery shopping.
0 1 2 3 4 5 6
Never Very often

6. Work in the garden. (_____ Check here if you do not have a garden.)
0 1 2 3 4 5 6
Never Very often

7. Go to a movie.
0 1 2 3 4 5 6
Never Very often

8. Visit friends.
0 1 2 3 4 5 6
Never Very often

9. Help with the house cleaning.
0 1 2 3 4 5 6
Never Very often

10. Work on the car. (_____ Check here if you do not have a car.)
0 1 2 3 4 5 6
Never Very often

11. Take a ride in a car or bus.
0 1 2 3 4 5 6
Never Very often

Please continue on next page

12. Visit relatives. (_____ Check here if you do not have relatives within 100 miles.)

0 1 2 3 4 5 6
Never Very often

13. Prepare a meal.

0 1 2 3 4 5 6
Never Very often

14. Wash the car. (_____ Check here if you do not have a car.)

0 1 2 3 4 5 6
Never Very often

15. Take a trip.

0 1 2 3 4 5 6
Never Very often

16. Go to a park or beach.

0 1 2 3 4 5 6
Never Very often

17. Do the laundry.

0 1 2 3 4 5 6
Never Very often

18. Work on a needed household repair.

0 1 2 3 4 5 6
Never Very often

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