DISSERTATION

THE RELATIONSHIP OF EXTRAVERSION TO SELF-EFFICACY AND CHRONIC PAIN MANAGEMENT IN WOMEN

Submitted by:

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY PATRICIA ANN ROMANO ENTITLED, "THE RELATIONSHIP OF EXTRAVERSION TO SELF-EFFICACY AND CHRONIC PAIN MANAGEMENT IN WOMEN" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

THE RELATIONSHIP OF EXTRAVERSION TO SELF-EFFICACY

AND CHRONIC PAIN MANAGEMENT IN WOMEN

Chronic pain is a silent health epidemic that afflicts millions of Americans each year and the majority of them are women. Researchers continue to try and identify causes of chronic pain and treatment strategies. One treatment strategy has been to evaluate how personality traits impact the experience of chronic pain. The purpose of this project was to assess the relationship of extraversion to self-efficacy, selection of wellness strategies, overall perception of pain disability, and number of pain days reported among a group of individuals with chronic pain. Thirty-five women between 40-65 years of age with chronic pain conditions of arthritis, fibromyalgia, or back problems completed a series of surveys over several waves of data. Results indicated that extraversion was significantly and positively correlated with self-efficacy. This is an important link because previous studies have identified self-efficacy as an essential factor for proactive pain management. However, the personality traits of agreeableness and openness were also significantly and positively correlated with self-efficacy. Extraversion was not found to be significantly correlated with selection of wellness strategies. This might be due to the possibility that the wellness strategies included in this study require special knowledge or training. Although no significant correlation was found between extraversion and overall perception of pain disability and number of pain days reported, potential relationships

trended in the inverse direction. A larger sample would help clarify whether a meaningful relationship exists between those variables.

Furthermore, it was hypothesized that self-efficacy would be a moderator and/or mediator variable between extraversion and the other three dependent variables. This was not found. The overall conclusion of this study is that the relationship of personality traits to aspects of chronic pain is complex. However, it is worth continuing to explore these relationships so that professionals can teach chronic pain patients how to use or modify their behavioral tendencies for effective pain management.

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DEDICATION

This dissertation is dedicated to my family, particularly my mother.

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CHAPTER I

INTRODUCTION

Prevalence of Chronic Pain

Chronic pain is a silent and little understood health epidemic that impedes the quality of life for millions of individuals (Gatchel & Turk, 1999; Jensen & Karoly, 1991; Tollison, 1998). According to Gatchel and Turk, physical pain afflicts more than 50 million individuals each year in the United States and accounts for 80% of physician visits. It costs over $70 billion annually in health care costs and lost productivity.

In a computer-assisted telephone survey conducted to explore the prevalence, severity, and treatment of chronic pain in 15 European countries and Israel, Breivik, Collett, Ventafridda, Cohen, and Gallacher (2006) found that 19% of adult Europeans dealt with moderate to severe chronic pain conditions. Respondents indicated that their chronic pain conditions negatively impacted the quality of their lives. Most were not treated by pain specialists and most did not engage in adequate pain management approaches.

According to Brown (2007), chronic pain has been recognized as a major health problem within industrialized nations. For European and North American studies, the prevalence of chronic pain has been estimated to be between 12-35% of the population at any given time and between 49-80% across a lifetime. Gender differences regarding chronic pain conditions have also been established. For example, in a sample of 135,535 adults in Canada, women reported higher rates of chronic pain conditions, pain severity, and depression than men in a national epidemiologic study (Munce & Stewart, 2007).

Impairment can affect an individual's life physically, emotionally, socially, vocationally, and financially (Afrell, Biguet, & Rudebeck, 2007; Breivik et al., 2006). Treatment of chronic pain is complicated by the fact that some conditions are not medically understood and are often complex and, therefore, one solution will not suffice (Brown, 2007). As a result, individuals go from physician to physician to seek relief. This can lead to conflicting diagnoses, unnecessary surgeries, inappropriate treatments, and depressed patients. Unfortunately, individuals often have to learn to live with their pain because treatment is not always available (Strong, Unruh, Wright, & Baxter, 2002).

Definition of Pain and History of Treatment and Theory

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (Masterson, 1998, p. 45). Usually, pain is categorized as acute or chronic. Acute pain is a direct consequence of tissue damage and may last 3 to 6 months, but disappears with healing.

Chronic pain, on the other hand, does not disappear with healing and its etiology may be unknown (Gatchel & Turk, 1999). It is experienced as persistent or recurring discomfort in one or more locations of the body (Gatchel & Turk, 1999). There are two types of chronic pain. One is chronic pain due to an identifiable pain generator such as degenerative disc disease. The other is chronic pain with no identifiable pain generator. This type of chronic pain continues after tissue healing has occurred but there is no explanation for why the pain persists. Or, the origin of the pain is not clear. The diagnosis of chronic pain is given when pain continues beyond 3 to 6 months. Examples of chronic pain include arthritis, fibromyalgia, lower back pain, and headaches (Gatchel & Turk, 1999).

Attempts to treat pain can be traced to ancient history (Gatchel, 1999; Shealy & Cady, 1998). The Chinese used acupuncture, opioids, and herbs to manage pain more than 4,500 years ago. Other cultures tried massage, exercise, diet, alcohol, and surgical trephination of the skull. Societies that believed pain was caused by spirits relied on exorcisms, Medicine men, and sacrifices (Morris, 1999; Shealy & Cady, 1998).

A major advancement in pain treatment occurred in the late 18th century when Joseph Priestly introduced nitrous oxide, an effective analgesic (Shealy & Cady, 1998). Other 19th century pain medications were morphine, codeine, and aspirin. Hypnosis, electrotherapy, and physical therapy were also introduced (Shealy & Cady, 1998). During the 20th century, other pain management procedures were developed, including lobotomies, dorsal column stimulation, biofeedback, steroids, and serotonin-altering drugs (Shealy & Cady, 1998). Today, over-the-counter and prescription medications, physical therapy, biofeedback, chiropractic care, meditation, massage, and surgery are popular approaches to controlling pain (Allen, Maleskey, Michaud, Nuwer, Votava, & Wild, 1992). Despite the treatment options available, chronic pain remains an enigmatic healthcare problem. There is still a great deal that medical specialists do not know. Furthermore, there is a subjective component to pain (Chapman, Nakamura, & Flores, 1999; Kanner, 1997). Individuals may report discomfort that cannot be observed through medical instruments or that is inconsistent with a pain syndrome. This subjective component can cloud diagnosis and treatment.

Gate Control Theory

In addition to treatment strategies, various pain theories have been put forth over the years. Rene Descartes, a 16th century French philosopher and mathematician, theorized

that pain is a result of tissue damage. The intensity of pain is directly related to the severity of the injury. According to his theory, cutting one's hand with a knife would be more painful than a needle prick. Descartes' position is applicable to acute pain but it does not explain: 1) absence of pain after a significant injury; 2) phantom limb pain; or 3) chronic pain (Melzack & Katz, 2004; Shealy & Cady, 1998).

Melzack and Wall (1965) developed the gate control theory to provide answers to some of these questions. According to Melzack and Wall, pain messages originate in the damaged tissue. Sensory nerves in the peripheral nervous system send pain signals to the spinal cord and brain. Two types of nerve fibers, A-delta nerve fibers and C-fibers, carry the majority of pain messages to the spinal cord. The A-delta nerve fibers are fast moving and carry electrical messages to the spinal cord at approximately 40 mph. C-fibers are slower moving and carry electrical messages to the spinal cord at approximately 3 mph. A-delta fibers are often involved in an immediate injury and C-fibers are involved in continuous pain. The cerebral cortex, the portion of the brain engaged in higher thinking, receives the signal and the pain is felt and interpreted.

The gate control theory proposes that pain messages encounter "nerve gates" in the spinal cord before they reach the brain. If these nerve gates are open, pain messages get through to the brain and pain is felt. If these gates are closed, pain messages are prevented from reaching the brain and pain may not be experienced. It is possible that the brain sends instructions to open or close the nerve gates and that sensory, cognitive, and emotional factors influence the brain's decision to accept or reject the pain signals (Melzack, 1999; Melzack & Katz, 2004; Melzack & Wall, 1965; Shealy & Cady, 1998). According to the gate control theory, a reason that interventions such as massage,

acupuncture, and medicines reduce pain is that they close nerve gates and reduce pain intensity. Inactivity and stress, however, open them and increase pain intensity (see Table 1). Although Melzack and Wall (1965) use the image of gates metaphorically, their perspective conveys the possibility that individuals can engage in thoughts or actions that empower them to reduce pain levels.

Biopsychosocial Model

Today, medical specialists agree that pain is a complex phenomenon, which should be addressed from a biopsychosocial perspective (Gatchel & Epker, 1999; Pridmore, 2002; Turk & Flor, 1999; Turk & Gatchel, 1999). According to this perspective, biological, psychological, and social components interact in chronic pain (Phillips & Gatchel, 2000; Philips & Rachman, 1996). The model supports the following tenets of the gate control theory: 1) physical and psychological components contribute to the experience of pain; 2) sensory, cognitive, and emotional factors facilitate or block pain intensity; and 3) individuals differ in how they respond to pain.

Cognitive and Behavioral Influence

Physically, the pain itself must be treated. Chronic pain can fluctuate from mild to severe symptoms and can lead to physical complications including loss of sleep, fatigue, impaired immune systems, and drug addictions (Roy, 2001). In a study conducted on 155 patients by Naughton, Ashworth, and Skevington (2007), disrupted sleep and poor sleep quality were positively correlated with depression and pain-related disability. Overall body fatigue also exacerbates chronic pain, and a decrease in fatigue can change perceptions of pain severity (Knoop, Stulemeijer, Prins, van der Meer, & Bleijenberg, 2007).

Table 1

Sensory, cognitive, and emotional factors that might influence nerve gates to open or close, thus allowing or disallowing pain messages to reach the brain (Melzack & Katz, 2004; Melzack & Wall, 1965)

Factors that Open Pain Gates & Cause More Suffering	**Examples**	**Factors that Close Pain Gates & Reduce Suffering**	**Examples**
Sensory Factors	Injury, inactivity, long-term narcotic use, poor pacing of activities	**Sensory Factors**	Increasing activities, short-term use of pain medication, relaxation training
Cognitive Factors	Focusing on the chronic pain, no outside interests or distractions, worrying about the pain	**Cognitive Factors**	Outside interests, constructive coping thoughts, distracting oneself from the pain
Emotional Factors	Depression, anger, anxiety, stress, hopelessness	**Emotional Factors**	Positive attitude, feeling the pain is not harmful, taking control of one's chronic pain, stress management

General movements, such as reaching, grasping, bending, or walking can be compromised. Individuals may have trouble meeting daily work or home demands (Roy, 2001). Tang, Salkovskis, Poplavskaya, Wright, Hanna, and Hester (2007) found that individuals with chronic back pain often engaged in safety-seeking behaviors (SSBs), particularly those with high health anxiety. Participants were observed on video-tape during two bag-carrying tasks. Those who used SSBs engaged in movements such as holding their back, tensing stomach muscles, or rocking to shift their weight. Although SSBs are employed with the goal of protecting oneself from further pain, they have the potential to exacerbate pain.

In another study of physical movements and activity rates among individuals with and without chronic pain, van den Berg-Emons, Schasfoort, de Vos, Bussmann, and Stam (2007) had participants wear an ambulatory monitoring device over one 24-hour period to determine whether patients with chronic pain had reduced activity levels compared to a control group. Duration of dynamic activity among the chronic pain patients was not significantly lower than the non-chronic pain control group. However, the intensity of physical activity was lower and chronic pain patients spent more time lying down.

McCracken and Samuel (2007) examined activity patterns in 276 individuals and highlighted four activity patterns: 1) avoidance, 2) pacing, 3) overuse, and 4) activity cycling. Those high in activity with low avoidance showed better physical and emotional functioning than the other groups.

Using the Chronic Pain Coping Inventory, Ersek, Turner, and Kemp (2006) found in a study of 250 older residents of a retirement community that participants engaged in a variety of pain management strategies. The most frequently reported strategies were task

persistence, pacing, and coping self-statements, and the least reported strategies were asking for assistance and relaxation.

Even if pain has an organic basis, other factors contribute to how it is experienced (Phillips & Gatchel, 2000). Demographic variables such as gender, age, and ethnicity can influence reactions to pain (Lewis, 2002; Phillips & Gatchel, 2000). Exton-Smith (1961) found that older people experience less pain than younger people. Merskey and Spear (1967) discovered that ethnicity influenced pain thresholds and complaints about pain, and that men have higher pain thresholds than women.

Cole (1965) reported that emotional states are related to persistent pain (Grzesiak & Ciccone, 1994; Weisberg & Keefe, 1999). For example, pain may initiate depression or be the result of depression (Robinson & Riley, 1999). Pincus, Santos, and Morely (2007) investigated the content of thoughts in depressed pain patients, non-depressed pain patients, and a group of healthy participants through a sentence-completion task. Depressed pain patients produced more negative health-related completions than the other groups.

Uncertainty about the trajectory of one's chronic pain condition and impact on one's future was a dominant concern among individuals who participated in a study about impressions of their past, present, and future situation (Richardson, Ong, & Sim, 2006). In a study of 169 chronic pain patients, Samwel, Evers, Crul, and Kraaimaat (2006) found that worrying predicted depression. A sense of helplessness predicted pain level, and helplessness and passive behavioral coping strategies significantly predicted disability.

Williams and Thorn (1989) found that holding the belief that pain will be enduring is associated with greater subjective pain intensity regardless of pain duration. Also, beliefs

in the endurance of pain were related to a decrease in compliance with physical therapy interventions, possibly due to patients misinterpreting sore muscles that resulted from therapy as counterproductive to managing their pain. Viewing pain as mysterious was associated with little improvement post treatment, negative perceptions of self, and diminished sense of internal control over health issues.

Coping Styles

Coping styles also play a role in how individuals handle their chronic pain. Cipher and Clifford (2003) investigated the relationship between personal coping styles and reactions to chronic pain. The authors focused on three coping styles called Repressive, Amplifiers, and Social Copers. Individuals who use the repressive coping style tend to reveal little about themselves, deny unpleasant emotions, and endorse positive characteristics such as cooperation, respect, and rule abidance. Their coping style is often perceived as reserved and passive. This style has been associated with greater pain thresholds and tolerance. Their frequent denial of pain, however, can impede recovery and lower immune functioning. Amplifiers, on the other hand, overexpress their emotions and freely complain about their discomfort. They are hypervigilant and habitually overreact to perceptions of even small threats triggered by environmental or biological stimuli. Expressions of anger are common in order to elicit help or protect themselves from perceived threats. Amplifiers report the least amount of pain tolerance of the three groups. The third group, the Social Copers, show the highest level of functional capacity but still report above-average levels of emotional distress. They are more sociable, forceful, narcissistic, and interpersonally successful.

In order to assess treatment outcomes among Repressors, Amplifiers, and Social Copers, Cipher and Clifford (2003) recruited 66 patients at a multi-disciplinary pain treatment clinic. Fibromyalgia, arthritis, and headache/migraine were among the diagnoses. The sample consisted of 24 Repressors, 18 Amplifiers, and 24 Social Copers. Participants responded to a set of questionnaires at their initial evaluation, at one month into treatment, and again at the conclusion of treatment. All three groups reported significant decreases in pain and functional impairment after treatment. At pre-treatment, Amplifiers started with the highest level of depression and showed the highest decrease in depression post-treatment. Also, Amplifiers improved in functional capacity but not in mood distress or overall mood, irritability, and anxiety. The Social Copers revealed the lowest levels of depression among the three groups post-treatment. Repressors were the least responsive to depression-focused therapy, possibly because of their introverted nature, lack of comfort in sharing, or denial of unpleasant emotions. This study suggests that coping styles can foster or inhibit one's self-efficacy for pain management (Cipher & Clifford, 2003).

Attitudes about pain also have an impact on reactions. Acceptance of one's chronic pain condition is a valuable strategy that can help chronic pain patients cope more effectively with their conditions (Afrell et al., 2007; Esteve, Ramirez-Maestre, & Lopez-Martinez, 2007). A study of 20 individuals indicated that those with chronic pain who regularly incorporated a sense of acceptance engaged in more active coping strategies. Acceptance means to be in harmony with the body. It's the realization that the occurrence of chronic pain is unpredictable and that one must adjust activities and plans

accordingly. Body awareness and body reliance are essential to developing a sense of acceptance.

Vowles et al. (2007b) conducted a study that assessed the effects of pain acceptance and pain control strategies on physical impairment in 74 individuals with chronic low back pain. Individuals in the pain acceptance group demonstrated greater functioning on a set of seven physical tasks and a 16.3% improvement in impairment compared to the pain control group and continued practice group.

Esteve et al. (2007) explored the influence of acceptance, pain-related cognitions and coping to adjustment to chronic pain for 117 chronic pain patients. Acceptance of pain was related to functional impairment. Those who are higher in acceptance understand the importance of participating in daily activities even if experiencing pain while doing so.

On the other hand, if individuals catastrophize their pain, they tend to cite higher levels of pain severity and disability (Esteve et al., 2007; Jensen & Karoly, 1991; Jensen, Nielson, Turner, Romano, & Hill, 2003; Jensen, Turner, & Romano, 2001). According to Vowles et al. (2007b), catastrophizing is defined as a negative cognitive set that leads to the overestimation of unpleasant outcomes. Individuals who catastrophize about their chronic pain conditions anticipate higher pain severity, distress, and disability. Among 76 participants in a multidisciplinary pain management program, reduction in catastrophizing was strongly associated with improved physical functioning (Moss-Morris, Humphrey, Johnson, & Petrie, 2007).

Jensen et al. (2003b) proposed that an attitude of readiness to adopt a self-management approach to pain would be significant in pain management. They hypothesized that greater readiness to self-manage pain would be positively associated

with adaptive strategies. Patients were recruited for a multidisciplinary treatment program. Those who were accepted received telephone interview versions of several pain-related questionnaires at the beginning and end of treatment, and at a 6-month follow-up. The specific pain program was a 3-week, 5.5 days per week outpatient program, which included physical therapy, cognitive-behavioral therapy, and coping skills training. Association between readiness and self-management of pain was unclear and inconsistent (Jensen et al., 2003b).

Social Support

Social components need to be considered when treating chronic pain patients. Positive social support has been correlated with healthier pain management (Phillips & Gatchel, 2000), but social support is not always available. Lack of support from family and friends was listed as a significant stressor reported by individuals living with fibromyalgia (Cunningham & Jillings, 2006). A qualitative study with 18 individuals with chronic back pain revealed that the perception of subtle or overt stigmatization by family, friends, and health professionals had a profound effect on self-esteem (Roy, 2001).

Individuals with chronic pain may become reclusive and withdraw from community activities (Roy, 2001). They may cease to fulfill family and parenting roles effectively (Roy, 1989, 1992, 2001). Family members or friends may become impatient with an individual's complaints of pain (Roy, 2001). Emotionally stressful conditions in the environment can exacerbate or create physical pain (Phillips & Gatchel, 2000).

Intervention Strategies

Recognizing that chronic pain is best addressed from the biopsychosocial perspective, some medical facilities have created multidisciplinary pain treatment teams (McCahon,

Strong, Sharry, & Cramond, 2005). These teams are made up of experts from various disciplines such as medicine, physical therapy, and mental health (Gatchel & Turk, 1999). Team members collaborate on patient treatment plans. A physician might conduct the initial pain diagnosis and prescribe medication, a physical therapist might provide the therapeutic treatment, and a mental-health counselor might assist the patient with how to live a more self-efficacious lifestyle (Strong et al., 2002). Patients are shown how to move from a health-provider dependent relationship to self-reliance for pain management (Jensen et al., 2003b). These pain treatment programs can include self-reports and observer reports on pain severity and pain strategies and can include continuous quality improvement goals (Comley & DeMeyer, 2001; McCahon et al., 2005).

Pain treatment programs generally implement cognitive-behavioral interventions, which help patients improve their physical and psychosocial functioning, and cope more effectively with pain (Allen et al., 1992; Engel, Schwartz, Jensen, & Johnson, 2000; Jensen et al., 2001; Turner, Jensen, & Romano, 2000; Vowles, McCracken, & Eccleston, 2007a). The primary goal is to teach patients "wellness" coping strategies and decrease "illness" coping strategies (Jensen et al., 2003b; McCahon et al., 2005). Wellness strategies include relaxation, activity pacing, and exercise. Illness strategies include seeing oneself as helpless in dealing with the pain or imagining worst case scenarios (Jensen et al., 2003b; Jensen, Keefe, Lefebvre, Romano, & Turner, 2003a).

The Role of Self-Efficacy in Chronic Pain Management

Studies show that self-efficacy is a critical factor in the management of chronic pain. If individuals have a sense of self-efficacy, their perception of pain disability decreases and their confidence in dealing with pain increases (Jensen & Karoly, 1991; Jensen et al.,

2001; Nicholas, 2007; Sarda, Nicholas, Pimenta, & Asghari, 2007). Patients who believe that they can control and manage their pain are more likely to have a positive sense of well-being, higher activity levels, and better health outcomes (Jensen & Karoly, 1991; Smarr et al., 1997; Turner, Ersek, & Kemp, 2005).

Self-efficacy refers to people's beliefs about their capabilities to exercise influence over events that affect their lives (Bandura, 1994). According to Bandura, self-efficacy beliefs determine how people think, feel, motivate themselves, and behave. People who have a strong sense of self-efficacy approach challenging tasks and they continue to persist even when they experience failure (Nicholas, 2007). They feel confident that they can exercise control over threatening, stressful, or difficult situations. An efficacious outlook on life helps people to achieve, accomplish goals, and feel positively about themselves. It can also lead to improved coping (Smarr et al., 1997).

People who are low in self-efficacy doubt their capabilities and, therefore, avoid tasks they view as threatening. They have low aspirations and weak commitment to goals. They tend to dwell on their deficiencies and they don't recover quickly if they experience failure. Accordingly, they often feel stressed and despondent (Bandura, 1997).

Self-efficacy can be taught and it stems from four main sources (see Figure 1). The first source is mastery of a skill. Immediate or gradual successes help build confidence, competence, and belief that one is in control (Bandura, 1994). Chronic pain patients need to learn how to manage pain symptoms, exercise, eat properly, and ask for assistance.

Social role models are the second influence for building self-efficacy. Observing another person who is similar to oneself succeed through sustained efforts convinces the onlooker that he/she can become efficacious in that skill (Bandura, 1994). Chronic pain

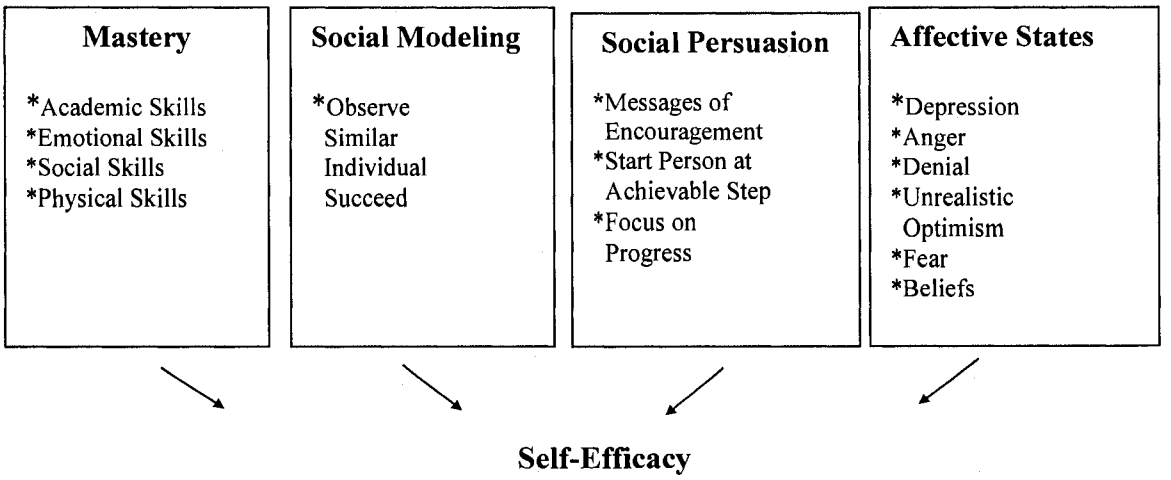

Figure 1. Four influences on self-efficacy. Items listed in the Mastery box are examples of global skills that can be taught. Items in the Affective States box are examples of emotions that might be barriers to an individual's willingness to become self-efficacious in a particular area.

patients can benefit from meeting individuals of their same gender and age who have successfully managed similar pain symptoms.

The third source of self-efficacy is social persuasion. People who are verbally persuaded that they possess the ability to succeed in a particular domain are more apt to mobilize greater and sustained effort. Social persuaders, or efficacy builders, know how to avoid placing people in situations that are significantly beyond the person's skill level. They measure success in terms of self-improvement (Bandura, 1994).

A number of social persuasion methods exist. Motivational interviewing (MI) is one that helps build exercise self-efficacy in people with fibromyalgia (Jones, Burckhardt, & Bennett, 2004). Regular exercise is beneficial to fibromyalgia patients but these individuals tend to be aerobically unfit, have poor muscle strength, and limited flexibility (Jones et al., 2004). MI can be used to motivate people with fibromyalgia to join exercise programs and continue attending classes even when they experience physical difficulties when exercising. MI sessions are usually 30- to 60-minute sessions that are followed with telephone support from a trained MI therapist. Advice can include providing the individual with information, communicating risk, and initiating a behavioral change sequence. This persuasion strategy is adaptable and helps break down barriers that convince people not to exercise (Jones et al., 2004).

The fourth source of building self-efficacy is reducing affective states that interfere with self-efficacy. Anxiety, depression, fear, and other negative beliefs can block people from attempting intimidating tasks. Also, people low in self-efficacy tend to interpret emotional stress as an indication of their inability to succeed at a task, whereas people

high in self-efficacy view stress reactions as energizing (Bandura, 1994). Emotionally, a person might learn how to regulate negative emotions about pain.

Another factor in physical and psychosocial disability is a patient's pain-related belief systems. Turner et al. (2000) assessed 169 patients who were entering a multidisciplinary pain treatment program on measures of pain, beliefs, coping, catastrophizing, physical disability, and depression. Belief scores significantly predicted physical disability and depression. Coping strategies predicted only physical disability and catastrophizing only predicted depression. Since pain-related beliefs can influence self-efficacy, addressing these beliefs should be included in treatment programs.

Self-efficacy is necessary for typical and extraordinary life demands. Life demands change over the course of one's life cycle, and people who are self-efficacious handle change in an energetic and confident manner (Bandura, 1997). Self-efficacy is important to tasks such as learning math or repairing items around the house. It is also significant for effective pain management.

A number of studies have identified self-efficacy as an important link in lowering pain severity, selection of effective coping strategies, and persistence until success is achieved (Buckelew et al., 1996). Self-efficacy has been shown to be significant in pain management among heterogeneous pain populations, including those with chronic low back pain and those with migraine headaches (Buckelew et al., 1996).

Buckelew et al. (1996) examined whether pretreatment self-efficacy and post-treatment changes in self-efficacy predicted post-treatment tender point index, disease severity, pain, and physical activity in individuals with fibromyalgia. Medical doctors

have identified "tender points" of the body where fibromyalgia patients are likely to feel discomfort. Tender points include the occiput, trapezius, gluteal, low cervical, second rib, and the knee. Some 109 subjects who had fibromyalgia were assessed before and after a 6-week training intervention. Subjects were randomly assigned to one of four treatment groups: biofeedback/relaxation training, exercise, combination biofeedback/exercise, or educational attention control. Higher degrees of self-efficacy did predict better treatment outcomes for all four groups, particularly regarding tender point index and perception of pain severity.

In a study on self-efficacy and chronic pain treatment, Kores, Murphy, Rosenthal, Elias, and North (1990) assessed the relationship of perceived self-efficacy and treatment outcomes in 34 chronic benign pain patients who had been admitted to the Pain Center at the University of Tennessee, Memphis. The majority of the patients had chronic back or leg pain. All were given a set of inventories to complete, including the Melzack Pain Questionnaire, Beck Depression Inventory, and the Health Locus of Control scale. Patients completed a weekly self-efficacy scale during their hospital stay.

The scale was comprised of walking distance, lifting ability, pain coping, employment potential, and family or avocational engagement. Self-efficacy ratings during the final week were used for outcome comparisons. Based on a median split, patients were divided into high and low self-efficacy groups. Results showed that by the end of the program high self-efficacy patients were significantly better on sitting tolerance and marginally better on standing tolerance than low self-efficacy patients. They reported themselves as more improved than the low self-efficacy group at a follow-up interview, and they were better at walking distance and indicated reduced pain and reduced down time.

Anxiety about going into pain is common for chronic pain patients and can lead to an increased perception of pain and increased pain behavior (Strahl, Kleinknecht, & Dinnel, 2000). Strahl et al. examined the impact of anxiety, coping strategies, and self-efficacy on individuals with rheumatoid arthritis. The participants were 133 women and 21 men diagnosed with this form of arthritis. Participants were mailed a packet of inventories to complete, which assessed physical, social, and emotional functioning, coping mechanisms used, fear or anxiety about pain, and perceived self-efficacy to cope with chronic arthritis. Although anxiety was found to be a significant barrier to effective pain management, self-efficacy was found to be consistently predictive of patient functioning more so than illness related variables.

Woby, Roach, Urmston, and Watson (2007) found that among 183 chronic low back pain patients, higher levels of functional self-efficacy and lower levels of depression were related to lower levels of disability. Functional self-efficacy was a strong predictor of pain intensity and pain disability.

The connection of self-efficacy to chronic pain management, however, is not necessarily simplistic. Meredith, Strong, and Feeney (2006) considered the roles of adult attachment, anxiety, and pain self-efficacy as predictors of pain intensity and disability for 152 participants. Higher scores on fearful and preoccupied (anxious) attachment styles were associated with low pain self-efficacy, whereas higher scores on the attachment dimension of comfort with closeness were linked to high pain self-efficacy, especially for males. Insecure attachment was associated with higher anxiety.

Role of Personality Traits

The relationship of personality traits and chronic pain has been studied by a number of researchers. Personality is defined as a set of enduring traits, which predispose individuals to think, feel, and behave in certain ways (Allen, 2003). Applegate et al. (2005) administered the MMPI at college entry to 2,332 subjects between 1964 and 1967. At a 30-year follow-up in 1997, men who had scored higher on traits of hypochondriasis, hysteria, and masculinity reported increases in chronic pain conditions as did women who had scored higher on traits of hypochondriasis, hysteria, and paranoia. None had a diagnosed chronic pain condition at the time of the original study.

Gregory, Manring, and Wade (2005) hypothesized that pain site would be related to personality traits such as alexithymia, counterdependency, and emotional distress. The study was conducted on 140 outpatients, 46 with no chronic pain, 49 with chronic back pain, and 46 with chronic pain in other locations. Results indicated that there may be some relationship between pain site and personality trait as in their finding that back/extremity pain was associated with counterdependency.

A number of studies have been devoted to examining whether and how the Big-5 personality traits of neuroticism, extraversion, agreeableness, openness, and conscientiousness are related to perception of chronic pain severity and chronic pain behaviors. Asghari and Nicholas (2006) investigated the effects of the five personality dimensions on pain-related beliefs and catastrophizing in 145 patients with chronic pain and found that only neuroticism was associated with pain-related variables.

Williams, Robinson, and Geisser (1994) used the Pain Beliefs and Perceptions Inventory with 37 chronic pain individuals and correlated the resulting beliefs with

several measures, including personality traits. Neuroticism was significantly positively correlated with beliefs in mystery, pain permanence, and self-blame. Belief in pain permanence and self-blame were positively correlated with catastrophizing. Belief that pain was mysterious was positively correlated with catastrophizing and perception of coping strategies as ineffective.

Extraversion and agreeableness were not correlated with pain beliefs in the Williams et al. (1994) study. However, the trait of openness was significantly negatively correlated with the belief in pain permanence, and conscientiousness was significantly associated with the perception of pain being more constant then intermittent.

Findings of a path analysis of 54 subjects with rheumatoid arthritis indicated that individuals higher in neuroticism experienced more chronic distress and had a propensity to catastrophize about their pain. Within-subjects analysis showed that individuals higher in neuroticism reported more intense pain and negative mood (Affleck, Urrows, Tennen, & Higgins, 1992).

In a different study, Affleck, Urrows, Tennen, and Higgins (1992) assessed the daily coping strategies that 75 individuals with rheumatoid arthritis used over 75 days. Approximately 40% of the participants reported using on average at least one coping strategy per day. Some did not use any pain coping strategy for weeks while others used up to six per day. The pain coping strategies that were used most frequently were taking direct action to reduce the pain and relaxation strategies. Those used least were expressing emotions about the pain and redefining the pain to make it more bearable. More than one-half of the participants reported no use of redefinition or spiritual comfort. Women used more types of coping strategies and were more likely to seek emotional

support. Neuroticism was related to greater use of emotional expression and lesser use of relaxation.

Harkins, Price, and Braith (1989) rated the impact of experimentally induced heat pain on sensation intensity, how strong the pain felt, and how unpleasant the pain was for participants. Results indicated that extraverts complained more about their clinical pain than introverts and were less apt to inhibit overt expression of their pain. Individuals who had scored higher on neuroticism perceived the experimental and their own chronic pain as more disturbing than those who scored lower.

In a study similar to Harkins et al. (1989), Wade, Dougherty, Hart, Rafii, and Price (1992) conducted research on the relationship between extraversion and neuroticism on the four major stages of pain processing: pain sensation intensity, pain unpleasantness, suffering, and pain behavior. Only neuroticism was related to pain unpleasantness but neither neuroticism nor extraversion was related to pain sensation intensity.

Nitch and Boone (2004) found that individuals with chronic pain who scored higher on neuroticism and who were more introverted were more interpersonally distressed. Adaptive copers indicated more emotional stability and a good balance between extraversion and introversion.

Pearce and Porter (1983) failed to find a predicted correlation between extraversion and likelihood of engaging in pain behaviors. Raselli and Broderick (2007) found that neuroticism and depression were correlated with pain intensity and pain unpleasantness for both momentary and recalled pain.

Although personality traits are perceived as enduring, Fishbain, Cole, Cutler, Lewis, Rosomoff, and Rosomoff (2006) reviewed available studies on personality traits and the

effects of pain to determine whether pain treatment could lead to changes in personality trait scores. Findings were consistent across studies that personality traits can be modified with pain treatment. For example, MMPI scores and scores on other coping/self-efficacy inventories and personality questionnaires improved after treatment. The Fisbain et al. (2006) work demonstrates both the importance of recognizing the influence that personality traits have on pain perception, self-efficacy, and pain management and also their usefulness as intervention tools for improving an individual's ability to effectively cope with chronic pain conditions.

Extraversion

Although self-efficacy is clearly related to chronic pain management, more research is needed to identify variables that contribute to acquiring self-efficacy. The current study focuses on extraversion as a variable that possibly influences self-efficacy and pain management. Carl Jung (1875-1961) theorized that all human beings are oriented toward either extraversion or introversion (see Table 2). Extraverts focus on the outside world whereas introverts focus on inner experiences (Allen, 2003).

Theorists other than Jung, such as Cattell and Eysenck, consider extraversion and introversion to be basic personality traits. Hundreds of studies have investigated these constructs using different inventories, including the Maudsley Personality Inventory, the Eysenck Personality Questionnaire, and the Revised NEO Personality Inventory (Allen, 2003). Costa and McCrae (1992a) consider extraversion to be one of five universal personality traits along with neuroticism, openness, agreeableness, and conscientiousness. All five traits have been found in longitudinal and cross-observer studies and in different age, sex, ethnic, and language groups (Costa & McCrae, 1992a; Eysenck, 1992).

Table 2

Behavioral descriptions of extraverts and introverts (Myers, 1993)

EXTRAVERTS	INTROVERTS
1) Attuned to external environment	1) Drawn to inner world
2) Prefer to communicate by talking	2) Prefer to communicate by writing
3) Learn best by doing or discussing	3) Learn best by reflection
4) Breadth of interests	4) Depth of interest
5) Tend to speak first and reflect later	5) Tend to reflect before acting or speaking
6) Sociable and expressive	6) Private and contained
7) Take initiative in work and relationships	7) Focus readily

Phillips and Gatchel (2000) examined research conducted over the last 40 years on the personality constructs of extraversion and introversion and their relationship to the individual's experience of pain. Most studies were conducted in the 1960s and 1970s, with smaller quantities in recent decades. Initially, research on extraversion and introversion consisted of pain-induced laboratory experiments. Participants were administered a pain stimulus such as heat, shock or cold. Typically these experiments focused on: 1) pain threshold; 2) the point at which a participant complained of pain; and 3) when a person could no longer tolerate the pain (Phillips & Gatchel, 2000). Compared to introverts, extraverts were found to have higher pain thresholds and have a higher tolerance for pain. Extraverts also complained more about their pain. Once pain became chronic, however, both extraverts and introverts showed more social introversion.

The findings of Phillips and Gatchel (2000) are consistent with the hypotheses proposed by Eysenck. He described extraverts as outgoing, socially active, and uninhibited. Introverts were described as quieter, more reserved, and more introspective (Phillips & Gatchel, 2000). Eysenck hypothesized that introverts had lower pain thresholds and lower pain tolerance because they operate at higher levels of cortical excitation than extraverts. As a result, introverts are more sensitive to pain (Phillips & Gatchel, 2000).

Over time, researchers realized that pain-induced laboratory experiments did not transfer to real-life situations and they began to conduct studies with clinical pain populations. Results from these studies were consistent with the laboratory studies regarding extraversion-introversion pain thresholds, tolerance, and complaints.

Compared to introverts, extraverts more frequently request pain medication (see Figure 2). Extraverts are more willing to ask for medication, whereas introverts might desire pain medication but are too reserved to ask for it. Extraverts are more adept at calling on social support, which is a significant resource for pain management (Phillips & Gatchel, 2000).

Purpose of Current Study

The constructs of self-efficacy and extraversion have been examined in the chronic pain literature and they have been found to influence reactions to pain. However, these constructs have not been tied together. More information is needed to determine whether extraversion influences self-efficacy and chronic pain management. Furthermore, it needs to be determined whether self-efficacy moderates or mediates the impact of extraversion on pain management, with implications for effective pain management programs.

Pain conditions. Three forms of chronic pain were included in this study: 1) arthritis; 2) fibromyalgia; and 3) lower back pain. All three are common chronic pain conditions. Arthritis is a highly prevalent form of chronic pain and it is the leading cause of disability among people over age 15 in the United States. Over half of those affected are younger than 65 years of age (Subcommittee on Aging, 2004). More than 100 types of arthritis exist (Lorig & Fries, 1986). Osteoarthritis is the most common type. It is a degenerative joint disease in which the cartilage that covers the end of the bones in the joint begins to deteriorate (Lorig & Fries, 1986). Rheumatoid arthritis is an autoimmune disease in which the lining of the joint becomes inflamed (Lorig & Fries, 1986). Other types of arthritis are gout, ankylosing spondylitis, juvenile arthritis, and systemic lupus. Although not every form of arthritis involves inflammation, every form involves areas in or around the joints (Lorig & Fries, 1986; Subcommittee on Aging, 2004).

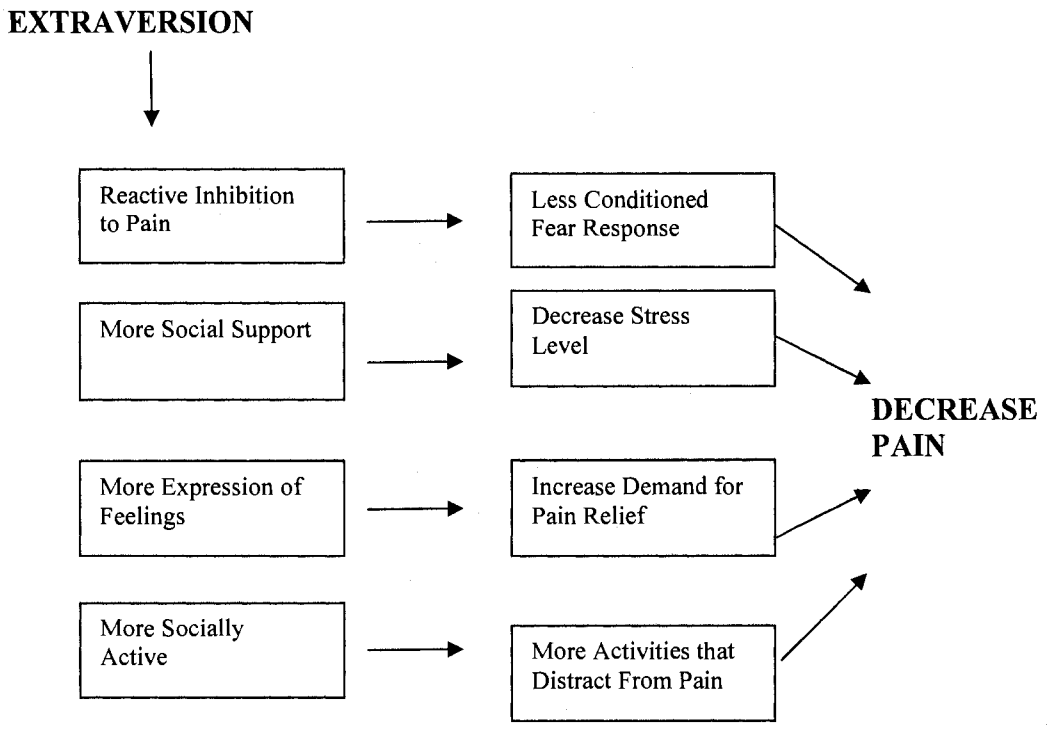

Figure 2. Relationship between extraversion, chronic pain, and the major covariates (Phillips & Gatchel, 2000).

Approximately 70 million people in the United States have some form of arthritis. The disease afflicts all age groups and 300,000 are children (Subcommittee on Aging, 2004). The disease is more common among women than men. Arthritis hinders the daily activities of about seven million individuals. Walking and dressing are just two of the daily activities that can be limited because of arthritis, and some individuals may have to quit their jobs (Subcommittee on Aging, 2004).

Compared to arthritis, fibromyalgia has never been firmly placed in a precise pain-syndrome category because of its elusive characteristics. Fibromyalgia is a widespread musculoskeletal pain and fatigue disorder with an unknown cause (Bellenir, 2002; Kanner, 1997; Nielson & Jensen, 2004; Okifuji & Turk, 1999). One hypothesis is that fibromyalgia results from underlying muscle pathology (Redondo et al., 2004). Individuals with fibromyalgia complain that they ache all over and that their muscles feel stretched. Burning or twitching sensations in the muscles can occur. Sleep problems, headaches, swollen extremities, impaired coordination, morning stiffness, brain fog, and memory impairment are often evident. Weather changes, hormonal fluctuations, stress, depression, and over-exertion can cause flare-ups (Panayi & Dickson, 2004).

Fibromyalgia has been diagnosed in people of all ages but is found predominantly in women (Kanner, 1997). To receive the diagnosis of fibromyalgia, widespread pain must be present for at least three months. Pain must be present in 11 of the 18 tender points (see Figure 3). Fibromyalgia can create substantial impairment in daily living.

The third category of chronic pain for the current study was lower-back pain. Lower-back pain (LBP) is epidemic in industrialized societies (Garofalo & Polatin, 1999). It is estimated that 2-5% of the nation's adult population has a serious LBP condition and that

80% of people will experience low-back pain problems at some point in their lives. Approximately 1 in every 25 people in the United States will change his/her work or retire early because of lower-back pain problems. About $16 billion is spent each year on medical care for LBP in this country. Also, the reoccurrence of LBP is between 30% and 70%. Other than job-related tasks, specific injury, or congenital malformation, the onset and reoccurrence of LBP is unknown. It is believed to occur as a result of physical or psychological factors. For example, emotional stress can create or increase back pain for some individuals. When stress is alleviated so is the pain. LBP appears to be equally prevalent among men and women (Garofalo & Polatin, 1999). Similar to arthritis and fibromyalgia, it can seriously interfere with daily activities and quality of life.

Variables. Extraversion, self-efficacy, perception of pain disability, pain management strategies, and number of pain days reported were the variables that were investigated in this project. Extraversion is defined as a persistent personality trait that involves an outward mental orientation compared to individuals who score lower on extraversion, also called introverts, who have an inward mental orientation. Self-efficacy relates to the level of certainty that one has in handling chronic pain. Pain disability is defined as the degree to which people feel impaired by chronic pain in their everyday life. Pain management strategies are divided into wellness and illness strategies. Wellness strategies involve relaxation, task persistence, exercise/stretching, and coping statements. Illness strategies involve guarding, resting, and requesting assistance. Number of pain days reported is the number of days during the week in which the individual perceives her pain as bothersome or significant enough to interfere with daily activities.

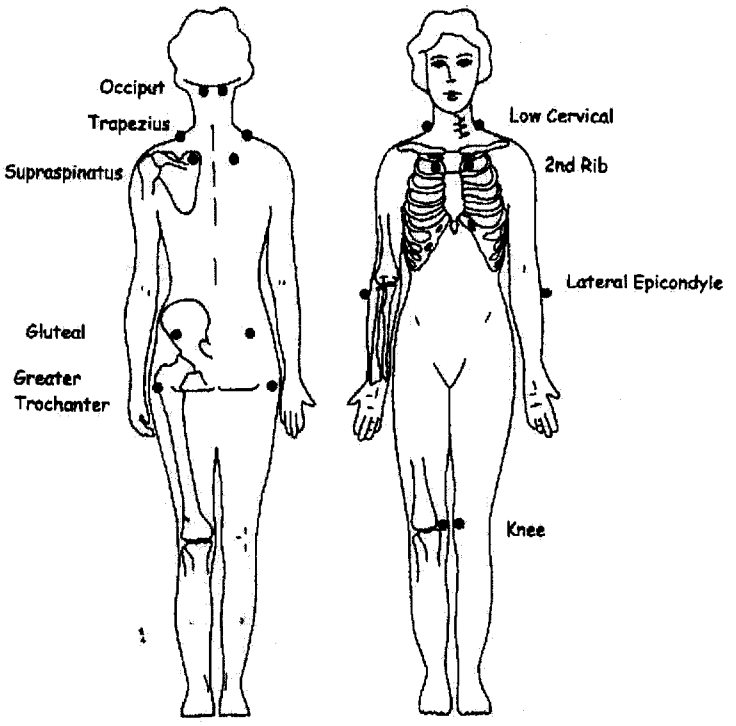

Figure 3. Locations of fibromyalgia tender points (Okifuji & Turk, 1999).

Hypotheses. It was hypothesized that: 1) Individuals higher in extraversion would report lower overall pain disability than individuals who score lower on extraversion; 2) Individuals higher in extraversion would report fewer number of pain days during the week in which pain was severe enough to interfere with their daily activities; 3) Individuals higher in extraversion would report higher levels of self-efficacy than those who score lower on extraversion; 4) Individuals higher in extraversion would use more wellness pain management strategies than those who score lower on extraversion (see Figure 4); 5) Self-efficacy would have a moderating influence on degree of extraversion and perception of pain disability, such that those highest in both extraversion and self-efficacy would report the lowest pain disability (see Figure 5); 6) Self-efficacy would have a moderating influence on extraversion and number of pain days, such that those high in both extraversion and self-efficacy would report a lower number of days in which pain was severe enough to interfere with daily activities (see Figure 6); 7) Self-efficacy would have a moderating influence on extraversion and chronic pain management strategies, such that those higher in extraversion and self-efficacy would be most likely to select wellness strategies (see Figure 7); 8) Self-efficacy would be a mediating factor between extraversion and perception of pain disability (see Figure 8); 9) Self-efficacy would be a mediating factor between extraversion and number of days pain interferes with daily activities (see Figure 9); and 10) Self-efficacy would be a mediating factor between extraversion and pain management strategies (see Figure 10).

A moderator variable affects the strength or direction of the relationship between an independent and a dependent variable. Mediator variables intervene between an

independent and dependent variable; their presence is hypothesized to be a necessary link between the independent variable and dependent variable (Baron & Kenny, 1986).

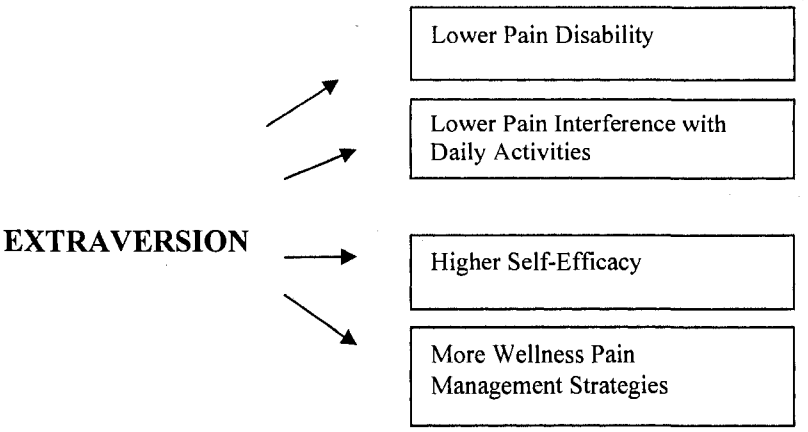

Figure 4. This figure reflects hypotheses 1, 2, 3 and 4. Individuals who score higher in extraversion should report lower levels of overall pain disability, lower number of days in which pain is severe enough to interfere with daily activities, higher levels of self-efficacy, and more frequent selection of wellness pain management strategies.

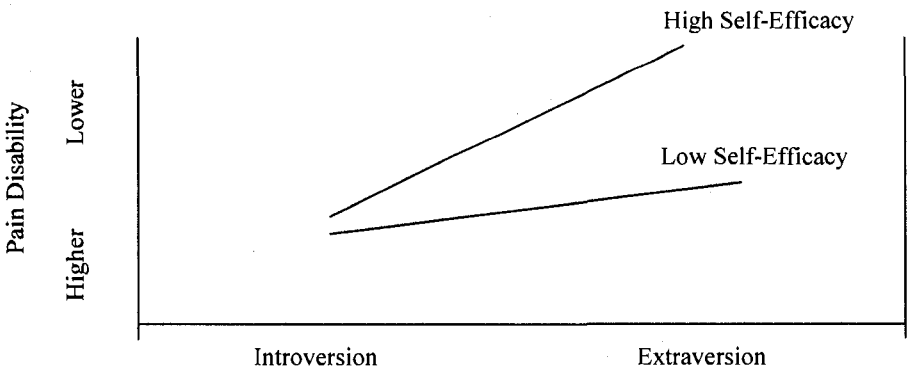

Figure 5. This figure reflects hypothesis 5. As a moderating variable, self-efficacy should positively correlate with extraversion and lead to lower overall perception of pain disability.

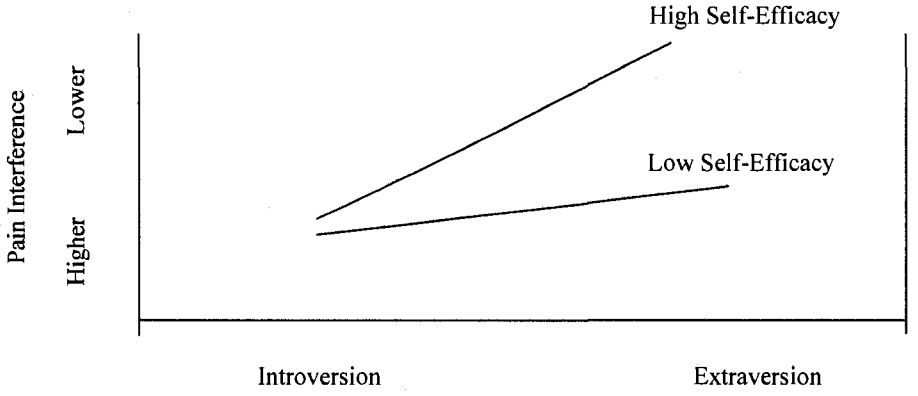

Figure 6. This figure reflects hypothesis 6. As a moderating variable, self-efficacy should positively correlate with extraversion and lead to lower number of days that pain interferes with daily activities.

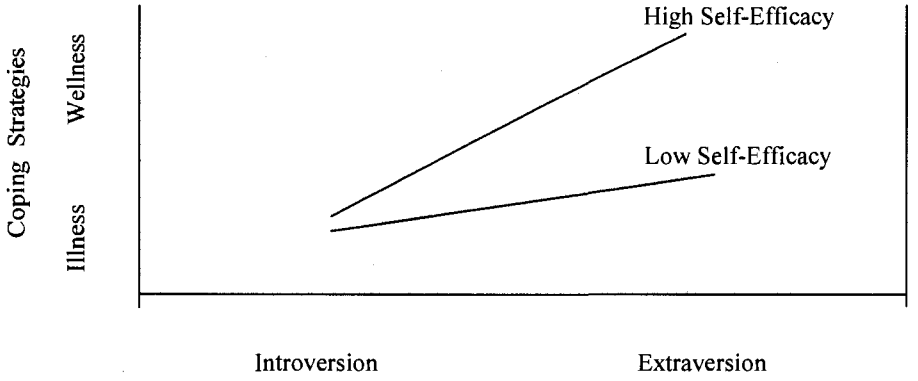

Figure 7. Hypothesis 7 posits that as a moderating variable, self-efficacy should interact with extraversion and lead to increased use of wellness coping strategies.

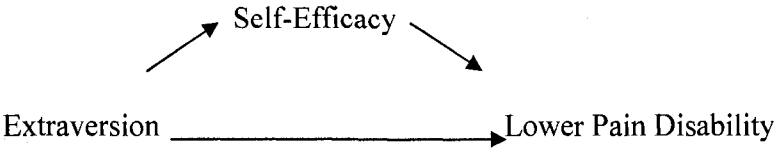

Figure 8. This figure reflects hypothesis 8. Self-efficacy should be an intervening or mediating variable between extraversion and overall perception of pain severity.

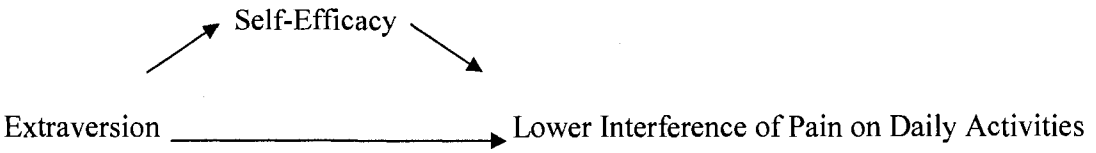

Figure 9. For hypothesis 9, self-efficacy should be an intervening or mediating variable between extraversion and interference of pain on daily activities.

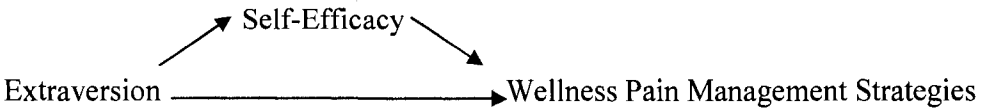

Figure 10. This figure reflects hypothesis 10, self-efficacy should be an intervening or mediating variable between extraversion and selection of wellness pain management strategies.

CHAPTER II

METHOD

Participants

Thirty-five women participated in the intake segment of this project and 28 of those 35 completed the follow-up questionnaires. Table 3 presents demographic and chronic pain information. Ages ranged from 40 to 65 years old. Seventeen of the participants marked that they had arthritis, 15 had fibromyalgia, and 24 had chronic pain due to back problems. Eighteen marked that they only had one of the three chronic pain conditions, 13 marked that they had two of the three, and 4 marked that they had all three. Duration of pain for this sample ranged from 3.6 years to 50 years. All of the participants indicated multiple pain sites. Some of the specific pain sites listed were neck, shoulders, lower back, arms, and hands. Most of the participants worked full time and most had tried several sources to reduce their chronic pain, including physician, physical therapist, massage therapist, and chiropractor. Thirty-four indicated that they used medication for chronic pain. Cold weather and exercise were cited by more than half of the sample as factors that made their chronic pain conditions worse. Thirteen of the participants indicated that months of the year had no impact on their chronic pain, whereas 21 indicated that the months of the year did have an impact, particularly November through December.

Table 3

Sample Description (n = 35)

Demographics	Percentage	Frequency
Age (Years)		
40-45	5.7%	2
46-50	34.3%	12
51-55	22.9%	8
56-60	25.7%	9
61-65	8.6%	3
Missing	2.9%	1
Level of Education		
H.S. Diploma/GED	20.0%	7
Two-Year Associates	14.3%	5
Vocational Certificate	5.7%	2
Bachelor's Degree	17.1%	6
Master's Degree	22.9%	8
Doctoral Degree	8.6%	3
Other	11.4%	4
Employment		
Don't Work	11.4%	4
Work Part Time	14.3%	5
Work Full Time	57.1%	20
Retired	14.3%	5
Missing	2.9%	1

Table 3 (continued).

Sample Description (n = 35)

Demographics	Percentage	Frequency
Annual Income		
Less than $20,000	22.9%	8
$21,000-$30,000	22.9%	8
$31,000-$40,000	17.1%	6
$41,000-$50,000	5.7%	2
Above $50,000	22.9%	8
Missing	8.6%	3
Ethnicity		
Caucasian	85.7%	30
Hispanic/Latino	5.7%	2
More than one category	8.6%	3
Religion		
Christian	63.0%	22
None Listed	37.0%	13
Chronic Pain Condition	**Percentage**	**Frequency**
Type		
Arthritis	48.6%	17
Fibromyalgia	40.5%	15
Back Problems	64.9%	24
Total Conditions		
One	51.4%	18
Two	37.1%	13
Three	11.4%	4

Table 3 (continued).

Sample Description (n = 35)

Chronic Pain Condition	Percentage	Frequency
Doctor Diagnosed		
Yes	97.0%	34
No	3.0%	1
Length of Time (Years)		
3-10	53.0%	18
11-18	18.0%	6
20-30	21.0%	8
34-44	6.0%	2
50	3.0%	1
Other Health Conditions		
Yes	53.0%	18

Chronic Pain Information	Percentage	Frequency
Sources Used to Reduce Pain		
Physician	94.3%	33
Physical Therapist	62.2%	23
Massage Therapist	67.6%	25
Chiropractor	75.7%	28
Acupuncture	32.4%	12
Physical Fitness Trainer	24.3%	9
Other	45.9%	17

Table 3 (continued).

Sample Description (n = 35)

Chronic Pain Information	Percentage	Frequency
Factors that Make Pain Worse		
Cold Weather	65.7%	23
Damp Weather	45.7%	16
Dress (e.g., shoes)	37.1%	13
Exercise	57.1%	20
Hot/Warm Baths	8.6%	3
Hormonal Changes	28.6%	10
Emotional Stress	68.6%	24
Other	45.7%	16
Months Pain is Worse		
January	54.3%	19
February	51.4%	18
March	31.4%	11
April	22.9%	8
May	11.4%	4
June	8.6%	3
July	14.3%	5
August	11.4%	4
September	14.3%	5
October	25.7%	9
November	54.3%	19
December	57.1%	20
Number Citing Months Pain is Worse	60.0%	21

Design

Participants were randomly assigned to one of two groups. One group ($n = 12$) completed the reports at Intake and again at Weeks 1 and 3. The other group ($n = 17$) completed the reports at Intake and at Weeks 1, 2, 3, and 4. The reason for the two groups was to assess whether or not completing the CPCI multiple times affected the outcomes. In total, there were either three or five reports of pain management strategies.

Materials

Instruction letter. A letter of instructions was attached to the front of the intake packet, which indicated the deadlines for when participants were to complete and return the intake and follow-up questionnaires (see Appendix A).

Consent form. All participants completed a consent form at intake (see Appendix B). Two copies of the consent form were included in the intake packet; the participant signed and returned one copy to the researcher and kept the unsigned copy for herself.

Contact Information form. A copy of this form asked the participant to include her name, address, phone number and email address. The phone number and email address were requested so that the researcher could call to remind a participant to return the intake and follow-up packets if they had not been received by the deadline dates (see Appendix C). One copy of the form was included in the intake packet and another copy was included in the follow-up packet in case the participant's information had changed.

Chronic Pain Questionnaire. Created by the researcher, the purpose of this questionnaire was to collect general information about each participant's chronic pain condition. Demographic questions such as age, ethnicity, marital status, educational level, income, and occupation, were included (see Appendix D).

NEO-FFI Form S. Based on the five-factor model of personality, this questionnaire was used to assess the degree of extraversion. The NEO Five-Factor Inventory Form S Adult (NEO-FFI) measures extraversion, neuroticism, agreeableness, openness, and conscientiousness and it is a shorter version of the NEO Personality Inventory (Costa & McCrae, 1992b). The NEO-FFI is made up of 60 items rated on a 5-point scale. Scores for each personality trait subscale fall into one of five possible categories: 1) very high; 2) high; 3) average; 4) low; or 5) very low.

When compared with the NEO-PI, the NEO-FFI domain scales showed correlations from .75 to .89. Published correlations of the NEO-FFI domain scales with the NEO-PI-R were neuroticism .92, .extraversion .90, openness .91, agreeableness .77 and .87 for conscientiousness (Costa & McCrae, 1992b). For the sample of 35 participants, the reliabilities for each scale were as follows: neuroticism $\alpha = .86$ (12 items), extraversion $\alpha = .70$ (12 items), openness $\alpha = .80$ (12 items), agreeableness $\alpha = .78$ (12 items) and conscientiousness $\alpha = .89$ (12 items).

Pain Self-Efficacy Scale (PSES). This 8-item scale adapted from Barlow, Williams, and Wright (1997) was used to assess self-efficacy for managing chronic pain (see Appendix E). For each item, participants marked on a scale from 1 to 10 how certain they were that they could handle their pain efficaciously. The points given for each of the 8 items were summed and then divided by the number of items answered for an average score. The published internal consistency reliability of the scale is .94. The Cronbach's alpha based on standardized items for this sample was $\alpha = .92$. The scale has been found to be a flexible and reliable instrument that can be modified to assess a wide range of pain conditions. The main content for each item should be maintained but the word

"pain" or the name of a specific pain syndrome can be substituted for the word "arthritis." This flexibility allows for mixed pain populations to be included in a single study or compared with each other (Barlow, Williams, & Wright, 1997; Levin, Lofland, Cassisi, Poreh, & Blonsky, 1996; Mueller, Hartmann, Mueller, & Wolfgang, 2003).

West Haven-Yale Multidimensional Pain Inventory (WHYMPI). This questionnaire consists of 12 pain-related scales divided into three separate sections. Section One focuses on perception of pain severity and impact of pain on an individual's life. The other two sections were not used in this study. Validity of the WHYMPI is supported by the results of confirmatory and exploratory factor analytic procedures (Kerns, Turk, & Rudy, 1985). Three items with $\alpha = .84$ for this sample were scored for this project as the perception of pain disability index. These specific items were: Item 1) Rate your level of pain at the present moment; Item 7) On the average, how severe has your pain been during the last week?; and Item 12) How much suffering do you experience because of your pain? Participants responded on a scale from 0 to 6. Responses for the three times were added, according to instructions, and then averaged. Additional single items from the WHYMPI were included in this study as fillers, for a total of 14 items from the inventory (see Appendix F).

Chronic Pain Coping Inventory (CPCI). This self-administered retrospective pain inventory asks participants to recall the number of times they used each strategy during the preceding seven days. It includes 64 items divided into eight subscales that measure pain coping strategies (see Appendix G). The inventory's subscales fall into three categories: ill-focused "illness" coping, well-focused "wellness" coping, and social support. Only the ill-focused and well-focused subscales were used for this study. The

three ill-focused strategies are guarding, resting, and asking for assistance, whereas the four well-focused strategies are relaxation, task persistence, exercise/stretching, and coping. Items for each subscale are answered on a scale from 0-7, which represents the number of days during that week that the participant had used that particular strategy.

In addition to the items related to the illness and wellness strategies, the CPCI has three other sections. At the beginning of the questionnaire, respondents are asked to list the specific body sites in which they experienced pain during that week. The final section of the CPCI asked respondents to list any medications taken during the week for their chronic pain and how many days they had taken each medication. Information from these two sections can be found in the description of the sample.

The CPCI also includes an item that measures pain days. Prior to answering the illness and wellness items, the CPCI asks respondents to circle from 0-7 the number of days during that week in which they experienced pain bad enough to be bothersome to them or cause them to change activities. Validity and reliability measures are not published for this one item but the item was used in this analysis to test for any relationship of extraversion and self-efficacy on the number of pain days cited at intake.

Internal consistency coefficients for the CPCI are greater than .70 and most are greater than .80. Test-retest reliability coefficients are greater than .70, except for the measure of non-steroidal medication use at .66 (Ektor-Andersen, Orbaek, Isacsson, & the Malmo Shoulder-Neck Study Group, 2002; Jensen, Turner, Romano, & Strom, 1995; Romano, Jensen, & Turner, 2003; Tan, Jensen, Robinson-Whelen, Thornby, & Monga, 2000; Tan, Nguyen, Anderson, Jensen, & Thornby, 2005; Truchon & Cole, 2005; see Appendix G). Sample reliabilities for the three illness strategies in this study were: guarding $\alpha = .83$ (9

items), resting α = .82 (7 items), and asking for assistance α = .89 (4 items). Scores for the four wellness strategies were: relaxation α = .75 (7 items), task persistence α = .79 (6 items), exercise/stretching α = .86 (12 items), and coping α = .94 (11 items). All of the CPCI illness and wellness subscale reliabilities were consistent with the published data.

Women and Chronic Pain Project Survey. The primary purpose of this brief survey was to gather information from participants regarding their opinions about participating in the project. Constructed by the researcher, the five questions were answered on a Likert scale (see Appendix H).

Procedure

Approval for this project was given by the Human Subjects Committee of Colorado State University. Women ages 40-65 with chronic pain conditions of arthritis, fibromyalgia, or back problems were recruited through posted fliers, email announcements, and word of mouth. Women were the focus of this project because they comprise the majority of chronic pain patients and they are overrepresented among those with diagnosis of fibromyalgia and arthritis. The age group was selected because of the possible shared lifespan similarities, such as having older children and still in the workforce. Recruitment took place over a 12-month period between 2006 and 2007. Most of the participants resided within the state of Colorado and a few resided in other states.

Participants were mailed an envelope that had inside an envelope that contained the intake questionnaires and another separate envelope that contained the follow-up questionnaires. The intake envelope included the: 1) letter of instructions; 2) consent forms; 3) Contact Information form; 4) Chronic Pain Questionnaire; 5) NEO; 6) PSES;

7) WHYMPI; and 8) one copy of the CPCI. The follow-up packet included another participant Contact Information form in case the participant had moved or changed her email address or phone number; either two or four copies of the CPCI, depending on assignment to the three-week or five-week group; and the Women and Chronic Pain Project Survey (see Table 4).

Table 4

Schedule for data collection procedures.

DATA COLLECTION PROCEDURES

Instruments	Intake	Week 1	Week 2	Week 3	Week 4
Consent Form	* +				
Chronic Pain Questionnaire	*+				
NEO-FFI	*+				
WHYMPI	*+				
Self-Efficacy Scale	*+				
CPCI	*+	*+	*	*+	*
Project Survey				+	*

* = *Group with four follow-up CPCIs*
+ = *Group with two follow-up CPCIs*

CHAPTER III

RESULTS

Sample Description (n = 35)

Personality dimensions for the 35 participants at intake are shown in Table 5. The five-week CPCI group (n = 17) and three-week CPCI group (n = 12), were compared with the no follow-up group (n = 6) at intake on scores for extraversion, self-efficacy, overall perception of pain disability, use of illness strategies, use of wellness strategies, and number of pain days (see Table 6 for means). MANOVA results for main effects for extraversion, self-efficacy and overall perception of pain disability were not significant for the three groups, Group, $\Lambda = .83$, F (6, 60), $p = .45$, $\eta^2 = .09$. Univariate results for extraversion scores were, F (2, 32) = .591, $p = .56$, partial $\eta^2 = .04$; for self-efficacy scores, $F(2, 32) = 2.21$, $p = .13$, partial $\eta^2 = .12$; and for overall perception of pain disability scores, $F(2, 32) = 2.33$, $p = .11$, partial $\eta^2 = .13$.

A similar MANOVA for illness strategies, wellness strategies, or number of pain days showed no difference between the three groups (see Table 6 for means), Group, $\Lambda = .75$, $F(6, 60) = 1.60$, $p = .17$, $\eta^2 = .14$. Univariate results for the illness scores were, $F(2, 32) = .433$, $p = .65$, partial $\eta^2 = .03$; for wellness, $F(2, 32) = 1.652$, $p = .21$, partial $\eta^2 = .09$; and for number of pain days reported, $F(2, 32) = 1.39$, $p = .26$, partial $\eta^2 = .08$. These results indicate that there were no significant differences in the scores for the three groups of participants at intake. Therefore, the tests for the *a priori* hypotheses used only

Table 5

Sample Personality Profiles

Personality Trait	*Category*	*Score Range*	*N=35*	*%*
Extraversion	Very High	38-43	1	*3*
	High	32-37	10	*29*
	Average	25-31	14	*40*
	Low	20-24	7	*20*
	Very Low	13-19	3	*9*
Neuroticism	Very High	33-40	4	*11*
	High	25-32	4	*11*
	Average	17-24	15	*43*
	Low	9-16	8	*23*
	Very Low	1-8	4	*11*
Openness	Very High	37-42	9	*26*
	High	31-36	9	*26*
	Average	24-30	12	*34*
	Low	18-23	4	*11*
	Very Low	12-17	1	*3*
Agreeableness	Very High	42-46	3	*9*
	High	37-41	11	*31*
	Average	32-36	11	*31*
	Low	27-31	6	*17*
	Very Low	22-26	4	*11*
Conscientiousness	Very High	44-48	7	*20*
	High	39-43	7	*20*
	Average	32-38	10	*29*
	Low	27-31	8	*23*
	Very Low	20-26	3	*9*

Table 6

Mean Scores for the Three Groups at Intake

Variable	*No-Follow Up (n = 6)*	*5-week (n = 17)*	*3- week (n = 12)*
Extraversion	27.83	29.06	26.58
Self-Efficacy	4.77	6.27	4.79
Pain Disability	4.11	3.12	3.94
Illness Strategies	3.04	2.42	2.69
Wellness Strategies	2.60	3.39	2.86
Pain Days	3.00	4.76	3.67

data for the intake segment of the project, which reflects responses for all 35 participants. At $\alpha = .05$, statistical power for the analyses with this sample was at least .80 to detect a large effect size of .15 (Keppel, 1991).

West Haven-Yale Multidimensional Pain Inventory (WHYMPI) (n= 35)

At intake, participants responded to 14 questions from the WHYMPI, including items related to the perception of pain severity scale. Responses to representative items from the WHYMPI are given in Table 7. The impact of chronic pain can be seen from the high percentages of respondents who reported that their chronic pain had substantially impacted their ability to work (Item 3), that their pain condition had substantially impacted the satisfaction or enjoyment they derived from work (Item 14), that their pain condition had substantially changed the amount of satisfaction and enjoyment they derived from participating in social and recreational activities (Item 4), that their actual ability to participate in recreational and social activities had substantially changed because of their chronic pain condition (Item 8), that their pain had changed the amount of satisfaction from family-related activities (Item 9), and that their marriage and family relationships had undergone significant changes due to their pain condition (Item 13). The three-item index of perception of pain disability is also shown (items 1, 7, and 12) and indicates a substantial but variable amount of pain experienced.

Tests of a priori Hypotheses

Variable correlations. Pearson bivariate correlations with pairwise deletion for missing data are shown in Table 8. Hypothesis 1 was not supported: Extraversion was

Table 7

West Haven-Yale Multidimensional Inventory (WHYMPI) Survey Responses (n = 35)

3. Since the time you developed a pain problem, how much has your pain changed your ability to work?

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	17.1%	14.3%	11.4%	8.6%	11.4%	14.3%	22.9%	*Extreme change*

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

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	0%	11.4%	14.3%	5.7%	25.7%	20.0%	22.9%	*Extreme change*

8. How much has your pain changed your ability to participate in recreational and other social activities?

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	11.4%	0%	5.7%	8.6%	20.0%	31.4%	22.9%	*Extreme change*

9. How much has your pain changed the amount of satisfaction you get from family-related activities?

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	11.4%	20.0%	2.9%	5.7%	22.9%	20.0%	17.1%	*Extreme change*

13. How much has your pain changed your marriage and family relationships?

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	14.3%	22.9%	5.7%	5.7%	14.3%	20.0%	17.1%	*Extreme change*

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

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No change	20.0%	17.1%	5.7%	14.3%	14.3%	11.4%	17.1%	*Extreme change*

Table 7 (continued).

West Haven-Yale Multidimensional Inventory (WHYMPI) Pain Disability Index (n = 35)

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

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No pain	5.7%	8.6%	17.1%	20.0%	34.3%	11.4%	2.9%	*Very intense pain*

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

	0	*1*	*2*	*3*	*4*	*5*	*6*	
Not at all severe	0%	8.6%	11.4%	14.3%	20.0%	40.0%	5.7%	*Extremely severe*

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

	0	*1*	*2*	*3*	*4*	*5*	*6*	
No suffering	0%	5.7%	22.9%	14.3%	20.0%	28.6%	8.6%	*Extreme suffering*

Table 8

Correlations of Personality Traits, Self-Efficacy, Pain Disability, Pain Days, Illness & Wellness Strategies (n = 35)

Variable*	E	N	A	O	C	Self-Efficacy	Pain Disability	Pain Days	Illness	Wellness
E	1.00	-.46††	-.01	.30†	.50††	.39††	-.24	-.16	.13	.08
N	-.46††	1.00	-.27	.06	-.59††	-.21	.35†	.27	.25	-.08
A	-.01	-.27	1.00	.15	.11	.50††	-.31†	.00	-.27	-.01
O	.29†	.06	.15	1.00	-.19	.33†	-.20	.45††	.01	.27
C	.50††	-.59††	.11	-.19	1.00	.13	-.16	-.10	-.01	-.02
Self-Efficacy	.39††	.21	.50††	.33†	.13	-.52††	-.52††	-.05	-.02	.07
Pain Disability	-.24	.35†	-.31†	-.20	-.16	-.06	1.00	.35†	.56††	.16
Pain Days	-.16	.27	.00	.45††	-.10	-.02	.35†	1.00	.47††	.57††
Illness	.13	.25	-.27	-.01	-.01	-.07	.56††	.47††	1.00	.42††
Wellness	.08	.08	-.01	-.02	-.02	.36†	.16	.57††	.42††	1.00

E = Extraversion
N = Neuroticism
A = Agreeableness
O = Openness
C = Conscientiousness

† = $p < .05$, one-tailed

†† = $p < .01$, one-tailed

not significantly correlated with overall perception of pain severity as measured by the WHYMPI, $r = -.24, p > .09$. Hypothesis 2 was also not supported: Extraversion was not significantly correlated with number of pain days reported, $r = -.16, p > .17$. Extraversion and self-efficacy were significantly correlated, $r = .39, p < .01$, consistent with Hypothesis 3.

Hypothesis 4 was not supported: Individuals higher in extraversion did not select more wellness strategies, $r = .08, p > .33$.

Testing moderator effects. Moderator effects for Hypotheses 5 through 7 were tested using the Baron and Kenny model (1986). For these hypotheses, self-efficacy is suggested as a moderating variable between extraversion and perception of pain disability, number of pain days reported, and selection of wellness strategies. For each hypothesis, three causal paths that were potentially linked to the outcome variable were identified and entered into the statistical equation. Path *a* tested the impact of the predictor variable extraversion on the outcome variable, path *b* tested the impact of the moderator variable self-efficacy on the outcome variable, and path *c* tested the impact of the interaction variable (predictor variable x the moderator variable) on the outcome variable. Although not required, it is best if the predictor and moderator variables are not correlated so that they are at the same level in their ability to be causal variables. The moderator hypothesis is supported only if path *c* is significant (Baron & Kenny, 1986). Hierarchical linear regression was used to test for moderator effects because it allows the researcher to enter variables in steps and in the order that the researcher deems relevant to the developmental impact of each predictor variable on the outcome variable (Warner, 2008). Hierarchical linear regression treats missing data by excluding cases listwise.

Hypothesis 5 was that extraversion and self-efficacy would be related to perception of overall pain disability and that self-efficacy would be a moderating variable, such that those higher in both extraversion and self-efficacy would particularly report lower pain disability. Scores on the WHYMPI were predicted using the following variables: extraversion, self-efficacy, and the interaction variable labeled ExSE. Hierarchical linear regression was used for this analysis. Extraversion was entered in Step 1, self-efficacy was entered in Step 2, and ExSE was entered in Step 3. The order was determined by the researcher based on an assessment of when each variable would have impacted the outcome variable. The overall regression was significant, $R = .56$, $R^2 = .31$, adjusted $R^2 = .24$, $F(3, 31) = 4.65$, $p < .01$. Contributions of individual predictor variables were not significant: extraversion $t(31) = -1.261$, $p = .22$; self-efficacy $t(31) = -1.965$, $p = .06$; ExSE $t(31) = 1.277$, $p = .21$. Given that path *c* was not significant, a moderator effect was not present.

Hypothesis 6 was that self-efficacy would have a moderating influence on extraversion and number of pain days that interfered with daily activities, such that those higher in both extraversion and self-efficacy would especially report a lower number of days in which pain was severe enough to interfere with daily activities. Number of days from 0-7 in which pain interfered with daily activities was collected from the CPCI for the 35 participants at intake. Scores on number of pain days were predicted using the following variables: extraversion, self-efficacy, and a moderating variable that combined extraversion and self-efficacy (ExSE). Hierarchical linear regression was performed and each variable was entered in the order specified by the researcher based upon a logical assessment of when each variable might have impacted the outcome variable;

extraversion was entered in Step 1, self-efficacy in Step 2, and ExSE was entered in Step 3. The overall regression, which included all three variables, was not significant, $R = .21$, $R^2 = .04$, adjusted $R^2 = -.05$, $F(3, 31) = .47$, $p = .71$. Contributions of individual predictor variables were also not significant: extraversion $t(31) = -1.024$, $p = .31$; self-efficacy $t(31) = -.692$, $p = .50$; and ExSE $t(31) = .730$, $p = .47$. The relationships of the predictor variables to the outcome variable were not as expected.

Hypothesis 7 was that self-efficacy would have a moderating influence on extraversion and chronic pain management strategies, such that those higher in both extraversion and self-efficacy would be especially likely to select wellness strategies. Scores on use of wellness strategies were predicted from the following variables: extraversion, self-efficacy, and a combination variable of extraversion and self-efficacy (ExSE) as a moderating variable. The wellness score was derived from subtracting illness strategies from wellness strategies at intake. Hierarchical linear regression was performed and each variable was entered in the order that the researcher determined as reflective of when each variable would have contributed to the outcome variable. Similar to Hypotheses 5 and 6, extraversion was entered in Step 1, self-efficacy in Step 2, and wellness in Step 3. The overall regression, which included all three variables, was not statistically significant, $R = .13$, $R^2 = .02$, $F(3, 31) = .180$, $p = .91$. Individual predictor variables were also not significant: extraversion $t(31) = -.080$, $p = .94$; self-efficacy $t(31) = .309$, $p = .76$, and ExSE $t(31) = -.179$, $p = .86$.

Testing mediator effects. Hypotheses 8 through 10 were that self-efficacy would be a mediating variable between extraversion and perception of pain disability, number of pain days reported, and selection of wellness strategies. Mediator effects are tested using

the Baron and Kenny (1986) model. Rather than an interaction effect used in the moderator model, mediator variables are thought to intervene between a predictor variable and outcome variable, and, thus, the impact of the predictor variable on the outcome variable is actually mediated through a third variable. The mediator and predictor variables must be correlated. To test for mediation, three equations are generated: 1) the mediator variable is regressed on the independent variable; 2) the dependent variable is regressed on the independent variable; and 3) the dependent variable is regressed on both the independent and mediator variables. All must hold in the predicted direction. Furthermore, the effect of the independent variable on the dependent variable must be less in the third equation than in the second (Baron & Kenny, 1986). Unfortunately, for Hypotheses 8, 9, and 10, the initial correlations between the independent and dependent variables were all nonsignificant (see Table 8), so there was in effect no relationship to mediate. Nevertheless, because there could be suppressor effects, tests of mediation were conducted anyway (Shrout & Bolger, 2002). In no case did the hypothesized mediator yield a marked change in the magnitude of the relationship between the independent variable, so Hypotheses 8, 9, and 10 were not confirmed.

Additional Analyses

All of the 35 participants completed the CPCI at intake. Six participants dropped out of the project after intake and the remaining 29 completed the CPCI either over the course of five consecutive weeks ($n = 17$) or for only three weeks ($n = 12$), which included Intake, Week 1, and Week 3. All of these 29 remaining participants, therefore, completed the CPCI for Intake, Week 1 and Week 3. This design was used to assess whether the reporting of pain management strategies was influenced by familiarity with

the CPCI. A series of within-subjects repeated measures ANOVAs were conducted across weeks to determine whether practice effects influenced responses to the CPCI and whether any specific trends existed for the selection of illness and wellness strategies, and number of pain days reported. Repeated measures ANOVA allows for an assessment of within-subjects changes in a longitudinal study as well as group interaction effects (Girden, 1992).

Five-week group. Illness scores were acquired by adding the weekly scores for guarding, resting, and assistance and then dividing those scores by 3.0 to obtain the average use of illness strategies for each participant. For the participants who completed the CPCI across five waves of data ($n = 17$), Mauchly's test indicated that the assumption of sphericity had been violated, Mauchly's $W = .254$, $\chi^2 (9) = 19.762$, $p < .02$. Therefore, degrees of freedom were corrected using the Greenhouse Geisser estimate of sphericity ($\varepsilon = .63$). Results showed that there was no significant difference in the illness scores between weeks for participants, $F(2.50, 40.12) = .446$, $p = .69$, partial $\eta^2 = .027$. The mean illness scores were 2.42, 2.12, 2.33, 2.15 and 2.19 for Intake, and Weeks 1, 2, 3, and 4, respectively (see Figure 11).

Wellness scores were acquired by adding the scores for relaxation, task persistence, exercise/stretching, and coping statements within each week and then dividing those scores by 4.0 to obtain the average use of wellness strategies for each participant. Mauchly's test indicated that the assumption of sphericity had not been violated, Mauchly's $W = .562$, $\chi^2 (9) = 8.31$, $p = .506$, for the five-week CPCI participants. Results showed that there was a significant difference in the wellness scores between weeks for participants, $F(4, 64) = 4.48$, $p < .00$, partial $\eta^2 = .022$. The mean wellness scores were

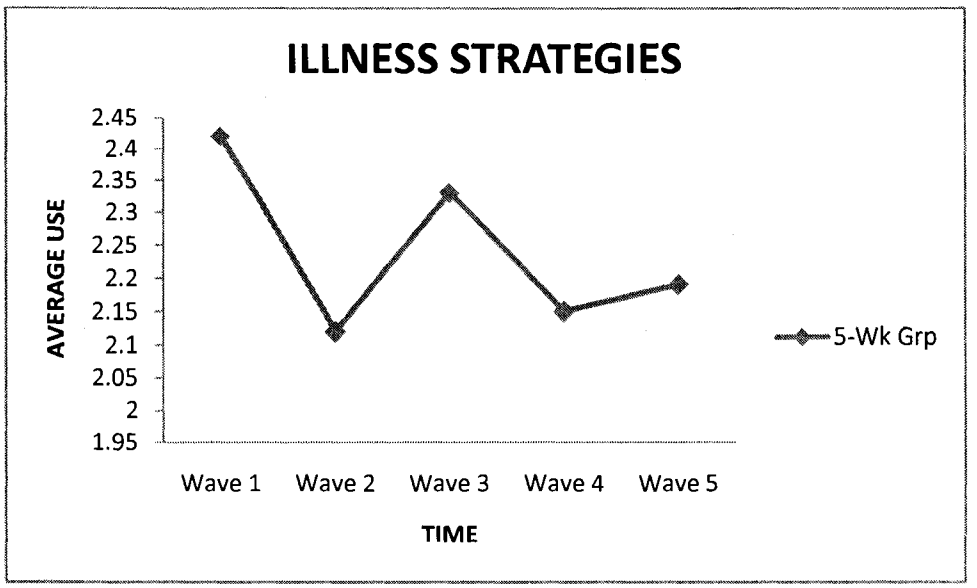

Figure 11. Average use of illness strategies among participants who completed the CPCI over five waves of data (n = 17).

3.39, 3.20, 3.10, 2.71 and 2.72 for Intake, and Weeks 1, 2, 3, and 4, respectively. Over the course of the five waves of data, wellness scores increasingly dropped each successive week and leveled off for weeks 3 and 4 (see Figure 12).

Also for the five-week group, participants reported the number of pain days that had been bothersome to them or interfered with daily activities on a scale from 0-7 and weekly scores were compared (n = 14). Mauchly's test indicated that the assumption of sphericity had not been violated, Mauchly's W = .462, χ^2 (9) = 8.81, p = .460. The results showed that there was no significant difference in the pain scores between weeks for participants, F(4, 52) = 2.36, p = .07, partial η^2 = .15. Mean scores were 4.64, 3.21, 4.00, 3.36, and 4.93 for Intake and Weeks 1, 2, 3, and 4, respectively (see Figure 13).

Three-week group. Repeated measures ANOVAs were also performed on the same variables for the participants who completed the CPCI only 3 times (n = 11). Regarding the use of illness strategies for this group, Mauchly's test indicated that the assumption of sphericity had not been violated, Mauchly's W = .777, χ^2 (2) = 2.27, p = .322. The results showed that there was no significant difference in the illness scores between weeks for participants, F(2, 20) = 1.97, p = .17, partial η^2 = .16. The mean scores were 2.50, 2.71, and 1.99 for Intake, Week 1, and Week 3, respectively (see Figure 14).

For wellness strategies (n = 11), Mauchly's test indicated that the assumption of sphericity had not been violated, Mauchly's W = .691, χ^2 (2) = 3.33, p = .189. The results showed that there was no significant difference in the wellness scores between weeks for participants, F(2, 20) = 1.19, p = .33, partial η^2 = .11. Mean wellness scores were 2.70, 2.95, and 2.88 for Intake, Week 1, and Week 3, respectively (see Figure 15).

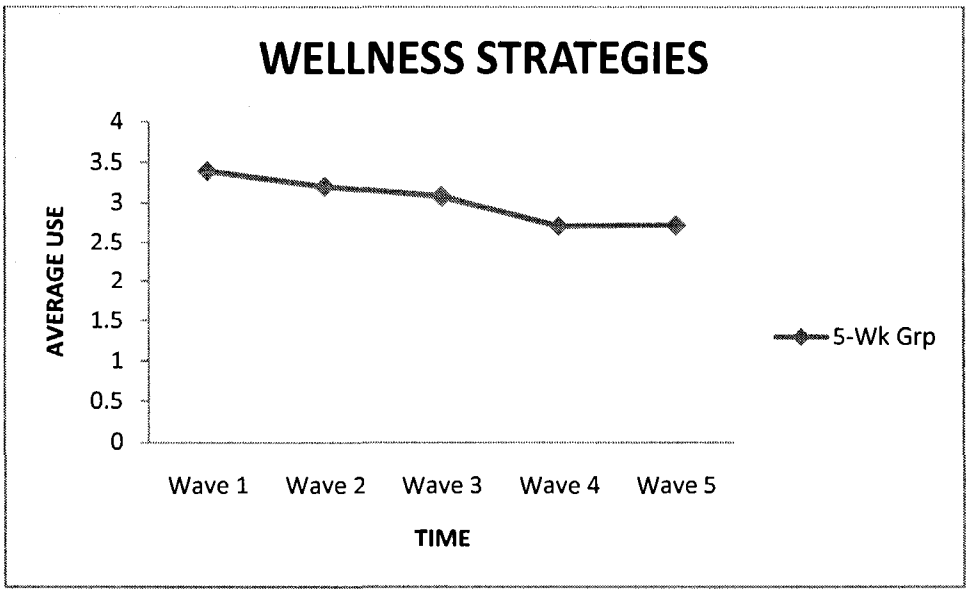

Figure 12. Average use of wellness strategies among participants who completed the CPCI over five waves of data ($n = 17$).

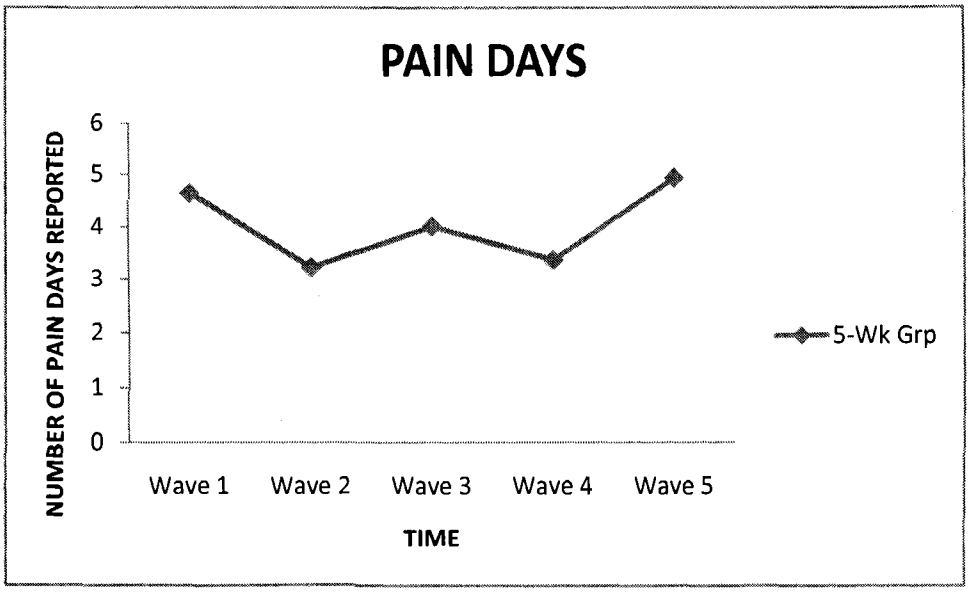

Figure 13. Average number of pain days reported by participants who completed the CPCI over five waves of data (n = 14).

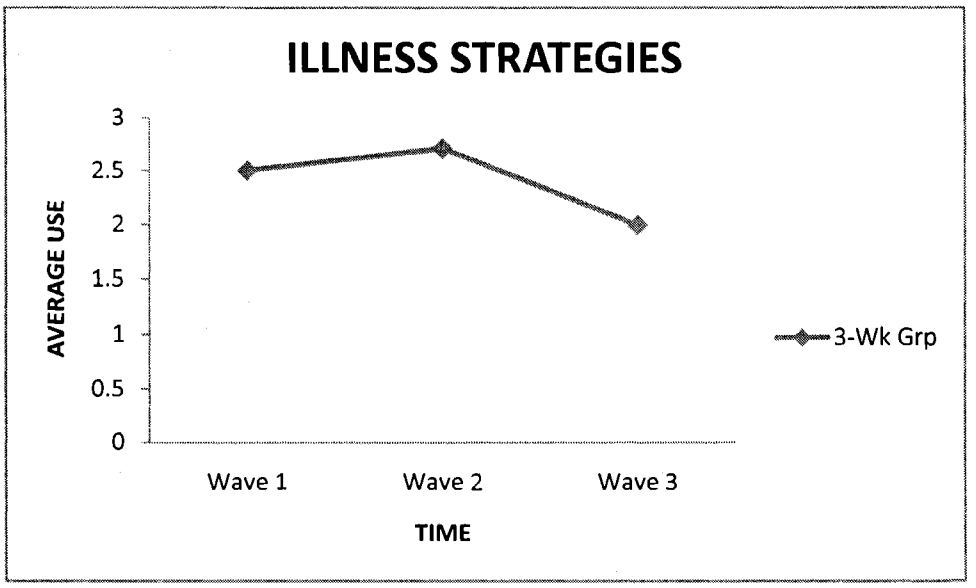

Figure 14. Average use of illness strategies among participants who completed the CPCI over three waves of data (n = 11).

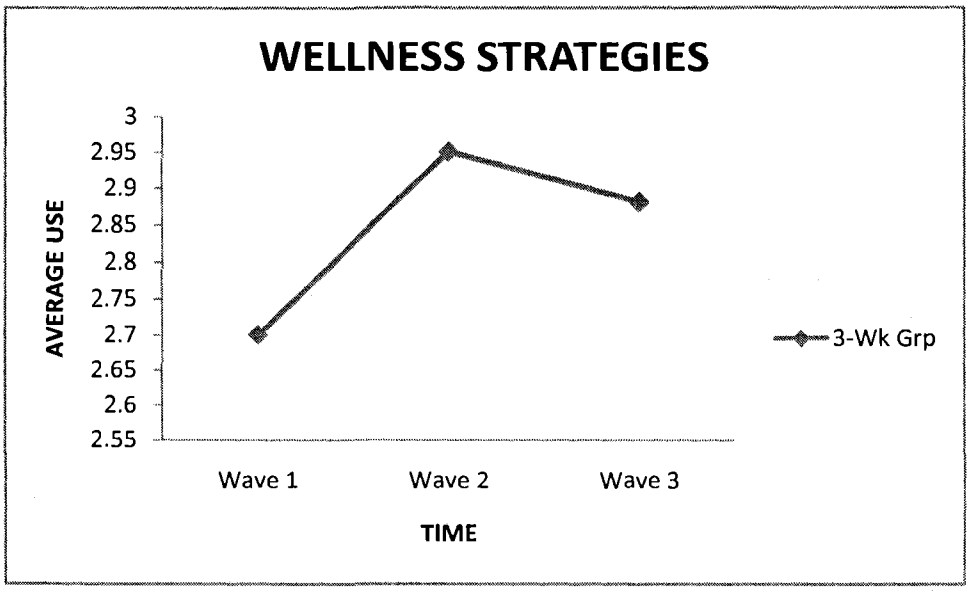

Figure 15. Average use of wellness strategies among participants who completed the CPCI over three waves of data (n = 11).

Scores for number of pain days were also evaluated ($n = 10$) and Mauchly's test indicated that the assumption of sphericity had not been violated, Mauchly's $W = .959$, χ^2 (2) = .333, $p = .847$. The results showed that there was a slight significant difference in the pain scores between weeks for participants, $F(2, 18) = 3.55$, $p = .05$, partial $\eta^2 = .28$. Mean scores were 3.10, 5.60, and 3.90 for Intake, Week 1, and Week 3, respectively. This indicates that average pain scores increased for Week 1 but were similar for Intake and Week 3 (see Figure 16).

Comparing the two groups. Participants completing the CPCI five times ($n = 17$) were compared with participants completing the CPCI three times ($n = 11$) on illness, wellness, and number of pain days for the Intake, Week 1, and Week 3 data waves. A 2 x 3 between-within repeated measures ANOVA regarding illness scores indicated that sphericity had not been violated, Mauchly's $W = .845$, χ^2 (2) = 4.20, $p = .122$. Findings were not significant. Results were $F(2, 52) = 2.16$, p = .13, partial $\eta^2 = .08$, for the group main effect. Results

were $F(2, 52) = 1.73$, $p = .19$, $\eta^2 = .06$, for the interaction effect, indicating that the two groups did not significantly differ in their use of illness strategies over the three waves of data. Mean scores for the five-week CPCI group were 2.42, 2.12, and 2.15 for Intake, Week 1, and Week 3, respectively. Mean scores for the three-week CPCI group were 2.50, 2.71, and 1.99 for Intake, Week 1, and Week 3, respectively (see Figure 17).

Mauchly's test was also not violated for a wellness score 2 x 3 ANOVA, Mauchly's $W = .957$, χ^2 (2) = 1.09, $p = .581$. Findings for the group main effect were not significant, $F(2, 52) = 2.12$, $p = .13$, partial $\eta^2 = .08$. The group interaction effect was significant, however, $F(2, 52) = 4.19$, $p = .02$, partial $\eta^2 = .14$. The two groups differed from each

other on their use of wellness strategies at Intake with the five-week group reporting use

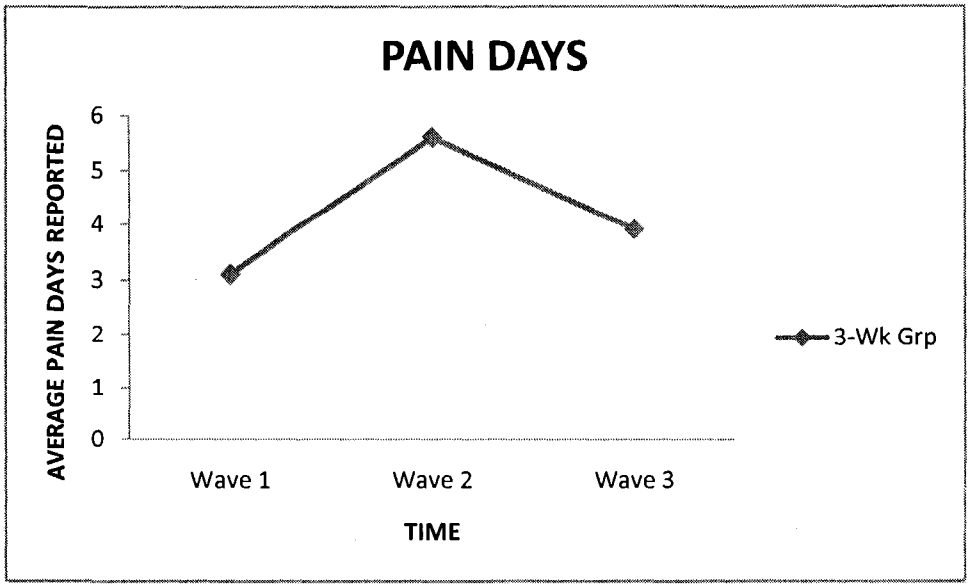

Figure 16. Average number of pain days reported by participants who completed the CPCI over three waves of data (n = 10).

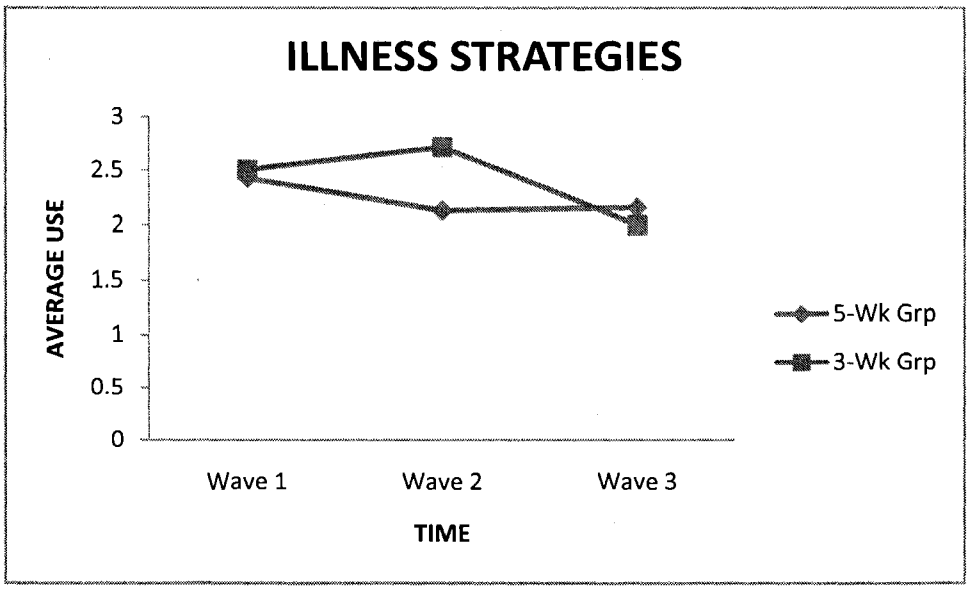

Figure 17. Comparison of five-week CPCI group (n = 17) and three-week CPCI group on average use of illness strategies over three waves of data (n = 11).

of more wellness strategies. Mean scores for the five-week CPCI group were 3.39, 3.20, and 2.71 for Intake, Week 1, and Week 3, respectively. Mean scores for the three-week CPCI group were 2.70, 3.00, and 2.90 for Intake, Week 1, and Week 3, respectively (see Figure 18).

In another 2 x 3 ANOVA participants in the five-week group (n = 16) and three-week group (n = 10) were compared across three waves on the number of pain days reported. Mauchly's test of sphericity was not violated, Mauchly's $W = .958, \chi^2 (2) = .982, p = .612$. The group main effect was not significant, $F(2, 48) = .824, p = .45$, partial $\eta^2 = .03$. However, the interaction effect was significant, $F(2, 48) = 5.99, p < .01$, partial $\eta^2 = .20$. The two groups differed significantly from each other on Week 1 with the three-week group reporting a higher number of pain days (see Figure 19). Means scores for the five-week CPCI group were 4.94, 3.44, and 3.70 for Intake, Week 1, and Week 3, respectively. Mean scores for the three-week CPCI group were 3.10, 5.60, and 3.90 for Intake, Week 1, and Week 3, respectively (see Table 9).

Overall, there were no substantial differences between groups over the various waves of data regarding illness, wellness, and number of pain days. There were no apparent trends in responses over the weeks of data collection.

Illness and wellness strategies compared. A paired samples t test was conducted to determine whether participants used illness or wellness strategies more often at intake. Results indicate no significant difference, $t(34) = -1.95$, p = .06, two-tailed. Mean scores were 2.62 and 3.07 for illness and wellness strategies, respectively. Furthermore, participants used task persistence most frequently compared to all other strategies.

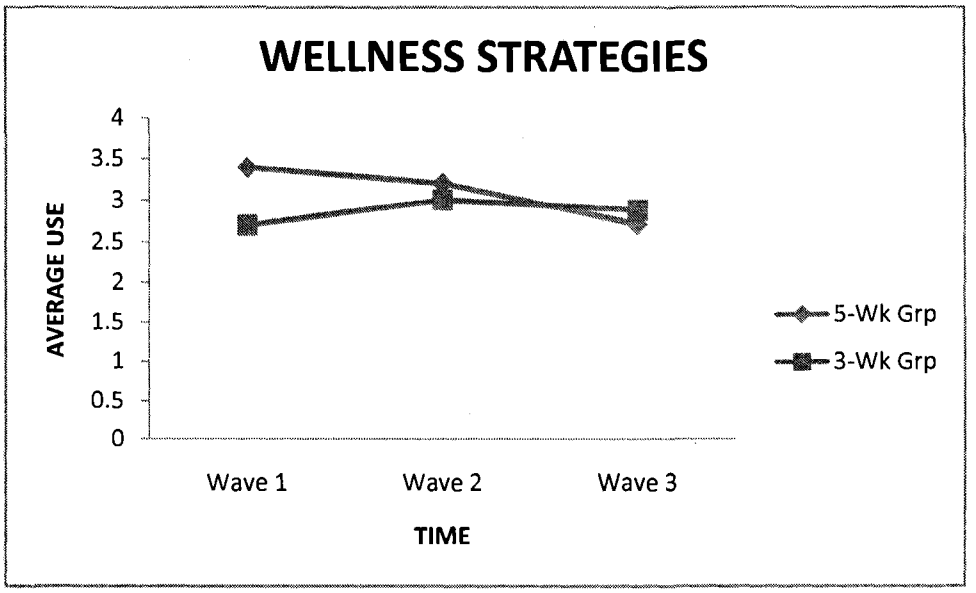

Figure 18. Comparison of five-week CPCI group (n = 17) and three-week CPCI group (n = 11) on average use of wellness strategies over three waves of data.

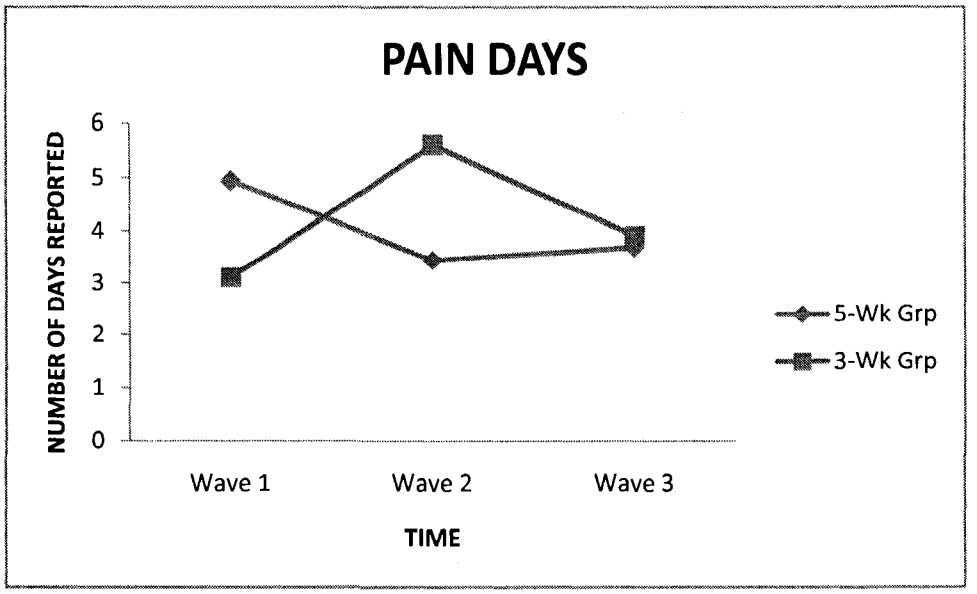

Figure 19. Comparison of five-week CPCI group (n = 16) and three-week CPCI group (n = 10) on average number of pain days reported over three waves of data.

Table 9: Comparison of Mean Scores for Number of Pain Days Reported for Participants who completed the CPCI five times and those who completed the CPCI only three times.

	5 CPCI Means	*3 CPCI Means*	*F*	*p*	*Partial* η^2
Intake	4.94	3.10	3.37	.08	.12
Week 1	3.44	5.60	6.04	.02	.20
Week 3	3.70	3.90	.05	.83	.00

Mean scores for illness strategies at intake were 3.21, 2.80, and 1.85 for guarding, resting, and requesting assistance, respectively. Mean scores for wellness strategies at intake were 1.70, 4.96, 2.85, and 2.79 for relaxation, task persistence, exercise/stretching, and coping statements, respectively.

Project survey (n = 27). Participants were asked to complete the 5-question Women and Chronic Pain Survey at the end of the follow-up phase. Eighty-one percent of the participants either strongly agreed or agreed that participating in the project had made them more aware of how they managed their chronic pain (Item 1). Eighty-two percent either strongly agreed or agreed that they found participating in the project worthwhile (Item 2). Thirty-three percent were not sure if they were satisfied with how they managed their chronic pain, and 44 percent indicated that they were not satisfied with how they managed their chronic pain (Item 3). Seventy-four percent indicated that they strongly agreed or agreed that they would like to have more information about how to better manage their chronic pain (Item 4). For the final question, 56 percent indicated that limited financial resources interfered with their ability to access resources to manage their pain (Item 5; see Table 10).

Table 10

Chronic Pain Project Survey (n = 27)

Item	*Strongly Agree*	*Agree*	*Not Sure*	*Disagree*	*Strongly Disagree*
1. This project helped make me more aware of how I manage my chronic pain.	40.7%	40.7%	14.8%	3.7%	0%
2. I feel that participating in this research project was worthwhile.	25.9%	55.6%	18.5%	0%	0%
3. I am satisfied with how I manage my chronic pain.	7.4%	14.8%	33.3%	40.7%	3.7%
4. I would like more information about how I can better manage my chronic pain.	33.3%	40.7%	14.8%	11.1%	0%
5. Limited financial resources have been a barrier to my ability to access interventions (e.g., medical care, medications, exercise training) that would help me reduce my chronic pain.	48.1%	7.4%	3.7%	29.6%	11.1%

CHAPTER IV

DISCUSSION

Outcomes from Testing Hypotheses

Personality correlates of self-efficacy. The results support one of the primary hypotheses of this study, that extraversion and pain self-efficacy would correlate positively. Self-efficacy has been established as essential for proactive pain management (Jensen & Karoly, 1991). Individuals who have a sense of pain self-efficacy feel confident that they can handle their symptoms effectively (Jensen & Karoly, 1991; Smarr et al., 1997; Turner et al., 2005). They believe that they are in control of their pain condition rather than viewing their pain condition as being in control of them.

For this study, extraversion was selected as the personality trait of primary interest because it is associated with where people focus their everyday attention. Individuals higher in extraversion focus on their external world and derive their energy from external stimuli. Individuals low in extraversion, also called introverts, focus on their inner mental world of ideas and experiences and they draw their energy from internal thoughts and feelings (Myers, 1993). Facets of extraversion are warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions (Costa & McCrae, 1992b). Individuals higher in extraversion will show more of these traits than individuals lower in extraversion. These characteristics imply that someone higher in extraversion would be more assertive in life and feel more positive in general.

An explanation for why self-efficacy might be correlated with extraversion is that individuals higher in extraversion possibly perceive themselves as able to cope more effectively with pain because of their tendencies toward an assertive, action-oriented, and positive emotion perspective. Extraversion may lead people to adopt a "can do" orientation and the personal belief that one can play a direct role in managing chronic pain effectively.

Although extraversion and self-efficacy were positively correlated, it is noteworthy to mention that the personality traits of openness and agreeableness were also positively correlated with self-efficacy. Some of the traits of openness are imaginative, insightful, talkative, and outgoing interests. Some of the traits of agreeableness are trusting, friendly, and kind (Costa & McCrae, 1992b). The roles of openness and agreeableness need further exploration as to exactly how they might be related to self-efficacy. For example, individuals high in openness might be more willing to try a variety of pain management strategies, including complementary alternative approaches such as acupuncture. Individuals higher in agreeableness might go with the flow of their pain condition more easily, which renders them more capable of dealing with their symptoms.

Furthermore, in this study, the trait of extraversion was inversely correlated with the personality trait of neuroticism. This inverse relationship may have some bearing on the connection between extraversion and self-efficacy. It is possible that individuals higher in extraversion experience fewer characteristics related to neuroticism, such as anxiety, which would enable them to feel more confident in their ability to manage pain. The opposite may be true as well. Rather than extraversion influencing neuroticism, it is possible that intense pain levels increase neuroticism and inhibit the trait of extraversion.

As one continues to focus on the on-going presence and intensity of the pain, its mysterious origins, and the inability to cure it, neuroticism may increase. By addressing the worries that may accompany chronic pain, neuroticism might be lowered and, perhaps, extraversion unmasked.

Since higher extraversion is related to a mental orientation of self-efficacy, it could be beneficial for pain management training programs to encourage participants to draw upon extraversion types of behaviors in ways that facilitate self-efficacy. The more that can be learned about the impact of personality traits on pain self-efficacy, the more individuals can learn to access or modify those traits for managing pain. In other words, personality traits could be utilized as pain management tools that are readily available to the individual.

Extraversion and wellness strategies. Although extraversion and pain self-efficacy were positively correlated, extraversion was not related to the selection of wellness pain management strategies as defined by the CPCI. The CPCI identifies guarding, resting, and asking for assistance as illness strategies and relaxation, task persistence, exercise/stretching, and coping statements as wellness strategies. Overall findings for this sample indicate that participants used all categories of illness and wellness strategies and that task persistence was the most frequently used category.

The fact that extraversion was not significantly related to the selection of wellness strategies may speak to how one cognitively assesses her ability to cope with pain but not to the types of actions taken. This disconnection between thought and action could be due to several factors. One, participants may develop pain management routines early on and continue to implement strategies that have worked for them in the past. Two, participants

possibly start with a specific strategy for minimal pain levels and change their strategies as pain becomes more severe. Similar to the first factor discussed above, people with chronic pain often have to figure out pain management strategies on their own. For the participants in this study, the use of both wellness and illness strategies increased with number of days that pain was significantly bothersome to them or interfered with daily activities. This indicates that there may be a progression in the type of strategies employed depending on the severity of the pain experienced. Learning about the steps taken to deal with various pain levels would be helpful to both patients and medical practitioners so that specific strategies can be assessed, and if needed, changed.

A third reason that there may be a disconnection between extraversion and selection of wellness strategies is that the wellness strategies presented on the CPCI may require training. The CPCI illness strategies of guarding, resting, and requesting assistance from others are simple to employ and do not require instruction. However, the wellness strategies of relaxation, exercise/stretching, and coping statements are more complicated. Relaxation involves a series of progressive steps that enable the person to reduce tension in the body. Exercise/stretching may actually increase pain and, therefore, is not utilized by some participants. Individuals need exercise plans that don't exacerbate pain, and these need to be devised by trained professionals. Coping statements follow specific formats that individuals may not have been taught.

Task persistence, which is one of the wellness strategies included on the CPCI, was the most frequently used of all of the CPCI pain management strategies. It is required in order to stay employed and meet daily demands. While task persistence might enable people to ignore the pain, it could potentially lead to overexertion and exacerbation of

pain symptoms if not implemented wisely. Also, the selection of pain management strategies might be contingent upon when the pain is acknowledged during the course of a day and where the individual is at the time. If the individual is at her job, for example, task persistence might be the most available strategy.

The fact that self-efficacy and none of the other personality traits was correlated with use of wellness strategies might again indicate that these strategies require special knowledge or training. Although not significant, the trait of openness was on the borderline of a positive and significant correlation with wellness strategies, which might mean that individuals higher in openness are somewhat more likely to try a variety of strategies to manage pain.

Extraversion and pain disability. Extraversion was not related to overall perception of pain disability as measured by the WHYMPI. The perception of pain disability scale elicited responses regarding the degree to which individuals believed that their chronic pain impacted the quality of their lives (Kerns et al., 1985). Although there was not a significant correlation, extraversion and perception of pain disability trended in the inverse direction. A larger sample size would provide additional information about any relationship that does exist between these two variables. If such a relationship does exist, it might imply that individuals higher in extraversion focus less on their pain than individuals lower in extraversion. Also, the extravert's tendency toward seeking social support and engaging in activities may provide distractions from noticing pain and may even reduce both its level and occurrence. As a result, individuals higher in extraversion would be less inclined to see pain as a barrier to life experiences.

However, the trait of neuroticism was positively correlated with perception of pain disability, and agreeableness was significantly inversely related to it. Explanations for why these two personality traits were related to perception of pain disability can probably be found in the characteristics of each one. It has been found that individuals higher in neuroticism focus on their pain, worry about it, and often feel overwhelmed by it (Williams et al., 1994). Individuals higher in agreeableness might be inclined to relax and go more with the flow of the pain. As a result, they might have a higher level of acceptance toward their pain, and acceptance has been found to be a major factor related to reducing neuroticism (Esteve et al., 2007).

The variable of self-efficacy was also found to be significantly inversely correlated with perception of pain disability. This finding shows the importance of increasing self-efficacy levels among individuals with chronic pain so that they can engage in actions, thoughts, and feelings that encourage them to feel more in control of their pain levels and less that the pain interferes greatly with their daily lives. On the other hand, high levels of pain may be less manageable and, therefore, reduce self-efficacy.

Extraversion and number of pain days. The fourth hypothesis in this study investigated the relationship between extraversion and number of pain days. It was predicted that higher extraversion would be related to fewer days being reported for the Intake week in which pain had been significantly bothersome. This hypothesis was not supported, but extraversion and number of pain days trended in the inverse direction. The fact that there was not a significant relationship might be due to the small sample size or that data were analyzed for only one week. It could also be the case that extraverts

are no more or less likely to report pain days, they just are higher in the belief that they can do something about it, i.e., they are higher in pain self-efficacy.

Although neuroticism was on the borderline of showing a positive and significant correlation with number of pain days, only openness showed a positive correlation with that variable. Individuals higher in openness do tend to feel emotions and experiences at a deeper and more intense level than those who are lower scorers on that trait. Therefore, it is also possible that those higher in openness are more aware of their pain levels (Williams et al., 1994).

Similar to perception of pain disability, self-efficacy was not correlated with number of pain days but the two variables trended in the inverse direction. Perception of pain disability, on the other hand, was positively correlated with number of pain days, which is consistent with the viewpoint of pain being problematic to one's daily life. Together, these findings suggest that the biological experience of pain is no different for extraverts and introverts, but their self-efficacy does differ.

Testing for moderator and mediator effects. Hypotheses 5 through 7 in this study suggested that self-efficacy would be a moderator variable between extraversion and overall perception of pain disability, number of pain days reported, and selection of wellness strategies. These hypotheses were not supported. One possible explanation is that the sample was too small for a minor relationship between extraversion and the three variables to be detected. It is also possible that extraversion is not strongly tied to these variables regardless of sample size. In the case of extraversion and selection of wellness strategies, it has already been discussed that this link might not exist because training and knowledge are needed for applying those techniques. As presented in the CPCI, there was

no relationship between extraversion and wellness strategies. Another possibility is that the relationship between extraversion and self-efficacy did not meet the desired criteria for testing for moderator effects. Baron and Kenny (1986) suggest that the independent and moderator variables not be correlated. In this study, extraversion and self-efficacy were positively related, so this correlation may have made it difficult to elucidate the relationship of extraversion to each outcome variable.

Hypotheses 8 through 10 suggested that self-efficacy would be a mediator between extraversion and perception of pain disability, number of pain days reported, and selection of wellness strategies. The basic premise is that the mediator variable accounts for the predictor variable's relationship with the outcome variable. Using the Baron and Kenny (1986) model, it was found that self-efficacy did not serve as a mediator variable. One possible explanation is that self-efficacy is not a true mediator variable between extraversion and the three variables of interest. It could also be that extraversion is not related to the variables, or that the small sample size failed to detect possible relationships.

Additional Analyses

Comparing the two groups. Statistical tests were conducted to determine whether there were any differences between participants who filled out the CPCI five times (n = 17) and those who completed it only three times (n = 11) regarding their use of wellness and illness strategies, and number of pain days reported. The purpose of this analysis was primarily to determine whether practice effects of completing the CPCI impacted responses. If practice effects were present, it would be expected that participants would begin to increasingly select wellness strategies. Both groups completed the CPCI at

Intake, Week 1, and Week 3. The five-week CPCI group also completed the inventory on Week 2 and Week 4. If practice effects were evident, then a significant difference between the two groups should have appeared on Week 3. Also, the five-week group would have continued to show an increase in the use of wellness strategies by Week 4, possibly due to social desirability effects. No substantial differences or response patterns were found between the two groups. Nor was a trend toward reporting wellness strategies evident in the five-week group by Week 4. This indicates that future studies can distribute the CPCI with less concern for practice effects.

However, accumulating additional waves of CPCI data from a larger sample would provide information on the various strategies individuals employ over several weeks, the medications that they use, and their rating of pain days. Multiple readings of the CPCI would enable the researcher to discern patterns of pain management behavior and whether personality traits or perception of pain disability impact pain management strategy selections made over time.

Project survey. This project relied upon a set of surveys that were completed at intake and over several weeks in order to get a more comprehensive picture of strategies participants used to manage pain. A survey was included at the end of the project to acquire feedback from participants regarding their impressions of the study. Overall, the majority of participants indicated that they felt participating was worthwhile and that they had learned more about how they manage their pain. These outcomes suggest that potential personal benefits of participating in future studies should not be ignored. Identifying which individuals could show therapeutic benefit from a self-report pain study might be worthwhile in developing future interventions.

Limitations

Several limitations of this study need to be acknowledged. The sample size was small (n = 35), and there was attrition from 35 at intake to 28 for the follow-up waves of data, which made it difficult to track patterns among participants. Most other pain management studies do report similar sample sizes. The sample was age 40 to 65 and was intentionally restricted to women, so the results may not generalize to men or other age groups. Furthermore, the study relied on weekly retrospective self-reports, therefore possibly compromising accuracy in reporting. More contemporaneous measures such as daily logging of pain levels and pain management strategies would possibly provide more detail than weekly retrospectives. Studies where participants report pain levels and management strategies when contacted by cell phone at random times would provide more accurate data.

Additionally, the self-efficacy questionnaire used in this study asked general questions about one's ability to cope with pain. However, it did not ask about belief in one's ability to select and effectively use specific pain management strategies. Bandura (1997) recommends that self-efficacy questionnaires include items that concretely address the specific variables being measured. Future studies that investigate the connection between self-efficacy and pain management strategies need to include items that focus on those strategies. For example, instead of asking how strongly a participant believes she is able to manage her pain it would be better to ask how strongly she believes that she can engage in coping statements to reduce pain.

Also, the measures of illness and wellness strategies were a simple tally of number of times specific strategies were retrospectively reported. This method of quantifying

strategies may be inadequate since it does not gauge intensity or duration of any given strategy when it is applied to a specific pain incident.

Conclusions

The personality trait of extraversion and its relationship to chronic pain management was the focus of this project. It was found that extraversion was significantly correlated with self-efficacy but not with the selection of wellness strategies, overall perception of pain disability, or number of pain days reported. Although the link between extraversion and self-efficacy is important, it is not enough for people to feel self-efficacious about their ability to manage pain. They also need training on how to apply wellness strategies, such as relaxation, exercise/stretching, and coping statements. Therefore, a logical research step would be to conduct a training program that teaches participants how to use wellness strategies to manage their pain and assess whether individuals who score higher in extraversion use those strategies more often than those who score lower on extraversion. Other possibilities would be for the training program to emphasize strategies for building self-efficacy, or to emphasize the lowering of neuroticism and then assess whether there are changes in the use of strategies. Daily logging of pain behaviors would also be of value in learning how individuals integrate illness and wellness strategies, social support, and use of medication into their pain management routines, and the sequence in which they are used.

Overall, this study indicates that identifying personality traits related to specific pain management variables such as self-efficacy is complex. Several personality traits, for example, were related to self-efficacy. A potential positive aspect of this complexity is that individuals will have several traits to draw upon for managing their pain. For

example, individuals could draw upon or modify their extraversion trait. Individuals could learn to lower neuroticism or utilize their openness or agreeableness traits. Conscientiousness might be valuable for medication use, scheduling of wellness strategies or meeting with medical professionals at specific intervals. In other words, individuals with chronic pain may have multiple points for how they can access and minimize or maximize their own personality traits as tools for chronic pain management. Although personality traits are by definition relatively stable, working to modify them or to acquire alternative tendencies could be beneficial for overall pain management. Alternatively, the strategies professionals teach to pain sufferers might in the future be selectively different depending on the personality of the patient.

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APPENDICES

Instruction Letter—Appendix A

Consent Form—Appendix B

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Chronic Pain Questionnaire—Appendix D

Pain-Self-Efficacy Scale—Appendix E

West Haven-Yale Multidimensional Pain Inventory (WHYMPI)—Appendix F

Chronic Pain Coping Inventory—Appendix G

Women and Chronic Pain Project Survey—Appendix H

Appendix A

Colorado State University

Department of Psychology
Fort Collins, Colorado 80523-1876
(970) 491-6363
FAX: (970) 491-1032
www.colostate.edu/Depts/Psychology

Dear Participant,

Thank you for your interest in the ***Women and Chronic Pain*** study. Enclosed you will find more information about the study and the consent form as well as two envelopes that contain the surveys.

Please complete the items in the brown envelope first and return them to me by _____. It is suggested that you fill out these surveys in one session, which will take you about 60-90 minutes. Keep one of the consent forms for yourself. Complete the items in the white envelope during the week written at the top of each survey and return all of them to me by _____.

To help maintain confidentiality, the consent and contact information forms will be separated from your survey responses immediately upon receipt.

Thank you again for your participation. If you have any questions, feel free to contact me.

Patricia Romano
Graduate Student
Department of Psychology
Colorado State University
970-491-1320
Patricia.Romano@ColoState.EDU

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: Women and Chronic Pain

PRINCIPAL INVESTIGATOR AND CONTACT INFORMATION: Paul Bell, Ph.D., Paul.Bell@ColoState.EDU, 970-491-7215

CO-PRINCIPAL INVESTIGATOR AND CONTACT INFORMATION: Patricia Romano, Patricia.Romano@ColoState.EDU, 970-491-6784

PURPOSE OF THE STUDY: The purpose of this project is to study the experiences that women have with chronic pain and chronic pain management.

PROCEDURES: This study will involve two parts. During the first part, you will be asked to complete a set of questionnaires, which will take approximately 90 minutes of your time. The second part of the project will ask you to complete a survey once a week for either two or four weeks. The weekly survey will take approximately 15 minutes of your time.

RISKS IN THE PROCEDURES: There are no known risks to you for participating in this project. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

BENEFITS: There are no direct benefits to you for answering the questionnaires in this project. However, the weekly survey part of the project may be beneficial in helping you to track your chronic pain condition. Also, your participation may provide information that will be useful in future studies or projects that involve women with chronic pain.

PARTICIPATION: Your participation in this research is voluntary. You will not receive any compensation for participating in this project. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. There is no cost to you for participating in this project.

CONFIDENTIALITY: The answers that you provide will be combined with information from others taking part in the study. If any publications or presentations result from this study, we will present only the combined information. Your name and other identifying information will be kept private.

We will make every effort to prevent anyone who is not on the research team from knowing that you participated in the project. Your name will be kept separate from your research records and will be stored in a different place under lock and key.

LIABILITY: The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury. Questions about participant' rights may be directed to Janell Barker at 970-491-1655.

QUESTIONS: Before you decide to participate in the study, please ask any questions now. Later, if you have questions about the study, you can contact the investigator, Paul Bell at 970-491-7215. If you have any questions about your rights as a participant in this research, contact Janell Barker, Human Research Administrator at 970-491-1655. We will give you a copy of this consent form to take with you.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

_____ _____

Name of person providing information to participant Date

_____

Signature of Research Staff

Appendix C

CONTACT INFORMATION

INSTRUCTIONS: Please provide the following contact information. This information will be used only for this research study and it is being collected so that the researcher can contact you during the project. It will be kept separate from all other surveys that you complete.

Name (Please Print): _____

Address: _____

_____

Area Code & Phone: _____

Times/Days Easiest to Contact You: _____

Do I have permission to contact you by email? _____ Yes OR ____ No

If you marked "yes", include your email address on the following line:

_____ _____

Appendix D

CHRONIC PAIN QUESTIONNAIRE

INSTRUCTIONS: This research project focuses on women ages 40-65 years old that have the chronic pain conditions of arthritis, fibromyalgia, or back problems. For the researcher to understand your chronic pain condition better, please answer the following items.

1. Circle below your chronic pain condition:

A. Arthritis (Please Specify Type of Arthritis:_____)

B. Fibromyalgia

C. Back problems (Please Specify Type of Back Problem: _____)

2. Has your condition been doctor-diagnosed? (Doctor can include physician, chiropractor or other medical specialist) Check below:

_____ Yes OR _____ No

3. How long have you had this condition? Estimate to the best of your ability.

_____ Years _____ Months

4. Do you have any other health conditions that impact your chronic pain? Check below:

_____ Yes OR _____ No

5. If you checked yes, please specify the condition(s): _____

6. Check your age category below:

_____40-45 years of age

_____46-50 years of age

__ __51-55 years of age

_____56-60 years of age

_____61-65 years of age

7. Check the item that best describes your current employment
_____ Don't work

_____ Work part-time

_____ Work full-time

_____ Retired

8. If you are working, check the item that reflects your personal yearly income:

_____ less than $20,000 per year

_____ $21,000-$30,000 per year

_____ $31,000-$40,000 per year

_____ 41,000-$50,000 per year

_____ above $50,000 per year

9. If you have a religious preference, please specify your religion:
_____

10. If Christian, specify the denomination: _____

11. Check your ethnicity/race category below:

_____ African American

_____ American Indian

_____ Asian American

_____ Caucasian/European American

_____ Hispanic/Latino

_____ Middle Eastern

_____ Native Hawaiian/Pacific Islander

____Other (Please Specify: _____)

12. Check years of completed education:

____ High School Diploma/GED

____ Two-Year Associate's Degree

____ Vocational Certificate

____ Bachelor's Degree

____ Master's Degree

____ Doctoral Degree

____ Other (Please Specify: _____)

13. Check all of the sources below that you have tried to reduce your chronic pain:

_____Physician

_____Physical Therapist

_____Massage Therapist

_____Chiropractor

_____Acupuncturist

_____Physical Fitness Trainer

_____Other (Please Specify): _____

14. Are there certain conditions that make your pain worse? If yes, mark all the factors below that make your pain worse.

___ Cold weather

___ Damp weather

___ Dress (e.g., shoes)

___ Exercise

___ Hot/warm baths

___ Hormonal Changes

___ Emotional Stress

___Other (Please Specify) _____

15. If weather conditions impact your pain, check the months when your pain is worse:

_____January	_____April	_____July	_____October
_____February	_____May	_____August	_____November
_____March	_____June	_____September	_____December

STANFORD PATIENT EDUCATION RESEARCH CENTER

Pain Self-Efficacy Scale

For each of the following questions, please circle the number that corresponds to how certain you are that you can do the following tasks regularly at the present time.

1. How certain are you that you can decrease your pain quite a bit?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

2. How certain are you that you can keep your pain from interfering with your sleep?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

3. How certain are you that you can keep your pain from interfering with the things in life that you want to do?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

4. How certain are you that you can regulate your activity so as to be active without aggravating your pain?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

5. How certain are you that you can keep the fatigue caused by your pain from interfering with the things you want to do?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

6. How certain are you that you can do something to help yourself feel better if you are feeling blue?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

7. As compared with other people with arthritis, fibromyalgia, or back problems like yours, how certain are you that you can manage your pain during your daily activities?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

8. How certain are you that you can deal with the frustration of arthritis, fibromyalgia, or back problems?

very uncertain 1 2 3 4 5 6 7 8 9 10 very certain

WEST HAVEN-YALE MULTIDIMENSIONAL PAIN INVENTORY

BEFORE YOU BEGIN, PLEASE ANSWER 2 PRE-EVALUATION QUESTIONS BELOW:

1. 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):

---

2. 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 above.

A.

In the following 20 questions, you will be asked to describe your pain and how it affects your life. Under each question is a scale to record 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.

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 problem interfere with your day to day activities?

0 1 2 3 4 5 6
No interference Extreme interference

3.Since the time you developed a pain problem, how much has your pain changed your ability to work?

0 1 2 3 4 5 6
No change Extreme change
___ Check here, if you have retired for reasons other than your pain problem

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

0 1 2 3 4 5 6
No change Extreme change

5. How supportive or helpful is your spouse (significant other) 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 mood						Extremely high mood

7. 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

8. How much has your pain changed your ability to participate in recreational and other social activities?

0	1	2	3	4	5	6
No change						Extreme change

9. How much has your pain changed the amount of satisfaction you get from family-related activities?

0	1	2	3	4	5	6
No change						Extreme change

10. How worried is your spouse (significant other) about you in relation to your pain problem?

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

11. During the past week, how much control do you feel that you have had over your life?

0	1	2	3	4	5	6
Not at all in control						Extremely in control

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

0	1	2	3	4	5	6
No suffering						Extreme suffering

13. How much has your pain changed your marriage and other family relationships?

0	1	2	3	4	5	6
No change						Extreme change

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

0	1	2	3	4	5	6
No change						Extreme change

Appendix I

Chronic Pain Coping Inventory: Patient Version

Please list the sites of your body where you experience pain, starting with the one that is most bothersome to you now:

1. _____
2. _____
3. _____
4. _____
5. _____

During the past week (past 7 days), how many days did you experience pain bad enough to be bothersome to you or to cause you to change your activities? Please circle the number of days..... 0 1 2 3 4 5 6 7

During the past week, how many days did you use each of the following at least once in the day to cope with your pain? (Note: You may have used some of these coping strategies on days that you did not have pain to prevent or minimize pain in the future. Please indicate the number of days you used each strategy FOR PAIN, whether or not you were experiencing pain at the time.)

Number of days

1. Imagined a calming or distracting image to help me relax..... 0 1 2 3 4 5 6 7
2. Kept on doing what I was doing..... 0 1 2 3 4 5 6 7
3. Stretched the muscles in my legs and held the stretch for at least 10 seconds..... 0 1 2 3 4 5 6 7
4. Ignored the pain..... 0 1 2 3 4 5 6 7
5. I took a rest..... 0 1 2 3 4 5 6 7
6. Made arrangements to see a friend or family member..... 0 1 2 3 4 5 6 7
7. I went to bed early to rest..... 0 1 2 3 4 5 6 7
8. I got support from a friend..... 0 1 2 3 4 5 6 7
9. Asked someone to do something for me..... 0 1 2 3 4 5 6 7
10. Reminded myself that things could be worse..... 0 1 2 3 4 5 6 7
11. Avoided using part of my body (e.g., hand, arm, leg)..... 0 1 2 3 4 5 6 7

CPCI: Patient Version (continued)

During the past week, how many days did you use each of the following at least once in the day to cope with your pain?

	Number of days
12. Focused on relaxing my muscles	0 1 2 3 4 5 6 7
13. Sat on the floor, stretched, and held the stretch at least 10 seconds	0 1 2 3 4 5 6 7
14. Told myself things will get better	0 1 2 3 4 5 6 7
15. Held on to something when getting up or sitting down	0 1 2 3 4 5 6 7
16. I got support from a family member	0 1 2 3 4 5 6 7
17. Exercised to strengthen the muscles in my arms for at least 1 minute	0 1 2 3 4 5 6 7
18. I rested as much as I could	0 1 2 3 4 5 6 7
19. Thought about someone with problems worse than mine	0 1 2 3 4 5 6 7
20. I talked to someone close to me	0 1 2 3 4 5 6 7
21. Told myself that I am adjusting to my pain problem better than many other people	0 1 2 3 4 5 6 7
22. Called a friend on the phone to help me feel better	0 1 2 3 4 5 6 7
23. Thought about all the good things I have	0 1 2 3 4 5 6 7
24. Listened to music to relax	0 1 2 3 4 5 6 7
25. Asked for help with a chore or task	0 1 2 3 4 5 6 7
26. Stretched the muscles in my neck (and held the stretch) for at least 10 seconds	0 1 2 3 4 5 6 7
27. Told myself my pain will get better	0 1 2 3 4 5 6 7
28. I didn't let the pain interfere with my activities	0 1 2 3 4 5 6 7
29. Exercised to strengthen the muscles in my legs for at least 1 minute	0 1 2 3 4 5 6 7
30. Thought about a friend who has coped well with a problem	0 1 2 3 4 5 6 7
31. Listened to a relaxation tape to relax	0 1 2 3 4 5 6 7
32. Engaged in aerobic exercise (exercise that made my heart beat faster) for at least 15 minutes	0 1 2 3 4 5 6 7
33. Limited my walking because of pain	0 1 2 3 4 5 6 7
34. Just didn't pay attention to the pain	0 1 2 3 4 5 6 7
35. Walked with a limp to decrease the pain	0 1 2 3 4 5 6 7

CPCI: Patient Version (continued)

During the past week, how many days did you use each of the following at least once in the day to cope with your pain?

	Number of days
36. Meditated to relax	0 1 2 3 4 5 6 7
37. Reminded myself that I had coped with the pain before	0 1 2 3 4 5 6 7
38. Lay on my back, stretched, and held the stretch at least 10 seconds	0 1 2 3 4 5 6 7
39. Held part of my body (e.g., arm) in a special position	0 1 2 3 4 5 6 7
40. Rested in a chair or recliner	0 1 2 3 4 5 6 7
41. Avoided putting weight on feet or legs	0 1 2 3 4 5 6 7
42. Asked for help in carrying, lifting or pushing something	0 1 2 3 4 5 6 7
43. Exercised to improve my overall physical condition for at least 5 minutes	0 1 2 3 4 5 6 7
44. Talked to a friend or family member for support	0 1 2 3 4 5 6 7
45. Reminded myself that there are people who are worse off than I am	0 1 2 3 4 5 6 7
46. Limited my standing time	0 1 2 3 4 5 6 7
47. Lay down on a bed	0 1 2 3 4 5 6 7
48. Avoided some physical activities (lifting, pushing, carrying)	0 1 2 3 4 5 6 7
49. Reminded myself about things that I have going for me such as intelligence, good looks, and good friends	0 1 2 3 4 5 6 7
50. Used self-hypnosis to relax	0 1 2 3 4 5 6 7
51. I just kept going	0 1 2 3 4 5 6 7
52. Exercised to strengthen the muscles in my stomach for at least 1 minute	0 1 2 3 4 5 6 7
53. Got together with a friend	0 1 2 3 4 5 6 7
54. Reminded myself that others have coped well with pain problems	0 1 2 3 4 5 6 7
55. Stretched the muscles where I hurt and held the stretch for at least 10 seconds	0 1 2 3 4 5 6 7
56. Avoided activity	0 1 2 3 4 5 6 7
57. Got together with a family member	0 1 2 3 4 5 6 7

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PAIN COPING QUESTIONNAIRE

During the past week, how many days did you use each of the following at least once in the day to cope with your pain?

	Number of days
58. Went into a room by myself to rest	0 1 2 3 4 5 6 7
59. Used deep, slow breathing to relax	0 1 2 3 4 5 6 7
60. Exercised to strengthen the muscles in my back for at least 1 minute	0 1 2 3 4 5 6 7
61. Stretched the muscles in my shoulders or arms, and held the stretch, for at least 10 seconds	0 1 2 3 4 5 6 7
62. Asked someone to get me something (e.g., medicine, food, drink)	0 1 2 3 4 5 6 7
63. Did not let the pain affect what I was doing	0 1 2 3 4 5 6 7
64. Lay down on a sofa	0 1 2 3 4 5 6 7

Please list each medication you took for pain during the past week, and indicate the number of days you took each medication during the past week. Some common medications taken for pain are: Aspirin, Tylenol®, Advil®, Nuprin®, Naprosyn®, Percodan®, Tylenol #3®, Valium®, Soma®, Fiorinal®, and Flexeril®. However, there are many others, so please list ALL of the medications you are taking for pain, not just the ones listed above.

	Number of days
1. _____	0 1 2 3 4 5 6 7
2. _____	0 1 2 3 4 5 6 7
3. _____	0 1 2 3 4 5 6 7
4. _____	0 1 2 3 4 5 6 7
5. _____	0 1 2 3 4 5 6 7

Please place a check mark here if you do not take any medications ( )

Appendix H

WOMEN AND CHRONIC PAIN PROJECT SURVEY

Instructions: Thank you for participating in the Women and Chronic Pain study. The researcher would like your responses to the following questions.

Please mark the bubble that BEST reflects your response regarding your experience with chronic pain.

	Strongly Agree	**Agree**	**Not Sure**	**Disagree**	**Strongly Disagree**
1) This project helped make me more aware of how I manage my chronic pain.	O	O	O	O	O
2) I feel that participating in this research project was worthwhile.	O	O	O	O	O
3) I am satisfied with how I manage my chronic pain.	O	O	O	O	O
4) I would like more information about how I can better manage my chronic pain.	O	O	O	O	O
5) Limited financial resources have been a barrier to my ability to access interventions (e.g., medical care, medications, exercise training) that would help me reduce my chronic pain	O	O	O	O	O