Theses and Dissertations

Fall 2014

Effectiveness of hypnosis interventions in a spine rehabilitation program

Courtney Racquel Cornick
University of Iowa

Follow this and additional works at: https://ir.uiowa.edu/etd

Part of the Educational Psychology Commons

EFFECTIVENESS OF HYPNOSIS INTERVENTIONS IN A SPINE
REHABILITATION PROGRAM

by

Courtney Racquel Cornick

A thesis submitted in partial fulfillment of the
requirements for the Doctor of
Philosophy degree in Psychological and Quantitative Foundations (Counseling
Psychology) in
the Graduate College of
The University of Iowa

December 2014

Thesis Supervisor: Professor Elizabeth M. Altmaier

Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

_____

PH.D. THESIS

_____

This is to certify that the Ph.D. thesis of

Courtney Racquel Cornick

has been approved by the Examining Committee
for the thesis requirement for the Doctor of Philosophy
degree in Psychological and Quantitative Foundations (Counseling
Psychology) at the December 2014 graduation.

Thesis Committee: _____

                    Elizabeth M. Altmaier, Thesis Supervisor

              _____

                    John Westefeld

              _____

                    Timothy Ansley

              _____

                    Susan Johnson

              _____

                    Valerie Keffala

To my family- Calvin, Carolyn, Caroline, and Candace

ABSTRACT

Chronic back pain has a profound impact on an individual and society. Over the past two decades individuals have become increasingly interested in Complimentary and Alternative Medicine (CAM) as a treatment for medical conditions. One of the most common uses of CAM is to treat back pain. There are a variety of CAM interventions to treat pain, and clinical hypnosis is one treatment that serves to help individuals to better manage their symptoms of chronic pain. In many cases, clinical hypnosis is used as an adjunct to treatment rather than a treatment alternative. Additionally, clinical hypnosis is included as part of relaxation treatments within chronic pain rehabilitation programs across the country. There remains a lack of information on hypnosis as a treatment for chronic back pain within chronic pain rehabilitation programs. The present study assessed pain intensity, disability, and quality of life for individuals who received hypnosis and those who did not in a chronic pain rehabilitation program. Descriptive data were presented for all participants and between groups and within group comparisons were made. Results of this study showed that prior to treatment, pain caused severe disability, was discomforting or distressing, and caused moderate to severe mental and physical impact. When patients returned 6-12 weeks later, all patients reported a decrease in disability and pain and an increase in physical and mental health quality of life. Groups did not vary significantly on measures of pain intensity, disability, and health status. Results of this study suggest that more research should be done on the usefulness of various treatments within interdisciplinary chronic pain rehabilitation programs. Additionally, more research will allow clinicians to gain a better understanding of the types of psychological interventions utilized chronic pain rehabilitation.

TABLE OF CONTENTS

LISTS OF TABLES

CHAPTER I

INTRODUCTION

Treating medical disorders with interventions that are most effective and also

most cost efficient is a primary public health goal. This aspiration is particularly

important for conditions, which appear to affect a large segment of the population and

cause a significant number of disabilities. One such condition is chronic back pain.

Healthy People 2020 set treating chronic back pain as one critical objective for this

decade. The report (Healthy People, 2020;U. S. Department of Health and Human

Services, 2011) notes that 80% of Americans experience back pain in their lifetime, 15–

20% of the population develops a chronic condition, 3–4% experience disability due to

back pain, and 1% of working adults are disabled completely and permanently due to

chronic back pain.

There are a variety of conventional medical approaches used to treat chronic back

pain. However, over the past two decades there has been increased interest in using

Complimentary and Alternative Medicine (CAM) to treat a variety of medical conditions.

CAM is primarily considered to be a range of health care systems, therapies, and products

that are not considered to be part of conventional medicine (Barnes, Powell-Griner,

McFann, & Nahin, 2004). According to the National Health Interview Survey (2007),

38% of adults used CAM interventions. The most common uses were found to be back

pain, head or chest colds, neck pain, joint pain, and anxiety and/or depression.

There are a diverse range of CAM interventions (e.g., yoga, herbal medications,

biofeedback, special diets, naturopathy, acupuncture, and energy healing). Hypnosis,

which is commonly used as a complimentary treatment for a variety of medical disorders

and pain, has been a method of treatment that dates back to ancient Egyptian and Shaman healers. However, the interest in using hypnosis as an alternative intervention for medical conditions has waxed and waned over time. In the past decade, however, there has been a resurgence of hypnosis research, and researchers have focused on hypnosis as a treatment for a multitude of physical and psychological diagnoses.

One particular focus of recent hypnosis research is the potential for cost saving aspects of using hypnosis in medical settings. For example, hypnosis has been related to a decrease in the time needed for medical procedures and the amount of analgesic and narcotic medications used (Lang, Benotsch, Fick, Lutgendorf, Berbaum, Berbaum, Logan, & Spiegel, 2000). A second recent focus on hypnosis has been patient safety in outpatient care. One study (Lang, Joyce, Spiegel, Hamilton, & Lee, 1996) provides evidence that patients needed fewer interruptions during surgical procedures and less analgesic medications when they were under hypnosis as compared to standard care procedures.

Despite the fact that hypnosis is trending upward in its use in medical settings, hypnosis as a treatment for medical disorders has been disputed throughout the years. Over time, there have been several theories on the mechanisms of hypnosis and how it operates. In the 18th century, Franz Mesmer developed a theory called animal magnetism (also referred to as mesmerism), which asserted that all living beings contain a magnetic fluid. Mesmer believed that he was able to apply his own magnetic influence, through the use of eye gaze and hand movements, to restore balance to his patients. While Mesmer noted significant changes in his patients, this theory was later discounted. Building on Mesmer's research, James Braid, often referred to as the father of hypnotherapy, found

that animal magnetism was not the reason for patient improvement. He concluded that the improvement was due to the use of suggestion. The 19th century brought continued research in hypnosis related to psychological states and was used as a treatment for hysteria.

In recent years, there continues to be multiple misconceptions about hypnosis, and researchers have disputed the mechanisms that produce the hypnotic trance. The public and some researchers believe that hypnosis involves a mysterious, magical state of consciousness and a lack of patient autonomy, which has resulted in some resistance in the use of hypnosis for medical conditions (Raz & Shapiro, 2002). However, improvements in technology and brain imaging studies have allowed hypnosis researchers to reduce this resistance, and hypnosis has become more widely accepted for a variety of medical conditions.

Advances in technology and brain imaging have also increased the understanding of medical hypnosis. Early imaging studies on meditation, which showed characteristic patterns of neural activity, paved the way for hypnosis research. Meditation researchers (Lou, Kjaer, Friberg, Wildschiodtz, Holm, & Nowak, 1999) cited differential activity in regions of the brain associated with executive functioning. This same pattern of neural activity has also been found during hypnosis.

Imaging studies have been particularly significant in the area of hypnosis and pain. Rainville, Duncan, Price, Carrier, and Bushnell (1997) were the first researchers to gain attention for brain imaging in the area of hypnosis and pain. Through the use of Positron Emission Tomography (PET), researchers cited the role of the anterior cingulate cortex (ACC), which is commonly associated with pain affect, and pain management in

hypnosis. Hypnosis has been shown to modulate pain related activity in this area of the brain. Several years later, researchers indicated the modulation of pain activity in other brain structures, such as the thalamus, primary and secondary somatosensory cortex, and insula. These studies brought significant awareness to hypnosis and pain, albeit most studies were conducted in an experimental setting.

Fewer studies have been performed to examine functional pain. Imaging studies conducted on patients with fibromyalgia (Derbyshire, Whalley, & Oakley, 2009) yielded similar findings when compared to hypnosis and pain in experimental conditions. Conversely, Nusbaum and colleagues (2011) examined the mechanisms of hypnosis in patients with chronic low back pain and did not find any significant activation in the ACC. This study (Nusbaum et al., 2011) was also novel in that it implicated the activation of brain regions that are involved in positive emotions (e.g., the frontal limbic network) and deactivation of regions involved in negative emotions.

Psychological treatments for medical disorders, specifically chronic pain, have been found to be beneficial. There have been many published trials on cognitive and behavioral treatments for pain management. In a review of 25 trials on the efficacy of cognitive behavioral treatments for pain management (Morley, Eccelston, & Williams, 1999), CBT was found effective in reducing the experience of pain, improving mood, increasing cognitive coping, and shifting pain appraisal. When CBT was compared to standard care, it was superior to other treatments in increasing positive coping, and decreasing the pain experience.

Hypnosis is one form of a psychological intervention used to treat medical disorders. It is usually seen as an adjunct to psychotherapy, but in research settings and

some medical settings, hypnosis is used as a treatment in itself. The way hypnosis is used may vary across settings; however, there are several factors that are involved in most clinical hypnosis practices. The first factor is called an *induction*. An induction is an activity that produces a state of trance by focusing an individual's attention and increasing expectancy. There are numerous induction techniques, the most common techniques being an eye-roll indication (Spiegel, 1972) and eye-fixation. The second factor of hypnosis involves the person going into a *trance* state. The depth of this trance state may vary depending on an individual's hypnotic ability and may or may not involve relaxation. A third factor is an individual's heightened ability to respond to *suggestions*, which is the impetus of hypnosis. The suggestions will vary according to the purpose of the hypnosis, and the suggestions are commonly presented as positive (e.g., increased comfort versus decreased pain). The last factor is a *re-alerting* phase. Like the other factors in hypnosis, this phase is widely dependent on the focus of the hypnosis exercise. Suggestions are often included during the re-alerting phase, and typically a person is re-alerted through the use of counting.

Recent reviews of medical hypnosis have shown that, like CBT, hypnosis has been found to be efficacious as an adjunct to treatment for multiple medical and psychological treatments. Many authors have theorized that hypnosis and CBT have common aspects, namely imagery and relaxation, and are easily integrated. Zarren and Eimer (2001) tested this assumption and found that when hypnosis is paired with CBT, hypnosis has been found to be more effective than CBT alone in treating depression. In some cases, hypnosis has been found to be more effective than using CBT in the reduction of depression and anxiety (Alladin, 2007). When researchers examined the

integration of hypnosis and CBT in chronic pain populations, patients reported a significant decrease in pain severity and intensity when he/she received hypnosis and CBT versus CBT alone (Edelson & Fitzpatick, 1989).

There have been fewer than 50 studies conducted to examine hypnosis as a treatment for chronic pain since the late 1960's, and most of them were published over the past two decades. Despite the limited amount of research conducted, researchers have examined a wide range of chronic pain disorders. These disorders include: migraine headache, pain related to sickle cell disease, osteoarthritis, fibromyalgia, pain secondary to disability, back pain, tension headache, muscle contraction headache, temporomandibular disorder, cancer pain, and myofascial pain. The majority of these studies show that clinical hypnosis provides analgesic effects and is effective in reducing an individual's experience of pain. For example, a meta-analysis conducted by Montgomery, Duhamel, and Redd (2000) examined the effectiveness of hypnotically induced analgesia for pain management and found that 75% of patients across studies experienced a reduction in pain. In addition, multiple researchers have found that individuals maintain the ability to manage pain at six and twelve month follow-up intervals if they continue to practice self-hypnosis following treatment.

Hypnosis has also has been found to be a beneficial treatment for chronic back pain. Numerous studies, particularly case studies, have examined hypnosis and chronic back pain, although there have only been ten published clinical trials since the late 1970's. Early research on hypnosis and chronic back pain found hypnosis to be an effective agent in reducing back pain in patients. However, these studies lacked any information about specific outcomes of pain management (e.g., quality of life) and long

term maintenance of pain. Recent studies of hypnosis and chronic back pain have corroborated findings from earlier studies. These studies have added to the literature in this area by incorporating information about an individual's level of hypnotic susceptibility, disability (e.g., level of functioning), and mood. Taking these factors into account, the literature provides evidence that patients experience benefits from hypnotic analgesia and find a reduction in their intensity of pain.

Measuring an individual's hypnotic susceptibility, which is an individual's ability to respond a set of questions to achieve various depths of trance, is one factor to understand outcomes of hypnotic analgesia studies for pain management. Montgomery, Duhamel, and Redd (2000) conducted a meta-analysis examining the effectiveness of hypnotically induced analgesia for pain management and concluded that an individual's level of hypnotic susceptibility, or suggestibility, greatly impacted the level of hypnotic analgesic effect. Additionally, various researchers have noted that pain relief varies as a function of hypnotic susceptibility. Other researchers dispute this claim and note that a person can benefit from hypnotic analgesia regardless of his/her level of hypnotic susceptibility. In addition, measuring hypnotic susceptibility may not be feasible and time effective in a clinical setting. There continues to be an ongoing debate about the importance of measuring hypnotic susceptibility, and some hypnosis researchers target measuring hypnotic susceptibility as a critical aspect of research.

Hundreds of adult chronic pain treatment programs exist throughout the United States. It has been proposed that treatment programs fall into the following categories: 1) modality oriented clinics, 2) pain clinics, 3) multidisciplinary pain clinics, and 4) multidisciplinary pain centers (Gatchel & Okifuji, 2006). There has been a recent

emphasis on the role of interdisciplinary pain programs, which suggests an integrated rather than parallel approach to treatment. Furthermore, the focus on interdisciplinary pain programs has continued to grow as an area of pain management (Stanos, 2012). A wide range of research has measured the efficacy of treatment programs with individuals suffering from certain types of pain disorders (Block and Guyer, 2007). Research suggests that interdisciplinary pain management programs are cost effective and have yield similar outcomes as compared to individuals who undergo back surgery (Brox et al., 2006). In addition, chronic pain management programs are more effective in reducing fear avoidance beliefs in patients when compared to patients who receive back surgery (Brox et al. 2003).

Psychology is an integral part of interdisciplinary pain programs. Research to this date has considered various psychological treatments (e.g., CBT) and how such treatments are effective in treating various pain conditions. Many pain management programs emphasize the use of relaxation training (Block and Guyer, 2007). Relaxation training consists of a variety of techniques (e.g., biofeedback, guided imagery, autogenic relaxation, focused breathing, and hypnosis). Effectiveness research fails to specify which relaxation techniques are most beneficial within pain management programs. Specifically, hypnosis research studies have yet to examine the effectiveness of hypnosis within comprehensive pain management programs.

Chronic back pain has a significant impact on individuals and society. In recent years, treatment of chronic pain has focused on biopsychosocial approaches for pain management, which includes various psychological interventions targeted at pain management. The purpose of this study is to examine the health outcomes of persons

with back pain in a two-week interdisciplinary pain program. In this study, it is

hypothesized that adding clinical hypnosis to an existing chronic pain treatment program

will result in better health outcomes as compared to the psychological component of the

current program, which involves teaching general relaxation techniques (i.e., focused

breathing, guided imagery, and autogenic relaxation).

CHAPTER II

LITERATURE REVIEW

This chapter is organized as follows. First, this chapter presents an overview of chronic pain. Second hypnosis is discussed, which articulates the difficulty in defining hypnosis and the competing theories of hypnosis. Third, this chapter highlights the research on hypnosis and chronic pain. In this section, alternative methods for the treatment of chronic pain are considered, and advantages and disadvantages are presented. Fourth, individual differences in hypnosis are provided and the neurological literature on hypnosis and chronic pain is reviewed. Finally, the need to consider research on hypnosis and chronic pain within a comprehensive pain treatment program is presented.

Chronic Pain

Studies find that as many as 30% to 40% of individuals suffer from chronic pain each year in the United States (Johannes, Le Zhou, Johnston, & Dworkin, 2010). In addition, the majority of physician office visits (60-80%; Cosser, 2002) are associated with various pain complaints. Back pain is more pervasive in that it impacts the majority of the chronic pain population. The World Health Organization found that 20% of individuals suffer from back pain with 50% of those individuals suffering from recurrent back pain.

Chronic pain impacts an individual's economic, social, and familial life. Individuals with chronic pain suffer from a variety of issues. Some of these issues include decreased appetite, loss of employment, increased depression and anxiety, decreased activity, decreased physical activity, loss of social support, and suicidal thoughts. These

struggles influence every part of an individual's daily life. Consequently, chronic pain impacts not only the individual but also their families. Families with loved ones suffering from chronic pain endure increased workloads and financial and emotional stressors. An individual's pain also resonates at the societal level with decreased work activity, tax revenue, and increased disability insurance (Ehrlich, 2003). There have been numerous reviews and books written about the nature of chronic pain. For reviews see: Gatchel & Turk, 1996; Price, 1999; Turk & Melzack, 2001; Wall & Melzack, 1999.

Theories of Pain

The personal and societal consequences of pain are clear and have been well documented in the literature across different fields of study. The cause of chronic pain, however, has been more puzzling to researchers. Theories of pain have evolved over time and with advances in technology, scientists continue to learn about the mechanisms of pain.

Philosophers and physicians of the Middle Ages were puzzled by the process of pain in the human body and developed multiple theories of the concept of pain. Popular theories of the Middle Ages suggested that pain was an independent function, and was merely a sensation, and an emotion. After the Middle Ages, attention was given to the function of the nervous system. Pearl (2007) wrote that Descartes (1644) proposed pain was caused when stimulation from an outside agent came in contact with the skin. After the contact, a message of pain traveled directly from the skin to the brain. With technological advances, this view was discounted, and the 18th century brought information about the role of neuronal messages. It was not until the 19th century that the

role and function of the spinal cord, specifically the dorsal horn, was implicated in in pain.

The mid-1800's brought a shift in the understanding of pain. Pearl (2007) wrote that Mueller (1840) proposed the idea of sensory nerve specificity. Melzack and Wall (1965) noted that Frey (1894) expanded on Muller's theory, which is commonly referred to as the *specificity theory of pain*. The assumption of the specificity theory is that the nervous system is well organized: pain is caused by tissue injury that excites pain receptors and fibers. Following this activation, pain receptors send messages via the spinal cord to the pain center of the brain (Melzack & Katz, 2001). Like acute pain, chronic pain was also understood as being a simple condition.

At the beginning of the 20th century, researchers continued to be dissatisfied with the understanding of pain. Sherrington (1906) was an original author to discuss tissue injury and the role of *noxious stimuli*, which are any stimuli capable of tissue damage, in pain. The signaling of noxious events, or nociception, is responsible for pain. From the early 1900's until the development of the gate control theory of pain, researchers developed an understanding of afferent and efferent pathways, brain locations of pain (e.g. the thalamus and rostral brain), different nerve fibers (C and Aδ) and the differences in sensations associated with such fibers (Pearl, 2007).

In 1965, Melzack and Wall changed the way pain was viewed in science through their development of the gate control theory. The gate control theory of pain elaborated on the existing pattern theories of pain and discounted the theory that there was a specific "pain center" in the brain. Melzack and Wall (1965) theorized that there are neuronal gates in the dorsal horn, which controlled activation of ascending projections. The gate

control theory was in opposition to theories that suggested that there were specific pain receptors and central pathways of pain. This theory was novel in its approach to pain and suggested that afferent fibers are selectively responsive to nociception.

Melzack and Wall (1965) posited three spinal cord systems that are implicated in pain. These systems are the substantia gelatinosa of the dorsal horn, dorsal horn fibers that project towards the brain, and the first central transmission cells (T cells). The experience of pain is caused by an interaction between these systems. Specifically, the substantia gelatinosa serves as a gate that modulates the afferent patterns before they affect the T cells. The afferent pathways, which are comprised of mylenated (Aδ) and unmylenated (C) fibers, act as the trigger that activates the brain processes that affects the modulation of the gate control system. The Aδ fibers carry the message quickly and are associated with intense pain. The C fibers, however, are associated with a slow or throbbing pain. Both the Aδ and C fibers are inhibited (closes the gate) by Aβ fibers, which are non-nociceptive fibers. The role of T cells is to activate neuronal mechanisms that compromise the action system responsible for the perception of pain. The system of pain functions through interaction and communication between the peripheral nerve to T cells in the spinal cord.

Since the development of the gate control theory, much of the theory has remained the same. There have been newer findings over the years, such as the function of the neuromatrix and pain (Melzack, 1999). Melzack (1999) discussed the role of tissue injury and the part of hormonal, neuronal, and behavioral activity to return to homeostasis. He offered that that, in situations of chronic pain, homeostasis regulation systems have failed. This theory gave way to Melzack's proposition of the neuromatrix

theory. The body-self neuromatrix theory suggests that there are a variety of loops between the thalamus and cortex and the cortex and limbic system. The architecture of this system is determined by both genetic and sensory inputs, and the output of the neuromatrix is referred to as the neurosignature. Melzack (1999) hypothesized that a variety of factors impact the neurosignature. These factors are: a) sensory input; b) cognitive interpretation of visual and other sensory input, which includes personality characteristics, past learning, attention, anxiety, and expectation; c) cognitive and emotional inputs from other areas in the brain; d) intrinsic neural inhibitory modulation inherent in all brain functions; and e) the activity of the bodies stress regulation system (e.g., immune and opioid system). This theory provided many answers to questions regarding the discrepancy between tissue damage and reported pain.

Psychological Factors of Pain

The pattern theory and the specificity theory failed to account for psychological factors as they relate to an individual's experience of pain. During the time where these theories were the basis of understanding pain, an individual who experienced pain that appeared to be discrepant with tissue damage was deemed to have pain that was purely psychiatric in origin. The gate control theory, however, provided an explanation of psychological factors and found them to be an integral part of an individual's pain experience. Melzack and Wall (1965) theorized that activities of the central nervous systems that are responsible for emotion, attention, and memory are mediated through the gate control system. Therefore, pain gates can be opened based on psychological factors. Also, Melzack (1999) discussed the role of cognitive factors such as previous learning and expectation and their impact on the pain experience.

From a psychological standpoint, pain is a subjective experience in which the mind responds to the variation of sensory information. Additionally, pain is filtered through a series of psychological factors like learned responses and an individual's current psychological status (Dersh, Gatchel, Mayer, Polatin, & Temple, 2006). Cognitive factors influence pain because these factors effect the way in which an individual understands the perception of sensory information. Once an individual has the perception of pain, he or she places a value on the experience. This process is referred to as pain appraisal (Sharp, 2001). The appraisal of pain is made by judging the meaning of pain and perceiving the efficacy of managing pain (Turner, Jensen, & Romano, 2000).

Assessment of Chronic Pain

Chronic pain is pain that endures despite the correction of the injury or after an expected healing period, approximately 3-6 months. There are different physiological and psychological approaches to the assessment of the chronicity of pain. A physiological assessment typically aims to determine the cause or the tissue damage associated with pain as well as the physical impairment associated with the pain. These assessments are usually in the form of magnetic resonance imaging (MRI), electromyography (EMG), or X-ray procedures.

Psychologists also have a role in the assessment of chronic pain. Psychologists often assess patients with pain that is deemed to be psychogenic in nature. However, given what is known about pain through the gate control theory, patients who experience pain above what is expected given tissue damage are not pathological. Behavioral assessments of pain include recognizing pain behaviors, which are verbal complaints of

pain and suffering, non-language sounds (e.g. moans), body posturing and gesturing, and displaying functional limitations of the disability (Fordyce, 1976).

Formal measures are also used in the assessment of chronic pain. Based on the findings of the gate control model of pain, Melzack (1975) developed the McGill Pain Questionnaire. This questionnaire quantifies sensory-discriminative, motivational-affective, and cognitive-evaluative components of the pain experience. Many other measures are used to assess chronic pain in comprehensive treatment programs that focus on the level of impairment/degree of disability as well as the pain experience of the patient. For a review of pain assessment, see Turk & Melzack, 2011.

Treatment of Chronic Pain

Medical Treatments

There are a variety of medical procedures used to treat pain. For acute pain, the cause of the pain is clear, and medical interventions successfully treat these pain disorders. Chronic pain, however, is less clear-cut and the specific cause of pain is, in many cases, unknown. Medical interventions for pain include surgery (e.g., nerve ablation and insertion of spinal cord stimulators), opioid medications, and trigger point and epidural injections.

Research on various medical interventions for chronic pain has demonstrated that patients have variable treatment outcomes. For example, Block, Gatchel, Daerdorff, and Guyer (2003) reported that half of all patients who receive spinal surgery report moderate improvement in pain symptoms. Block and colleagues (2003) noted that 25% of patients who receive spine surgery have no relief in symptoms. Interesting areas of research

examine the psychology of spine surgery (for a review see Block, Gatchel, Daerdrff, and Guyer, 2003). However given the scope of this paper, this area will not be reviewed.

Opioid use for the treatment of chronic pain is controversial. Some authors believe that opioid use is an effective treatment for chronic pain (Turk, 2002). Furthermore, when the dose of the opioid is stable over time, the risk of addiction and dependency is minimal (Ballantyne & Mao, 2003). Other research has refuted this claim and warns of the dangers of opioid medications to treat chronic pain. Schofferman (1993) wrote about the negative impacts of opioid medication and pointed out that patients experienced hyperalgesia, constipation, psychological dependency, and many other unfavorable symptoms related to chronic prolonged use of opioid medication. In addition, Turk and Okifuji (1998) found that long-term opioid use only results in a 32% reduction in pain.

Certainly there are patients who utilize various medical interventions and experience complete pain relief. However, there is a large percent of patients, which despite the best efforts of their caregivers exhaust all possible medical treatment options. The process of repeated failure to respond to medical interventions for pain management can become an emotionally frustrating process for patients, which in turn further exacerbates pain symptoms. For this portion of the population, a new treatment approach would be appropriate that involves a focus of pain management, particularly self-management of chronic pain. To add to this goal, increasing functioning and reducing disability and cognitive behavioral changes are essential aspects of treatment.

Psychological Treatments

To manage pain, individuals may utilize a variety of psychological tools to better

tolerate, adjust to, or minimize their experience of pain. The tools that an individual

utilizes are often referred to as coping strategies, and treatment programs for chronic pain

commonly teach various coping strategies. Coping strategies tend to fall into two

categories, behavioral and cognitive.

A review of psychological factors of chronic pain (Jensen, Turner, Ramano, &

Karoly, 1991) has shown there are a variety of aspects associated with an individual's

ability to manage chronic pain. The authors of this review cited seven pain categories

associated with an individual's pain experience: 1) beliefs about general locus of control;

2) beliefs about control over pain; 3) attributional style; 4) cognitive errors; 5) self-

efficacy beliefs; 6) outcome expectancies; and 7) other appraisals of pain. The findings of

this review highlighted the relationship between a perceived sense of control over pain,

avoidance of catastrophizing, and a belief that he/she is not disabled. Therefore, many

psychological treatments for pain management address these issues to increase an

individual's overall level of functioning.

Behavioral Treatments. Behavioral treatments are commonly used to treat

chronic pain. The assumption of most behavioral approaches for the management of

chronic pain centers on the idea that pain is a function of both physical and psychological

factors. The types of behavioral treatments can be separated in to three categories: 1)

operant, 2) cognitive, and 3) respondent. However, in many comprehensive treatments

approaches for pain management, the different behavioral techniques are combined.

Operant Treatments. Operant treatments for pain management are based on the

principles of operant conditioning proposed by Skinner (1969). The theory of operant

conditioning asserts that if a behavior is followed by desired events, the likelihood of the

behavior will increase. Fordyce, Fowler, Lehmann, and DeLateur (1968) applied

Skinner's model of operant conditioning to chronic pain when they posited that a

patient's pain behavior solicits sympathy or attention, which increases the recurrence of

the pain behavior. When the conditional attention for the pain behavior is removed, the

behavior will decrease in frequency. In behavioral treatments based on operant models,

positive reinforcement for pain behaviors is removed, and positive reinforcement is

instead supplied for health behaviors, including activity.

Respondent Treatments. Respondent treatments for chronic pain have the goal

of modifying the physiological response of a patient. Examples of respondent treatments

for pain management include relaxation (e.g., progressive muscle relaxation) and

electromyographic (EMG) biofeedback. Flor, Fydrich, and Turk, (1992) examined the

effectiveness of relaxation and biofeedback techniques in pain populations and concluded

that both are effective in helping patients to manage pain. In addition to this, one study

found EMG biofeedback and relaxation superior to other behavioral treatments in the

management of pain (Flor, Birbaumer, Schulte, & Roos, 1991; Flor & Birbaumer, 1993).

Cognitive Behavioral Treatments. The focus of cognitive behavioral therapy

(CBT) for chronic pain management is to assist individuals in changing behaviors and

cognitions as they relate to pain through the use of various psychological interventions.

The term CBT refers to a continuously evolving domain of treatments that are present

focused, parsimonious, and empirically driven (Herbert & Forman, 2011). McCracken

and Turk (2002) cited eight common components of CBT for chronic pain. These are:

promotion of a self-management perspective, relaxation skills training, cognitive therapy

(e.g., cognitive restructuring or self-statement), behavioral activation and management,

problem-solving skills training, other interventions to change perception (e.g., guided imagery, desensitization, hypnosis, or attention control exercises), communication skills training, habit reversal, maintenance and relapse prevention.

CBT has been broadly studied for its usefulness in treating chronic pain. In a meta-analysis on CBT and chronic pain (Morley, Eccleston, & Williams, 1999), researchers found the CBT produced beneficial changes in an individual's mood and behavior. Moreover, CBT was found to increase individuals' functioning and decrease negative and maladaptive coping behaviors, which can be viewed as decreasing fear and avoidance of pain (McCracken & Turk, 2002).

Acceptance and Commitment Therapy (ACT). In recent years, researchers have focused their attention on other behavioral approaches for the treatment of chronic pain. Wicksell, Dahl, Magnusson, and Olson (2005) theorized that Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) helps individuals with chronic pain to improve functioning by helping clients focus on their values while still being aware of the pain when it is present. Furthermore, these researchers theorized that certain forms of language (e.g., patients stating that they cannot live until the pain is gone) create hopelessness in people's lives. ACT reduces this type of language in order help an individual move forward towards values. Specific research studies on ACT and chronic pain have found that ACT interventions are related to pain improvement, decreased depression, decreased pain related anxiety, and increased functioning (Dahl, Nilson, & Wilson, 2004; McCracken et al., 2005; McCracken, MacKichan, & Eccleston, 2007; Vowles, McCracken, & Eccleston, 2008; Wicksell et al., 2005; Vowles, Wertherell, & Sorell, 2008).

Biopsychosocial Model. Given the lack of success of traditional medical interventions, alternative models of treatment are used to help patients manage chronic pain. The biopsychosocial model of pain has become one of the most widely accepted models for the treatment of chronic pain (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). The biopsychosocial model stems from the idea of the non-dualistic mind body connection. In this view, pain encompasses biological, psychological, and social factors (Gatchel, 2001). Gatchel, Peng, Peters, Fuch, & Turk, (2007) note that any model that does not acknowledge and address psychology, sociocultural, and biological changes is insufficient in the treatment of pain.

The biopsychosocial model focuses on function rather than impairment, and strives to improve patient functioning and decrease impairment, and many rehabilitation models acknowledge the benefits of psychological interventions (e.g. cognitive behavioral coping skills and relaxation training) for the management of pain (Turk & Okifuji, 2002).

Comprehensive Pain Management Programs

Interventions for pain management date back thousands of years (Gatchel, McGeary, McGeary, & Lippie, 2014). However, the concept of chronic pain rehabilitation is relatively novel. The need for pain services in a centralized location was prompted with the return of World War II soldiers in the 1940's. John Bonica and William Livingston were both pioneers in discussing comprehensive pain rehabilitation. John Bonica developed one of the first multidisciplinary pain clinics at the University of Washington, which incorporated eight disciplines. The principles of Bonica's multidisciplinary model were taught at his training programs in Seattle, Washington.

However, after attempts to establish a movement for multidisciplinary pain clinics, he was unsuccessful in his attempts to establish a national movement supporting multidisciplinary treatment because many physicians used his approach to pain management in single modality pain clinics and there was an overall lack of treatments for pain management (Rathmell, Zensm Gallinger, & Brown, 2010)

In the 1960's, psychologists Bill Fordyce and John Loeser, at the University of Washington Hospital department of Physical Medicine and Rehabilitation, developed a pain program that was a first of its kind. This model of pain management examined the role of social reinforcement, increased exercise, and weaning patients off an overdependence on pain medications (Meldrum, 2007). The goal of the newly developed programs was focused on pain management rather than pain elimination. The new thoughts around pain management were slow to develop around the country due to a variety of factors. For example, high costs and administrative and organizational factors stunted the growth of pain clinics, and such issues continue to negatively impact interdisciplinary pain programs to this day.

For several decades there was a growth in interdisciplinary pain rehabilitation. Psychology treatment within the pain programs moved beyond Fordyce's behavioral reinforcement model to incorporate the cognitive processing components of pain management. Thus, Cognitive Behavioral Therapy and coping skills training are a main aspect of treatment. Later studies in the 1990's found that the behavioral interventions within pain management programs was superior to no treatment or singular medical interventions alone in reducing pain, impairment, and utilization of health care. The inclusions of behavioral treatments were seen as superior to

medical interventions and no treatment in improving mood, functioning, and return to work (Flor, Fydrich, and Turk, 1992).

The 1990's brought an emphasis towards establishing standards of care within pain management. In the 1990's the International Association for the Study of Pain (IASP), which was established in 1973, developed a task force a task for to establish characteristics and standards of pain treatment. The outcomes established standards of care in team composition (i.e., at least two physicians, a physical therapist, psychologist, and medical specialists), administrative functions, and biopsychosocial assessment (Loeser, 1990).

The movement to establish better care has carried on, and there has been a legislative emphasis on pain improving care. The years 2000-2010 were deemed the "Decade of Pain Control and Research" (Gatchel, McGeary, McGeary, and Lippie, 2014). There were legislative initiative within Congress, the Joint Commission on Accreditation of Healthcare Organizations, and Department of Veteran's Affairs. Initiatives focused on increased research intervention, increasing assessment (i.e., inclusion of pain as the fifth vital sign), and improved pain care of Veterans (Lynch, 2001). Despite the legislative power behind the Decade of Pain Control, researchers asserted that the outcomes did not live up to the set goals secondary to a decrease in funding within pain research through the National Institute of Health (Bradshaw, Empy, Davis, Lipshitz, Dalton, Nakamura, and Chapman, 2008).

Today, a multitude of chronic pain treatment programs are available throughout the United States. The Commission on Accreditation of Rehabilitation Facilities (CARF) shows that there are 58 accredited rehabilitation facilities. Turk and Wilson (2010)

proposed that treatment falls into the following categories: 1) modality oriented clinics, 2) pain clinics, 3) multidisciplinary pain clinics, and 4) multidisciplinary pain centers. Research continues to support that interdisciplinary pain management is cost effective and has yield similar outcomes as compared to individuals who undergo back surgery (Brox et al., 2006). In addition, chronic pain management programs are more effective in reducing fear avoidance beliefs in patients when compared to patients who receive back surgery (Brox et al. 2003).

Despite what is known about the effectiveness and cost saving aspects of interdisciplinary chronic pain rehabilitation programs, there has a been a decrease in programs around the country and some programs struggle to exist or fail within today's healthcare system. Gatchel and Okifuji (2006) discussed the role of third party payers in the underutilization of interdisciplinary pain management programs. These authors posited that the initial costs of these programs are more expensive than long-term costs of singularized medical interventions. Additionally, third party payers may provide various aspects of interdisciplinary care within a fragmented nature, which is less effective for the patient over all. Lack of standards within interdisciplinary care have also contributed to the decrease in utilization of programs secondary to decreased efficacy from programs that function from in multidisciplinary model rather than an interdisciplinary model (Gatchel, McGeary, McGeary, and Lippie, 2014).

Complimentary and Alternative Medicine

Complimentary and Alternative Medicine (CAM) inventions have seen an increase in use over the past two decades (National Health Interview Survey, 2007). CAM is an umbrella term that encompasses a variety of treatments and treatment

approaches. The definition of CAM may vary given the marketing approach or research focus. Barnes and colleagues (2004) define CAM as a group of diverse medical and health care systems, therapies, and products that are not presently considered to be part of conventional medicine. The National Center for Complimentary and Alternative Medicine (NCCAM; 2013) utilizes the term "complimentary health approaches" which encompasses approaches that consist of mind and body practices and the use of natural products. This approach to describing CAM simplifies the understanding as the words complimentary and alternative are used interchangeably but in many cases refer to different concepts. Complimentary medicine is the use of non-mainstream medicine in conjunction with conventional medicine. Conversely, alternative medicine suggests that an individual uses non-mainstream medicine instead of conventional medicine, which is a less common approach. As research trends change, providers are using what was once seen as complimentary approaches within their mainstream healthcare practices. This approach is referred to as "integrative medicine" (NACCM, 2013).

While the growth has been small, studies have found some increase in the use of CAM interventions in the past two decades. National Health Interview Survey data show a slight increase of CAM use since 1999. Surveys from the National Health Interview Survey (1999) found that 28.9% of individuals utilized CAM in the last 12 months. In 2002, the use of CAM interventions increased to 36%. Again, a slight growth was seen in the NHIS 2007 survey with an upturn to 38% with most increases seen in yoga and acupuncture (Tindle, Davis, Phillips, and Eisenburg, 2005). Prayer is typically excluded from the definition of CAM; however, when prayer is included within a CAM definition, there is a nearly 30% increase in the report of use.

CAM interventions are typically categorized as the following: herbal medicine, yoga, high dose vitamins, homeopathy, relaxation techniques, special diets, lifestyle, commercial, and folk medicine (NHIS, 1999, 2002, and 2007). The most common uses of CAM include the treatment of back pain, head or chest colds, neck pain, joint pain, and anxiety or depression. Less common uses of CAM include sinusitis, cholesterol, asthma, hypertension, and menopause (Barnes, Powell-Griner, McFann, and Nahin, 2004).

Research has shown an increase in CAM use due to the cost saving aspects of many interventions (Herman, Poindexter, Witt, & Eisenberg, 2012). Barnes, Powell-Griner, McFann, and Nahin (2004) studied characteristics of individuals who utilized CAM. Findings showed that women were more likely than men to utilize CAM interventions of mind body practices and prayer. There is a positive correlation between age and CAM use. Additionally, when prayer for health reasons in included in the definition of CAM, African American's were more likely than Caucasian and Asian adults to use CAM.

As previously noted, there are a variety of CAM interventions. Mind-body therapies/relaxation techniques within CAM include the following: biofeedback, meditation, guided imagery, progressive relaxation, deep breathing, hypnosis, yoga, tai chi, qi gong, prayer, and energy healing. Prayer, specifically prayer for one's own health, was the most common mind body intervention followed by meditation. Hypnosis, which is less commonly used, was found to more utilized than biofeedback and qi gong (Barnes, Powell-Griner, McFann, and Nahin, 2004). Some studies find that there has been a steady increase use of hypnosis as a CAM as hypnosis becomes more accepted as a health care practice (Kessler et al., 2001).

Hypnosis

Techniques of hypnosis have been practiced for many centuries dating back to the ancient Shamans and Egyptian healers (Gravitz, 1991). There have been many words and names used to describe altered states of consciousness or trancelike states. However, from ancient times to present day, individuals are still practicing these techniques to help bring about desired changes in their lives.

Ancient Shaman healers are typically considered to have made foundational contributions to the field of hypnosis. The literature suggests that Shamans used trance states as an aspect of physical healing (Ludwig, 1966). North American Shamans have also been cited in their practice of psychological healing through hypnosis. Even though the clinical practice of hypnosis dates back approximately 220 years, it was not until the 1800's that hypnosis (at the time called mesmerism) was brought to the attention of medical practitioners. There are numerous individuals that are cited for their contributions in the field of hypnosis: Franz Mesmer, Marquis De Puysegur, Abbe' Faria, James Esdaile, James Braid, Bernheim, Charcot, Pierre Janet, Sigmund Freud, Clark Hull, Milton Erickson, and Herbert Spiegel. These individuals all influenced the understanding and use of hypnosis in both medicine and psychology. While all of the contributors to the field of modern hypnosis cannot be covered in depth for their particular contributions, there have been different reviews and histories highlighting the history of hypnosis. For reference of the history of hypnosis see*: Hypnosis: A Brief History* (Pintar & Lynn, 2008).

The practice of hypnosis developed in two major schools that trained many of the notable founders in the field of hypnosis and psychology. These schools were the Paris

School and the Nancy School. The Paris School, founded by Charcot, attracted notable researchers of the time such as Freud, Janet, James, Gilles de la Tourette, and Binet. The practitioners at the Paris school were trained with the understanding that hypnosis was evidence of a pathological state that was due to somatic changes within an individual (Butler, 2006). Practitioners of the Paris school believed that neurotic symptoms associated with hysteria could be removed by using hypnosis. At the Paris school, researchers attempted to conduct hypnotic inductions that produced complete somnambulism of their subjects.

The competing school of thought was the Nancy School of Medicine. The Nancy School was headed by Liebeault and Bernheim and used hypnosis with the understanding that hypnosis was similar to sleep and individuals were under the power of suggestion (Butler, 2006). The Nancy School was well received in societies of medicine and was recognized by the Academy of Medicine in Paris (Butler, 2006). Later research in the Nancy School focused on the first studies of suggestion and hypnotic susceptibility within individuals (Davis, & Husband, 1931). Many of the research questions posed in the Nancy School continue to be examined and refined in current hypnosis research.

Much of the research on hypnosis in the 18th century was performed in laboratory settings. The 19th century birthed the use of hypnosis in clinical and medical settings. Sigmund Freud is cited as one of the first practitioners to use hypnosis in psychotherapy with patients exhibiting symptoms of hysteria (Stengers & Lapidus, 1990). Freud discontinued the use of hypnosis in his later work for other forms of treatment, such as free association. There are many historical accounts of the reasons for which Freud discontinued hypnosis in his work. One author wrote the following: "After a certain

amount of time Freud no longer allowed himself to resort to hypnosis. He thought it would be a privileged instrument for recalling memories, for suppressing the autocracy of the psychic-life, but found hypnosis to be a deficient instrument. Freud was disappointed with hypnosis," (Stengers & Lapidus, 1990 p. 83).

More historical accounts discussed Freud's separation from hypnosis as a means of incorporating his work of free association, which can be seen by some as contraindicative to one another. For example, Smith (1999) stated that Freud believed that hypnosis implied mistrust in nature in a sense that an individual's mind acts upon nature rather than nature acting upon the mind. Various researchers report that Freud moved away from hypnosis and continued to reject hypnosis throughout the remainder of his career. However, in a 1918 speech made by Freud, it appeared that he had not rejected overall the use of hypnosis, and stated that he believed in the uses of suggestive therapy and incorporated some of these practices into his later psychoanalytic work (Gravitz & Gerton, 1981).

Reports of hypnosis being used in the field of psychology began in the 1920's. Clark Hull was one of the first psychologists to research the nature of hypnosis. While Clark Hull is traditionally known for his work in educational psychology, he started a hypnosis research team that took an experimental approach to studying hypnosis and suggestibility. Clark Hull's interest in hypnosis was created after he was personally exposed to the benefits of hypnosis, which led him to become interested in developing a theoretical understating of the phenomenon.

Hull was one of the first researchers in the field of psychology to call for more research evidence of the theories in hypnosis. Jenness (1944) noted that eight years after

Hull began researching hypnosis, he developed a hypnosis research program and wrote a series of papers that aimed to renew an academic interest in the field of clinical hypnosis. One notable publication was in 1933 when Hull published *Hypnosis and Suggestibility: An Experimental Approach (1933).* This publication operationalized and defined ideomotor actions, which are symbolic activities that are equivalent to an action, and also showed the research evidence surrounding the use of suggestions in hypnosis. In later years, Hull developed a way to quantitatively measure hypnosis. Hull's approach to measurement in hypnosis continues to be used in present day hypnosis research.

Definitions of Hypnosis

Developing a unified definition of hypnosis has posed a challenge for many hypnosis researchers and practitioners. Early definitions of hypnosis were centered on the idea that hypnosis is a magical or supernatural experience (Spanos & Chaves, 1991). This definition is one common misconception of present day hypnosis and has created a barrier between hypnosis researchers and practitioners. By the mid-20th century, thoughts of hypnosis changed and many authors provided scientific evidence for the efficacy of hypnosis (White, 1941). Notwithstanding the expansive literature on hypnosis, there continues to be large amount of misinformation in the public about the phenomenon. For example, Nash and Barnier (2008) stated that common assumptions about hypnosis are that individuals are asleep during a trance, individuals perform actions against their wills, clients become robots, and that individuals are faking. There continues to be a push in the field to develop a working definition in order to bring about unity for researchers, practitioners, and the public.

In 1993, the executive committee of Division 30 (Society of Psychological Hypnosis) of the American Psychological Association (APA) chaired by Irving Kirsch developed an official definition of hypnosis. The initial aim of the official definition created by Division 30 was to unify the field under one definition. Despite their best efforts, members of the executive committee continued to disagree about the definition and believed that it favored particular theoretical orientations. Other complaints about the definition were that it was too long for practical clinical use. Moreover, some critics believed that the definition was too generic and the examples limited the usefulness of the definition. The major complaint of the definition was that self-hypnosis was left out.

Nearly 10 years after Division 30 created an official definition, a new definition was created in 2003. A committee was formed to make the language more clear and the definition more inclusive of different theoretical orientations. The new definition would be shorter and include information about the neurological basis of hypnosis. The 2003 the new definition of hypnosis was published and remains the official definition of hypnosis by Division 30 to this date. The definition is as follows:

> "Hypnosis typically involves an introduction to the procedure during which the subject is told that suggestions for imaginative experiences will be presented. The hypnotic induction is an extended initial suggestion for using one's imagination, and may contain further elaborations of the introduction. A hypnotic procedure is used to encourage and evaluate responses to suggestions. When using hypnosis, one person (the subject) is guided by another (the hypnotist) to respond to suggestions for changes in subjective experience, alterations in perception, sensation, emotion, thought or behavior. Persons can also learn self-hypnosis,

which is the act of administering hypnotic procedures on one's own. If the subject

responds to hypnotic suggestions, it is generally inferred that hypnosis has been

induced. Many believe that hypnotic responses and experiences are characteristic

of a hypnotic state. While some think that it is not necessary to use the word

"hypnosis" as part of the hypnotic induction, others view it as essential.

Details of hypnotic procedures and suggestions will differ depending on the goals

of the practitioner and the purposes of the clinical or research endeavor.

Procedures traditionally involve suggestions to relax, although relaxation is not

necessary for hypnosis and a wide variety of suggestions can be used including

those to become more alert. Suggestions that permit the extent of hypnosis to be

assessed by comparing responses to standardized scales can be used in both

clinical and research settings. While the majority of individuals are responsive to

at least some suggestions, scores on standardized scales range from high to

negligible. Traditionally, scores are grouped into low, medium, and high

categories. As is the case with other positively scaled measures of psychological

constructs such as attention and awareness, the salience of evidence for having

achieved hypnosis increases with the individual's score" (Green, Barabasz,

Barrett, & Montgomery, 2005 p.262-263).

Despite the years and effort spent creating definitions, the debate over an

appropriate definition persists. This debate mainly centers on the theoretical orientations

in hypnosis since there are three main theoretical camps in hypnosis. The first is the

theory of altered states of consciousness (ASC). This view holds that there is a special

state of functioning within the brain, which causes the hypnotized person to behave in

ways that match the suggestions of the therapist. Furthermore, Tart (1990) discussed the qualitative nature of ASC: a feeling that the quality of his or her mental functioning has shifted or is different from a normal alerted state. Hence the ASC is a subjective change in an individual's experience.

Researchers and practitioners that hold the belief in ASC during hypnosis remain divided on the definition. Revonsuo, Kallio, Sikka (2009) examined different definitions of ASC and noted strengths and weakness of the definitions. These researchers stated that past definitions of ASC did not provide evidence on how to differentiate a normal state of consciousness from an altered state. These authors noted that there needs to be a clear line drawn between the overall state of consciousness and the particular phenomenon of consciousness. To date, there is not one clearly accepted definition of ASC, which makes the theoretical debate in hypnosis even more complex.

The second theoretical camp is the sociocognitive theory of hypnosis, which has also been referred to as the *no state view* of hypnosis. Sociocognitve theorists argued that there is no evidence that the client's mental state was changed by hypnosis. Coe and Sarbin (1991) stated that a sociocognitive view of hypnosis suggests that clients enact the "role" of being hypnotized and therefore enact behaviors of catalepsy, compulsive post-hypnotic behaviors, and sensory and motoric behaviors. Furthermore, research has found that hypnotized subjects' responsiveness to suggestions depends on the level of perceived expertness of the hypnotist (Coe & Sarbin, 1991). In sum, the sociocognitive theory suggests that individuals are aware of the expectations and contextual factors of being hypnotized. Therefore the individuals' act in accordance with the goals they wish to

achieve from hypnosis, and no special or dissociated state of consciousness occurs or is necessary.

Most of the research on the sociocognitive perspective is dated, although some research in recent years has attempted to continue to provide evidence for the sociocognitive perspective. Lynn, Kirsch, and Hallquist (2008) have conducted research with past sociocognitive perspectives and stated that individuals who are hypnotized display goal directed behaviors in which they have superior control of their thoughts and feelings.

The third theoretical perspective is the dissociation and neodissociation interpretation of hypnosis. This theory stems from original dissociation theories of the late 19th and early 20th century (Hilgard, 1991). Pierre Janet and Morton Prince pioneered early dissociation theories in hypnosis. Theories of dissociation tended to describe dissociation as being a pathological condition. However, Hilgard's (1986) hypnosis research on healthy college students provided evidence that dissociation is not a pathological condition. Thus, the term neodissociation was used to separate dissociation in hypnosis from the idea that all dissociation was a state of pathology (Hilgard, 1991).

Neodissociation can be defined as disconnection with the associative process. This theory attempts to separate itself from the ASC by describing dissociation as a "condition" of hypnosis rather than a "state". In the 1970's, research on the hidden observer (Hilgard, Morgan, & Macdonald, 1975) aimed to provide evidence of the dissociative state. This research used writing in trance exercises to allow the hidden observer to become a clearer concept. Current research by Woody and Sadler (2008) on neodissociation has found that the this theory is at odds with itself by stating that

dissociative states should not require much effort; however, the neodissociation theory provides that the dissociative state of hypnosis takes effort and initiative. Given the inconsistencies in the dissociation theories, Woody and Sadler (2008) proposed a new model of dissociation that varied drastically from Hilgard's (1986) neodissociation theory. This proposed dissociation theory favors the idea that hypnosis is a fluid combination of dissociative mechanisms in which feedback loops in the mind are disrupted.

In recent years, theorists have aimed to bridge the gap between the different theoretical perspectives in hypnosis (Lynn & Green, 2011). Neurological tests such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) scans have shown evidence supporting both an altered states and a sociocognitive perspective. For example, brain structures associated with focused attention, absorption, imagination, and reduced analytical thought have been found with hypnotic trances (Oakley & Halligan, 2010; Spiegel, 2009). Theorists believe that these findings give strong evidence for the sociocognitive perspectives. However, opposing researchers (Barabasz & Barabasz, 2008; Oakley & Halligan, 2010; Raz & Shapiro, 2002) have documented evidence for state-like changes in the brain, found in the activation of the anterior cingulate cortex (ACC). Notwithstanding the findings that support the altered states perspective, some sociocognitive theorists view these results with caution secondary to the ACC's role in other non-hypnotic functions. Lynn and Kirsch (2006) stated that non-hypnotic functions associated with the ACC include but are not limited to: monitoring the degree of response conflict; overriding dominant response tendencies; reappraising the relationship between internal states and events.

Hypnosis and Chronic Pain

As previously noted, behavioral interventions have been shown to be effective in reducing an individual's maladaptive pain behavior. In addition to this conclusion, hypnosis has also been studied and found useful in this population. Hypnosis is not a treatment that can stand-alone for the treatment of chronic low back pain. Rather, hypnosis is an adjunct to treatment, in which it is used a relaxation technique for the management of chronic pain. Kirsch, Montgomery, and Sapirstein (1995) reviewed the literature on hypnosis as an adjunct to CBT in the treatment of health disorders. The researchers concluded that hypnosis enhances the effects of traditional CBT interventions for the treatment of a variety of disorders. The review of hypnosis for the treatment of chronic pain, presented in the next section of this chapter, makes the assumption that hypnosis is used as an adjunct to treatment under the biopsychosocial model of pain management.

While hypnosis has been found to be a beneficial treatment for chronic pain, there may be disadvantages or contradictions for using hypnosis to treat chronic pain. Most of the writing about the "dangers" of hypnosis took place in 1950's and 1970's. Much of the work in this area focused on using insight-focused hypnosis (hypnoanalysis) and non-symptom focused hypnosis. Apart from the scarcity of recent literature, ethical practice of hypnosis must include the considerations of risks. Coe and Ryken (1979) discussed minor risks that individuals may experience after experimental hypnosis, including headache, dizziness, and nausea, which took place in approximately 5% of individuals. Researchers have also noted less common complaints of panic, anxiety, and unexpected reactions in clinical hypnosis settings (Judd, Burrows, & Dennerstein, 1985). Notably, the studies in

which negative affective reactions were present were situations where insight-focused hypnosis was used with age regression techniques (Nash, Johnson, & Tipton, 1979; Nash, Lynn, Stanley, Frauman, & Rhue, 1985).

To increase safety in experimental settings, Lynn, Martin, and Frauman (1996) proposed a protocol for conducting hypnosis in a group. The protocol includes the following: " (a) participants' informed consent is obtained; (b) a graduate student hypnotist, trained in hypnosis, presents a prehypnotic talk designed to dispel myths and misconceptions about hypnosis and to minimize feelings of failure associated with inability to respond to hypnotic suggestions; (c) the hypnotist invites participants to ask questions about hypnosis; (d) during hypnosis, an assistant serves as a "spotter" whose role is to identify participants who react negatively to any aspect of the procedure; (e) after hypnosis, the hypnotist approaches, talks with, and debriefs participants so identified; (f) all participants, regardless of whether they were or were not identified by the spotter, are invited to discuss their experiences with the hypnotist or with the laboratory at any time; and finally, (g) participants with negative reactions are followed up at a 1-week interval" (Lynn, Martin, & Frauman, 1996, p. 10-11). The use of this protocol attempts to minimize and contain any negative reactions that one may have during hypnosis.

There is little research evidence about the long-term effects of using hypnosis interventions. In the case of chronic pain, follow-up studies are no longer than 12 months and more likely to be three or six months. Moreover, the literature does little to provide information about the nature and methodology of treatment. Patterson and Jensen (2003) stated that there is a lack of information about the dose effect of hypnosis session for the

treatment. Additionally, the nature of the progress in hypnosis groups for chronic pain is unclear. For example, some hypnosis groups for the treatment of chronic pain meet for 1.5 hours for four weeks, and other groups meet for 10 sessions. Additionally, some patients are encouraged to listen to a hypnosis CD, at home, between sessions and following treatment. To date there is no standard protocol that is supported by the literature on the most effective treatment for hypnosis and chronic pain.

Hypnosis and Back Pain

Few studies have specifically examined hypnosis and chronic back pain. The six published studies are reviewed and analyzed for their specific contributions to the literature in this area.

Crasilneck (1979) studied 29 patients who failed to achieve pain relief following disc surgery. Of the 29 patients, five individuals were excluded based on psychological factors (e.g. severe depression, and low motivation and frustration tolerance) contraindicative to hypnotherapy. Of the remaining 24 participants, the majority were male (n=16) with a mean age of 47 years. In addition, 20 of the 24 participants were considered to be addicted to analgesic pain medication. An average of 31 sessions over a nine-month period were conducted, an eye-fixation induction technique was used, and participants were given suggestions of pain management (e.g. you are going to be able to block most of the pain, and most of your pain will come under your control). Patients were taught self-hypnosis after session two, and were encouraged to practice self-hypnosis. Results showed that 20 of the 24 patients reported pain relief after 6 sessions of hypnosis.

Crasilneck (1979) failed to consider several key factors in this study of hypnosis for chronic low back pain. First, hypnotic susceptibility was not measured. Widely used standardized measures of susceptibility were developed in the in the late 1950's (Stanford Hypnotic Susceptibility Scale; Weitzenhoffer and Hilgard, 1959). Without a measure of hypnotic susceptibility, the researchers were unable to know whether improvements were based on the fact that participants were able to achieve deep levels of hypnotic trance. Second, no standardized measures of health improvement were used, so judgment of improvements were based on general patient reports, anchors for which could vary from patient to patient. Last, patients were only encouraged to practice self-hypnosis between sessions, but were not instructed about the benefits and the necessity of continued practice self-hypnosis.

McCuley, Thelen, Frank, Willard, and Callen (1983) compared hypnosis to relaxation with patients who experienced chronic low back pain. Patients in this study were assigned to an eight-week self-hypnosis group (n=9) or relaxation group (n=8). The McGill Pain Questionnaire (MPQ; Melzack, 1975) was used to assess an individual's subjective experience of pain. Outcomes of this study showed that participants in the hypnosis group had less difficulty with initial sleep disturbance, and the participants' physicians reported that medication use was less problematic for patients. Both groups reported significant reductions in their pain. Like other studies, the authors of this study failed to account for hypnotic susceptibility and standardization in their treatment protocol.

Edelson and Fitzpatrick (1989) conducted a clinical trial comparing three treatment groups: hypnosis, CBT, and an attentional control group. The majority of the

patients in this study had the primary concern of back pain; however, some patients also reported pain in other areas of their bodies. All participants (n=27) were male; mean duration of pain was 9 years. The McGill Pain Questionnaire (MPQ; Melzack, 1975) was used to obtain the participants' subjective measures of distress secondary to pain. An activity log was used to measure activity, which was an indicator of positive health behaviors, and participants were seen for one hour daily over two weeks. Results of this study showed that patients in the CBT group showed a significant decrease in their time sitting and a significant increase in their time standing. Patients in the hypnosis group showed significant changes on the MPQ, specifically decreased pain perceptions from pretreatment to post treatment assessments. When CBT was compared to the attention control group, participants in the CBT spent significantly more time walking. This same difference was noted between the CBT and hypnosis group. The results indicate that it would be useful to combine CBT and hypnosis to treat chronic pain.

In 1989, Spinhoven, Linssen, and Gazendam conducted a study examining hypnosis in chronic low back pain. This study employed 49 participants and compared self-hypnosis to an education-training program. This study provided a new approach in the examination of hypnosis and chronic pain by utilizing a cross over design; however, it is important to note that only 50% of patients completed both aspects of the study. Participants were assigned to either the hypnosis or education group. Then participants received no treatment for two months and subsequently received the treatment that they had not received in the first trial. A pain diary was used to measure pain, and the SCL-90 was used to measure affective state. Patients in the hypnosis group were taught self-hypnosis in the 5th session and given an audiotaped recording to use between sessions.

Patients reported improvement in their pain intensity after receiving both treatments; therefore,

he results indicated the treatment packages (i.e. combining self-hypnosis with psychoeducation) are beneficial in treating chronic low back pain.

Crawford et al. (1998) examined the role of hypnosis for the treatment of chronic low back pain with 15 adults who had experienced pain for an average of 4 years. Hypnotic susceptibility was measured for all individuals in the study, and all but one of the 15 participants scored in the medium to high range on a standardized measure of hypnotic susceptibility. This study measured the effects of hypnotic analgesia through scalp-recorded event-related potentials (SERP's). Event-related potentials are defined as voltage changes that are induced in the brain in response to a variety of sensory, cognitive, and motor processes. Results of this study showed that a significant number of participants experienced a decrease in their perception of pain after their first exposure, or training, in hypnosis. When the participants received their third training, 60% of participants reported complete pain relief. One participant in this study reported no pain reduction from hypnosis. Notably, this participant scored low on a measure of hypnotic susceptibility. The researchers of this study are under the belief of the advantages of a certain level (i.e. medium to high) of hypnotic susceptibility for pain management, which is consistent with reports from (Bowers, 1982; Hilgard & Hilgard, 1994; Montgomery et al., 2000). However, there is also evidence that pain relief from hypnotic analgesia is not determined by an individual's level of hypnotic susceptibility (J. Barber, 1980; J. Barber & Mayer, 1977).

This study (Crawford et al., 1998) was the first to study SERP's with hypnotic analgesia, and determined that the anterior frontal cortex was responsible for the inhibitory process associated with pain. In addition, these authors concluded that hypnotic analgesia led to significant changes in event-related potential, which suggests that there is a lower perception of distress related to pain.

Tan, Fukui, Jensen, Thornby, Waldman, and DeBakey (2010) conducted a pilot study to measure the effectiveness of a four-session self-hypnosis protocol to treat chronic low back pain. This study used a convenience sample of male veterans (n=9) referred by a Veterans Affairs Medical Center (VAMC) anesthesiology based pain clinic. The majority of the sample had at least some college education (88%) were Caucasian (67%) and had pain for 2-32 years. Results of this study found the majority of participants (5 out of 9) had significant and clinically meaningful pain reduction; however, pain reduction was not maintained at a 3-6 month follow-up. The study was limited, in that participants were not required to continue practicing hypnosis at home to maintain gains and the subjects were not compared to a control group.

All of the studies reviewed showed that a significant number of participants received some benefits from hypnosis to manage their chronic low back pain. Hypnotic susceptibility was not measured across the studies; so, it is unknown whether many individuals that received benefit were highly hypnotizable. In addition, each of the studies used different measurement techniques and different outcome reports. Therefore, based on the outcome studies on hypnosis and chronic low back pain, there is evidence that hypnosis treatments are associated with: increase pain relief, pain reduction, decreased perception of pain, and increased health behaviors (e.g. walking).

Individual Factors in Hypnosis

Brain Imaging

The use of brain imaging technology has allowed researchers to specifically

examine brain activation during hypnosis with chronic pain patients. Previous imaging

studies on hypnosis (Derbyshire, Whalley, & Oakley, 2009; Faymonville et al., 2000)

have repeatedly implicated the role of the parietal lobe with hypnotic movement, ACC

with attention and reduced stroop test interference during hypnosis, inhibition of the left

frontal lobe, and increased signaling between the ACC and the parasympathetic nervous

system during hypnosis. Nusbaum et al. (2011) examined the neural networks involved

with patients with chronic low back pain during hypnotic analgesia. The authors of this

study used PET to examine normal states and hypnotic states. Results of this study

indicated that normal states of alertness showed activation in certain pain modulation

networks (i.e. frontotemporal cortex, insula, somatosensory cortex, and cerebellum).

When participants were in a trance state, emotional pain modulation networks were

activated. These networks include frontotemporal cortex, insula, caudate, accumbens,

lenticular nuclei, and anterior cingulate cortex (ACC). Therefore, the findings of this

study corroborate studies that suggest that hypnosis helps to modulate the sensation pain.

Hypnotic Susceptibility

Hypnotic susceptibility, also referred to as hypnotizabilty, is an individual's

ability to achieve a trance state during hypnosis. In addition, researchers have found that

hypnotic susceptibility positively correlates with an individual's ability to gain benefits

from hypnosis (Bowers, 1982; Hilgard & Hilgard, 1994, Montgomery, Duhamel, &

Redd, 2000). Therefore, the higher the person's hypnotic susceptibility, the more deeply

he or she is able to go into a trance state and achieve the positive benefits of hypnosis for a variety of disorders. Despite these findings, other researchers have noted that there is no significant evidence of a positive relationship between level of hypnotizability and benefits received from hypnosis for pain management (Barber, 1980).

Measuring hypnotic susceptibility has become common in hypnosis research within laboratory setting to describe the outcomes of data. Over the past several decades, there have been multiple measures created to measure hypnotizability. These measures assess an individual's ability to respond to a number of hypnotic suggestions (e.g. arm levitation). Typically higher scores on these measures are associated with higher levels of hypnotizability. The usefulness of these measures has been disputed in clinical settings to treat chronic pain secondary to the idea that most items on general measures of hypnotizability are unrelated to hypnotic analgesia. In addition, measuring hypnotizability within clinical settings may not be feasible due to time constraints in clinical practice and lack of applicability within clinical settings.

Purpose of Study

The purpose of this study is to examine the differential effects of a hypnosis intervention and a cognitive behavioral therapy intervention for individuals with chronic back pain within an interdisciplinary chronic pain rehabilitation program. This research will add to previous research in:

1. Examining the usefulness of hypnosis as a treatment of back pain.

2. Measuring several post treatment outcomes for individuals who receive hypnosis and those who do not.

3. Including samples of individuals that are seen within a clinical setting rather than individuals in a laboratory setting.

This study furthers our understanding of the types of interventions, in this case hypnosis, that are widely used in chronic pain rehabilitation programs across the country. The following chapter will discuss the procedures of this study.

CHAPTER III

METHODS

This chapter discusses the methods and procedures used in this study. First, it describes the participants. Second, this chapter defines the procedure used. Third, a review of the measures is presented.

Participants

Participants were adult patients with chronic pain who participated in the outpatient two-week spine rehabilitation program through the University of Iowa Spine Center in the Department of Orthopaedics and Rehabilitation at the University of Iowa Hospitals and Clinics. The two-week spine rehabilitation program is an interdisciplinary program designed to teach patients skills to increase functioning and manage their pain. Patients are seen by a team of healthcare professionals (i.e., a physical medicine and rehabilitation physician, a psychologist, physical therapists, a vocational rehabilitation specialist, and nurses) to aid in learning new skills for pain management. The psychological portion of the two-week rehabilitation program teaches cognitive behavioral coping skills and relaxation. The aim of the psychological program is to provide patients with knowledge of the connection between the mind and body, to strengthen coping skills, and to teach relaxation techniques. The psychologist on staff meets with patients 1-3 times per day during each day of the spine rehabilitation program. Patients are encouraged to practice coping skills and relaxation techniques in their time outside the program.

The Principle Investigator solicited patients during the third day of the psychological portion of the rehabilitation program. Those patients who expressed an

interest in learning more about the study, and met the inclusion criteria for participation, were recruited; continuous recruitment occurred until the necessary number of participants was met. A record was kept of the number of patients approached for participation and the number declining along with their primary reason for declining. To be eligible to participate in this study, participants were required to meet the following inclusion criteria:

1) At least 19 years of age or older.

2) English as first language.

3) Meet criteria for chronic pain.

    a. Pain that endures despite the correction of the injury or after an expected healing period, approximately 3-6 months

4) Pain was not acute or related to a terminal condition.

5) Pain was musculoskeletal in nature and is in the low back region.

6) No cognitive or educational deficits that would preclude valid completion of the study measures.

Procedure

As previously mentioned, all participants were approached for participation on the third day of the rehabilitation program. Participants were told that the study purpose was to examine the outcome of relaxation procedures learned during the spine rehabilitation program. The study was composed of two treatment groups. Group A comprised a cognitive coping skills training, and participants were offered information on the role of cognitions and pain. In addition to this, participants were taught relaxation exercises, which included focused breathing, guided imagery, and autogenic relaxation. Group B

received the same cognitive coping skills training and relaxation exercises as Group A, and participants were also taught self-hypnosis relaxation for pain relief. All participants were given the same relaxation exercises (i.e., guided imagery and autogenic relaxation) on a CD and were asked to practice the exercises. Group B was given an additional CD with a hypnosis exercise. All participants (Group A and Group B) were seen by the principal investigator for a total 3 hours (days 3, 4, and 8) during the psychological portion of the rehabilitation program. Participants were given the opportunity to speak privately with the principal investigator about their experience or study participation. Participants returned for a 1.5-hour follow-up re-measure 6-12 weeks following the treatment group.

Therapist

The treating therapist in this study was also the author of the current study. The author was supervised by a licensed health psychologist at the University of Iowa Spine Center. Supervision of the study included individual supervision following each treatment session, and the supervisors' presence during treatment. The author is a 5th year doctoral candidate in the University of Iowa Counseling Psychology program. The author completed a basic training and intermediate training certificates in clinical hypnosis through the Society of Clinical and Experimental Hypnosis annual conferences in 2010 and 2011. Treatment fidelity was maintained by following safety guidelines proposed by Lynn, Martin, and Frauman (1996) for conducting hypnosis in experimental settings. The following protocol was followed: a) author obtained informed consent; (b) the author, who was trained in hypnosis, provided psychoeducation dispelling myths and misconceptions about hypnosis and to minimize feelings of failure associated with

inability to respond to hypnotic suggestions; (c) the author invited participants to ask questions about hypnosis; (d) during the hypnosis exercise, the Spine Center Psychologist served as a "spotter" whose role was to identify participants who react negatively to any aspect of the procedure; (e) after hypnosis, the author approached, spoke with, and debriefed participants; (f) all participants, regardless of whether they were or were not identified by the spotter, were invited to discuss their experiences with the author or Spine Center psychologist at any time; and finally, (g) participants were given the opportunity to follow-up with the author in person or via the contact information provided on the informed consent document. .

The treating therapist/principal investigator received written consent from the director of the University of Iowa Spine Center to conduct this present study. The psychological program was not changed for the patients participating in this study. Rather all individuals in treatment received the same treatments and interventions, and study participation was based on the authors' use an individual's outcome measures for data.

Measures

Health Status

The Medical Outcomes Study (MOS) Short Form Health Survey (SF-36) is a widely used health status inventory that measures the health-related quality of life (Ware & Sherbourne, 1992). The SF-36 is comprised of 36 items divided into eight scales: physical functioning (PF; 10 items), role limitations due to physical health problems (RP; 4 items), bodily pain (BP; 2 items), general health (GH; 5 problems), vitality (VT; 4 items), social functioning (SF; 2 items), role limitations due to emotional problems (RE; 3 items), and general mental health (MH; 5 items). Participants are instructed to respond

to each item about their perception of their health status during the previous four weeks. For example, "During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups?" and "How much bodily pain have you had during the past 4 weeks?" Each of the subscales is scored between 0 and 100 with higher scores indicating better health status for each of the eight areas. The mean of all eight scales had an alpha coefficient of .84.

A factorial analysis showed two main clusters on the SF-36. These clusters are the Physical Component Summary (PCS) And Mental Component Summary (MCS), which accounts for 80-85% percent of the variance in the eight scales in a U.S. population (Ware, Kosinski, & Keller, 1994). The PCS is related to role limitations due to physical health problems, and bodily pain. The MCS is correlated with the social functioning, role limitations due to emotional problems, general mental health. Cronbach's alpha coefficient for the PCS and MCS are greater than .70 across populations (Ware, Kosinski, Turner-Bowker, & Gandek, 2002)

For the purposes of this study, the PCS and MCS were used. Scoring of the MCS and PCS is as follows. First, the eight scales are standardized based on the norms from the U.S. population. These norms are based on 2,474 individuals stratified by age and gender. Second, the scores are aggregated using factor score coefficients that are based on the U.S. normative sample. Third, the aggregate scores are standardized using a T-score transformation (mean= 50 and standard deviation=10).

Pain

Participants' pain experience and intensity were measured using the Short Form of the McGill Pain Questionnaire (SF-MPQ, Melzack, 1987). The SF-MPQ consists of 11 sensory (e.g. throbbing, gnawing), and 4 affective descriptors (e.g. tiring, exhausting). All pain descriptors are rated on a scale from 0-3 (0 = none, 1 = mild, 2 = moderate or 3 = severe). Scores on this measure can range from 0 (no pain) to 45(severe pain).

The sensory, affective and total scores SF-MPQ are highly correlated (all categories r=>.80) with the Long Form-MPQ (Melzack, 1975), which showed acceptable psychometric properties in postsurgical, labor pain, and musculoskeletal pain. Wright, Asmundson, & McCreary (2001) examined the factorial validity of the SF-MPQ. Results of this analysis confirmed the dimensional validity of this measure as well as satisfactory internal consistencies of the sensory and affective dimensions (0.78 and 0.76). Strand, Ljunggren, Bogen, Ask, and Johnsen (2008) assessed the test-retest reliability for the sensory, affective, and total scores with patients with musculoskeletal pain and reported and found test-rest reliability of .76, .62, and .75 respectively. For patients with rheumatic pain, test re-test reliability (2-3 weeks after follow-up) for sensory, affective, and total scores were .95, .79, and .93 respectively. Gronblad, Lukinmaa, and Konttinen (1989) had similar results of test-rest reliability (.83) in a population of individuals with chronic low back pain.

Disability

To measure disability, the Oswestry Low Back Pain Disability Questionnaire was used (ODQ; Fairbanks, Couper, Davies, & O'Brien, 1980). The ODQ is one of the most commonly recommended measures of disability for patients with chronic back pain.

The ODQ consists of 10 items, which address different aspects of functioning: pain intensity (e.g. " I have no pain in the moment"), personal care (e.g. "I can look after myself normally but it is very painful"), lifting, walking, sitting, standing, sleeping, sex life, social life (e.g. a. "Pain has restricted my social life and I do not go out as often"), and traveling. All questions are scored on a 6-point scale ranging from 0 (no limitation) to 5 (maximum limitation). The items are totaled to a maximum of 50 and then doubled and interpreted as a percentage. The higher percentages equal greater disability. At the UIHC Spine Center, the ODQ is administered at a computer kiosk, and the total for the ODQ is reverse scored, with lower scores being equal to greater disability.

Fairbanks, Couper, Davies, & O'Brien (1980) tested the reliability of the ODQ with a group of 22 patients with back pain that were not expected to spontaneously recover. These patients completed the ODQ at weekly intervals. Results showed that the correlation coefficient for the test re-test reliability is .99. Baker, Pynsent and Fairbank (1989) also found adequate test re-test reliability when they compared computerized and paper and pencil formats of the measure with 104 patients (r=.89). Internal consistency was also found to be adequate for the ODQ (Cronbach's alpha = 0.86; Wittink. Turk, Car, Sukiennik, & Rogers , 2004).

Follow-up Practice Questionnaire

All participants completed a follow-up questionnaire 6-12 weeks after their rehabilitation program. The questionnaire queried the patient about the amount of time he/she spent practicing relaxation exercises, how often he/she used the relaxation CD provided by the program, the amount of time that relaxation reduced his/her experience of pain, the coping skills he/she used since returning home, and whether or not he/she

received additional mental health treatment targeted at pain management. Participants in

the hypnosis group received an additional questions asking about the amount of times

he/she practiced hypnosis.

CHAPTER IV

RESULTS

The results of the study are presented in this chapter. This section includes descriptions of study participants. In addition, descriptive statistics for the measures are reported, which include data on norms and reliability. Lastly, the research questions are addressed.

Sample Characteristics

A total of 35 individuals with chronic spine pain took part in the two-week spine rehabilitation program at the University of Iowa Hospitals and Clinics between the months of October 2012 and August 2013. Potential subjects were approached during the third day of the rehabilitation program to participate in this study. Twenty-five participants consented to participate. Subjects did not disclose their reasons for not consenting to be part of the study. Of the participants who consented, 5 participants either failed to complete all measures or failed to return for a follow-up re-measure. In order to maximize the number of participants, the pretreatment data include all 25 participants; the follow-up data include the 20 returning participants.

Table 1 provides a summary of the demographic characteristics of the participant sample. Of the 25 participants, over half were male (56%). The ratio of male to female participants is dissimilar to other reports on back pain populations, where the majority of patients with back pain are women (Von Korff, et al., 1988). The majority of participants were Caucasian individuals from Iowa who were privately insured (24%) or were in the process of workers' compensation (48%). The average age of participants was 45.5 years of age with the oldest participant being 67 years of age and the youngest 30 years of age.

Table 1 *Demographic Characteristics of the Patient Sample*

VARIABLES		n	%
Sample Size		25	
Age		45.52*	10.17*
Gender			
	Male	14	56
	Female	11	44
Ethnicity			
	Caucasian	25	100
Insurance			
	Private	6	24
	Worker's Compensation	12	48
	Medicare	1	4
	Medicaid	1	4
	Tri-Care	3	12
	VA	1	4
	Iowa Care	1	4
Residence			
	Iowa	23	92
	Illinois	1	4
	Kentucky	2	8

Note. * These values represent the mean and standard deviation, respectively.

Table 2 and 3 lists the characteristics of the sample divided by group. The final sample had more individuals in the hypnosis group (60%), and the hypnosis group had more male participants than female participants. Both groups were similar in their payer status, with the relaxation group having marginally more individuals in the workers' compensation and private insurer status groups. The average age of the two groups was similar, with the average age being about 45 years old.

Table 2 *Demographic Characteristics of the Hypnosis Group*

GROUP HYPNOSIS		n	%
Sample Size		15	60
Age		46.06*	9.19*
Gender			
	Male	9	56
	Female	6	44
Ethnicity			
	Caucasian	15	100
Insurance			

Table 2 Continued

	Private	3	20
	Worker's Compensation	7	46
	Medicare	0	0
	Medicaid	0	0
	Tri-Care	3	20
	VA	1	7
	Iowa Care	1	7
Residence			
	Iowa	12	80
	Illinois	1	7
	Kentucky	2	13

Note. * These values represent the mean and standard deviation, respectively

Table 3 *Demographic Characteristics of the Relaxation Group*

GROUP-RELAXATION		n	%
Sample Size		10	40
Age		44.7*	11.97*
Gender			
	Male	5	50
	Female	5	50
Ethnicity			
	Caucasian	10	100
Insurance			
	Private	3	30
	Worker's Compensation	5	50
	Medicare	1	10
	Medicaid	1	10
	Tri-Care	0	0
	VA	0	0
	Iowa Care	0	0
Residence			
	Iowa	10	100
	Illinois	0	0
	Kentucky	0	0

Descriptive Statistics

Ranges, means, and standard deviation for the study measures are provided in

Table 4. In regard to disability, measured by the ODQ, both groups reported 'severe

disability'(Fairbanks, Couper, Davies, & O'Brien, 1980), which is considered a score

between 60% and 80%, prior to entering the spine rehabilitation program. Both groups

reported 'moderate disability' (Fairbanks, Couper, Davies, & O'Brien, 1980), which

indicates a score between 40% and 60%, at their follow-up re-measure.

Pain levels, measured by the SF-36 (Melzack, 1987), were moderate for both

groups (Hypnosis M=16.13 SD=7.49; Relaxation M=20.22 SD=9.89) prior to treatment.

After treatment, both groups reported a decrease in pain (Hypnosis M=13.58 SD=6.50;

Relaxation= 13.63 SD=9.83). On a measure of present pain (i.e., MPQ PPI scale), the

relaxation group reported less average present pain following treatment (M=2.78 to

M=2.00). Conversely, the hypnosis group reported an average increase in present pain

(M=2.33 to M=3.82) 6-12 weeks following the rehabilitation program.

Health status, measured by the SF-36 PCS and MCS (Ware & Sherbourne, 1992),

was similar for both treatments. Both groups revealed a similar increase in physical

health status (Hypnosis M= 34.03 SD=6.04 to M=40.03 SD=7.52; Relaxation M=33.45

SD=1.71 to M=38.45 SD=3.88) and neither group was considered to be in the 'high

range' according the research by Taft, Karrison, and Sullivan (2001). Similarly, mental

health component scores increased for both groups with neither group falling into the

'low' (below 20) or 'high' (above 58) range (Hypnosis M=39.91 SD=14.61 to M=45.17

SD=15.59; Relaxation M=43.33 SD=15.59 to M=45.12 SD=2.10).

Table 5 demonstrations how the available comparative data for study measures

compares to the study data. T-tests were used to compare means for pain and functioning.

For the present study, there was not a significant difference in pain compared to

normative samples of patients who experienced chronic musculoskeletal pain for both the

hypnosis and relaxation groups (t(23)= 0.18, p>.05; t(17)= 1.71, p>.05) (Melzack, 1987). There were also no significant differences found in mental health quality of life scores between the normative data and the study sample (t(532)=0.46, p>.05; t(527)=0.54, p>.05). However, physical health quality of life scores were significantly lower for all patients in this sample as compared to comparative patients in a general medical population (t(532)=2.37, p<.05; t(527)=2.09, p<.05) . Of note, all comparison were made using limited sample sizes (N=10; N=15), which may have impacted an accurate comparison between the study sample and comparative samples.

Table 4 *Descriptive Statistics for Psychometric Instruments*

Group	Measure	Range	Mean-Pre	SD=Pre	Mean-Post	SD-Post
Hypnosis						
	Disability	0-100	52.20	.13	34.77	.15
	Pain	0-45	16.13	7.49	13.58	6.50
	PPI	0-5	2.33	.488	3.82	5.72
	Health Status					
	PCS	0-100	34.03	6.04	40.03	7.52
	MCS	0-100	39.91	14.61	45.17	15.59
Relaxation						
	Disability	0-100	47.33	.11	37.12	.24
	Pain	0-45	20.22	9.89	13.63	9.83
	PPI	0-5	2.78	.67	2.00	.93
	Health Status					
	PCS	0-100	33.45	1.71	38.45	3.88
	MCS	0-100	43.33	15.59	45.12	2.10

Table 5 *Scores and Data Comparison for Measures*

Hypnosis Measures		n	N	Sample M	SD	N	Comparison Study M	SD	T-test t	Sig.
Pain		15	15	16.3	7.49	10	15.7	11.9	0.18	>.05
Health Status										
	PCS	21	15	34.03	6.04	519	41.13	11.56	2.37	<.05*
	MCS	14	15	39.91	14.61	519	41.13	11.56	0.46	>.05

Table 5 Continued

Relaxation Measures		Sample				Comparison Study			T-test	
		n	N	M	SD	N	M	SD	t	Sig.
Pain		15	9	20.22	9.89	10	15.7	11.9	1.71	>.05
Health Status										
	PCS	21	10	33.45	5.43	519	41.33	11.56	2.09	<.05*
	MCS	14	10	43.33	5.94	519	41.33	11.73	0.54	>.05

n=Number of items in a scale
N=Sample size
1=Sample Size and standard deviations based on musculoskeltical pain population (N=10)(Melzack, 1987)
2= Norms and standard deviations based on back pain population (N=519) (Ware & Kosinski, 2001)

The next table (Table 6) shows the use of relaxation and coping skills practiced

following the rehabilitation program between the treatment groups. On average,

individuals in the relaxation group practiced relaxation at significantly higher rates than

the hypnosis group practiced self-hypnosis (t(17)=7.155, p<.0001). The hypnosis group

also reported the rate at which they practiced both hypnosis and relaxation skills (Table

7). In examining the hypnosis groups skill practice alone, individuals in the hypnosis

practiced relaxation skills at a significantly higher rate (t(18)=2.288, p<.05).

Table 6 *Relaxation and Hypnosis Practice Following Rehabilitation Program*

Group	N	Range	Mean	SD	T	Sig.
Hypnosis	10	0-10	3	3.53	7.155	<.0001*
Relaxation	9	12-42	26	9.49		

Table 7 *Hypnosis Group's use of Hypnosis and Relaxation*

Hypnosis Group	N	Range	Mean	SD	T	Sig.
Hypnosis	10	0-10	3	3.53	2.288	<.05*
Relaxation	10	5-100	24.33	29.35		

All participants in the study reported that they engaged in coping skills following treatment, which was strongly encouraged throughout the rehabilitation program. The majority of the patients in this study utilized exercise, stretching, and/or distraction to cope with pain at follow-up. In addition, most patients engaged in more than one coping skill. It is unknown whether individuals engaged in reported coping skills prior to entering the program, and data represents individuals' report of coping skills 6-12 weeks following rehabilitation.

Table 8 *Skills used Following the Rehabilitation Program*

Group	Skills	N	%
Hypnosis			
	Distraction	11	27.3
	Exercise	11	63.6
	Massage	11	2.33
	Music	11	9
	Relaxation	11	54.5
	Stretching	11	45.5
Relaxation			
	Distraction	8	62.5
	Exercise	8	62.5
	Massage	8	0
	Music	8	0
	Relaxation	8	37.5
	Stretching	8	12.5

Research Questions

The first research question pertained to whether patients who received hypnosis would report a lower experience of pain at follow-up than patients who did not receive hypnosis. In order to determine whether the two groups differed, an independent samples t-test was conducted examining the participants' pain scores prior to entering the

rehabilitation program and 6-12 weeks after the rehabilitation program. Prior to entering the treatment program, the groups' pain levels were not statistically different (Table 9). At a follow-up re-measure, statistical significance was not demonstrated between the two groups' report of pain (Table 10). Pain was also measured using the MPQ Present Pain Inventory (PPI; Melzack 1987). Participants did not differ significantly prior to or after receiving interdisciplinary pain treatment.

The second research question examined whether participants differed on the amount of disability they reported after receiving treatment (i.e., hypnosis or relaxation). T-tests were conducted, and groups were not significantly different on the amount of disability reported prior to entering the spine rehabilitation program (Table 9). Similarly, there were no significant differences found between groups on the amount of disability reported after attending the two-week rehabilitation program (Table 10).

The third research question tested whether the group that received hypnosis had significantly better physical and mental health quality of life 6-12 weeks after the two-week rehabilitation program. Between groups comparisons were made using the mental health composite (MCS) and the physical health composite (PCS) of the SF-36. Mental health status scores did not differ significantly between groups for patients entering the rehabilitation program. Similarly, there were not significant differences found between the two groups mental health status scores at the 6-12 week re-measure. As with the mental health composite scores, patients did not significantly differ between groups on the physical component scale at pre-treat and post-treatment (Table 9 and Table 10).

In sum, all participants were statistically similar in their report of pain, disability, and physical and mental health quality of life prior to entering a comprehensive pain

management program. When groups were compared to examine the additive effects of

hypnosis in a pain rehabilitation program, hypnosis interventions were not significant in

their additive effect for reducing pain, decreasing disability, or improving physical and

mental health quality of life.

Table 9 *Pre-treatment Independent Samples T-test (Hypnosis vs. Relaxation)*

Variable		t	df	Sig.
Pain		-1.148	22	>.05
	Present Pain	-1.884	22	>.05
Disability		.922	22	>.05
Functioning				
	Physical	.246	23	>.05
	Mental	-.558	23	>.05

Table 10 *Post-treatment Independent Samples T-test (Hypnosis vs. Relaxation)*

Variable		t	df	Sig.
Pain		-.011	18	>.05
	Present Pain	.883	17	>.05
Disability		-2.76	19	>.05
Functioning				
	PCS	.393	19	>.05
	MCS	.009	19	>.05

Lastly, the author tested whether there was an effect of time by examining pre and

post-treatment scores. A multivariate analysis of variance was conducted to assess for the

effect of time on the dependent variables (i.e., pain, disability, and physical and mental

health status). Results showed that there was a significant treatment effect for the

hypnosis and relaxation groups for pain, disability, and health status. A test for an

interaction between time and treatment (i.e., time* treatment) was also conducted. There

were no significant interactions found between time and treatment on pain, disability, and

health status (Table 11). This suggests while there is not an additive effect of hypnosis,

individuals in the hypnosis group did improve from pre and post treatment.

Table 11 *Test of Between and Within Subjects Effects for Time and Treatment*

Within Subjects Effects		df	Mean Square	F	Sig.
Pain		1	355.267	10.384	<.05*
	Present Pain	1	1.150	.110	<.05*
Disability Functioning		1	.222	7.708	<.05*
					<.05*
	PCS	1	301.035	7.222	<.05*
	MCS	1	468.810	7.350	<.05*
Between Subjects Effects		df	Mean Square	F	Sig.
Pain		1	36.817	.370	>.05
	Present Pain	1	4.748	.496	>.05
Disability Functioning		1	.001	.065	>.05
	PCS	1	5.650	.078	>.05
	MCS	1	.255	.001	>.05
Time* Treatment		df	Mean Square	F	Sig.
Pain		1	35.267	1.031	>.05
	Present Pain	1	11.255	1.080	>.05
Disability Functioning		1	.013	.442	>.05
	PCS	1	6.749	.162	>.05
	MCS	1	.415	.007	>.05

CHAPTER V

DISCUSSION

First, the results of this study will be discussed and compared to the existing literature. Second, limitations of the study are presented. Third, implications for further research and clinical practice will be made. Finally, the author provides concluding remarks.

Discussion of Results

The purpose of this study was to examine whether adding hypnosis interventions to the psychological portions of a two-week pain rehabilitation program was more effective than traditional relaxation techniques alone in reducing pain and disability while improving physical and mental health quality of life. Results of this study showed that the two treatment groups were similar in their report on pain, disability, and functioning prior to the rehabilitation program; furthermore, groups did not differ significantly 6-12 weeks after the program on any of the outcome measures. However, both groups had a signification reduction in pain and disability and reported significant improvements in physical and mental health as a result of taking part in the chronic pain rehabilitation program.

Demographic Characteristics

The characteristics of the present sample do not vary greatly from previous hypnosis research in this area. For example, most studies on chronic pain and hypnosis are primarily comprised of middle-aged, Caucasian samples. While many hypnosis studies have similar demographic characteristics across participant samples, some hypnosis studies have found differences in hypnosis intervention outcomes across ethnic

groups (Brodsky, & McNeil, 1984). However, most studies in this area have not assessed racial/ethnic differences on typical outcomes of chronic pain. Hypnosis researchers have suggested that more research be conducted in the area of racial/ethnic differences in hypnosis to confidently say that disparities exist.

Though the demographic characteristics of the present study are similar to chronic pain research in hypnosis, the current study does not represent a community sample of individuals who experience chronic spine pain. The present study consists of middle aged, Caucasian men. Epidemiological research reports that chronic back pain is more prevalent in woman, with gender patterns being consistent across cultures and time (Von Korf, et al., 1988). With regard to race, some research suggests that African Americans experience higher pain rates when compared to Caucasians (Green et al.; Green, Anderson, Baker, Washington, & Smith, 2003). However, other studies have shown less discrepancy in pain between African American and White individuals. While such differences cannot be completely understood, as these differences are not one-dimensional, some researchers discuss the role of cultural factors, healthcare coverage, and limited involvement in the healthcare systems as being possible reasons for differences within reports of chronic pain between ethnic groups (Allison, Symmons, & Brammah, 2002; Hardt, Jacobsen, Goldberg, Nickel, & Buchwalk, 2008;).

There may be many reasons why the current sample differs from a community sample. In regard to ethnicity, data was collected in a predominately Caucasian state. Therefore, the likelihood of an ethnically diverse sample is limited. Another consideration is the referrals sent to the Spine Center. It is unknown how referral decisions are made, and the group of individuals referred may be skewed towards certain

populations. A final consideration, which is referred to later in this chapter, is the large group of individuals in the process of workers' compensation. This subset has unique characteristics that may not be the same as community samples of patients with chronic pain.

The primary difference between this sample and other samples is that there was large number of patients pursuing workers' compensation in the current sample. Previous research on hypnosis and chronic back pain does not report that sample populations were involved in the workers' compensation process.

The amount of workers' compensation claims for back pain account for about 15% of all claims, and such claims account for 40% of the total claims costs in workers' compensation (Arnetz, Sjögren, Rydéhn, & Meisel, 2003; Melhorn, Wilkinson, & Riggs, 2001; Webster, & Snook, 1994; Volinn, &Van Koevering, Loeser, 1991). It is estimated that over 11 billion dollars per year are paid to U.S. workers for compensation related to back pain (Murphey, & Volinn 1999; Webster, & Snook, 1994), and in recent years, musculoskeletal injuries have accounted for 20 billion dollars of claim expenditure (Baldwin, 2014). Individuals engaged in in worker's compensation have been disproportionately between the ages of 50- 64, have lower incomes, and are female (Thomas, Stone, & Greenwood, 1990; Volinn, &Van Koevering, Loeser, 1991).

Vora and colleagues (2012) examined treatment outcomes for workers' compensation samples in spine rehabilitation programs. The researchers of this study concluded that individuals who attended a spine clinic program for pain management yielded better outcomes (i.e., returned to work) and experienced less pain than individuals who did not have such interventions. Additionally, these authors cited the role

of time since injury (TSI) in being negatively correlated with function (i.e., increased time off of work prior to intervention predicted poorer outcomes). In the present study, all individuals received comprehensive interventions, which would suggest functional improvement; however, it is unknown how much time had lapsed since individuals were injured at work prior to receiving intervention. Clinical data to assess time since a work related injury was not collected in the present study secondary to the fact that informed consent was obtained to view certain aspects of the patients' medical record. Specific workers' compensation information was covered under the informed consent agreement due to the unknown population characteristics and demographics at the outset of this study.

Individuals in the present study were compared to normative data. There was a significant difference found in physical health quality of life, with individuals in the present study reporting poorer quality of life in terms of their physical health functioning. In general, research has found that individuals with chronic non-malignant pain experience a significant decrease in quality of life compared even to other medical populations (e.g., patients with gastrointestinal symptoms, hypotension, and depression; Becker, Bondegaard, Alf Kornelius, Per, Jorgen, 1997). For example, Becker and colleagues (1997) found that individuals with chronic pain have comorbid sleep disturbance, social isolation, anxiety, and/or depression, which may all negatively impact an individual's quality of life. Similar to other studies, this data supports previous research that established that a patient's rating of physical functioning and quality of life tends to be the most sensitive measure for chronic pain patients.

Practice

Analysis of data regarding relaxation practice between the two groups yielded significant differences. All participants in the program were encouraged to log their practice while participating in the rehabilitation program, and to also continue practicing relaxation skills post-treatment. At the follow-up re-measure, participants in the relaxation group reported practicing relaxation at a higher rate following treatment. Individuals in the hypnosis group reported the amount of time they spent practicing hypnosis and/or relaxation, and they engaged in higher rates of relaxation. Turner (1982) discussed the critical nature of practicing relaxation techniques learned in pain management programs and attributed practice to long-term gains of rehabilitation and treatment. Both groups engaged in a significant amount of practice of relaxation techniques, which may have contributed to gains 6-12 weeks following the rehabilitation program.

Understanding why individuals were less likely to practice hypnosis may be attributed to several factors. First, there may have been a belief that the relaxation modalities learned were more helpful in reducing their experience of pain than hypnosis techniques. Second, hypnosis was a novel concept to most patients participating in the rehabilitation program, and one's comfort level of practicing the intervention on their own may have been more daunting of a task. Last, the Hypnosis group received education about hypnosis and engaged in three hypnosis practice sessions, which were lead by the principal investigator/treating therapist. After groups received hypnosis treatment, hypnosis groups did not engage in additional hypnosis practice for the remainder of the rehabilitation program. Given that individual only practiced hypnosis three times and

practiced other relaxation techniques at least 7 times during the rehabilitation program, there may have been an underlying assumption amongst participants in the hypnosis group that the relaxation techniques practiced more regularly were of greater importance than hypnosis techniques. Despite an individual's level of practice in the present study, outcomes between pre-and post- treatment for groups were the same. This is likely indicative of the skills learned during the rehabilitation program rather than whether the individual engaged in a specific type of relaxation.

All of the individuals who completed the treatment program reported that he/she engaged in the use of positive coping skills 6-12 weeks following participation in the rehabilitation program. Most of the participants, regardless of treatment group, reported that he/she engaged in exercise, relaxation, distraction, and stretching as a source of coping. While increasing coping skills is seen as a hallmark of the psychological portions of chronic pain rehabilitation programs, some research disputes the effectiveness of engaging in coping skills as a way to improve wellbeing. Jensen, Turner, and Romano (1994) examined the correlates of improvement in the multidisciplinary treatment of chronic pain. The authors of this study found that coping strategies (e.g., exercise and keeping busy) emphasized in chronic pain rehabilitation programs did not explain significant amounts of improvement amongst patients. However, the utilization of other coping skills (i.e., changing maladaptive beliefs about pain) were found to be essential in positive outcomes following treatment. It is difficult to know if participants engaged in coping skills prior to entering the program and what coping skills subjects attained while participating in the rehabilitation program. Also participants were asked, "What other coping skills (not relaxation exercise)" that they participated in after treatment. Despite

asking about "other coping skills", the majority of participants listed relaxation (i.e., focused breathing and relaxing) within this section.

Pain

A critical aspect of the present study was to examine if there was a reduction in pain between the hypnosis and relaxation groups, and whether just taking part in either intervention reduced pain. Results found no differences between groups in pain outcomes. Previous research on the differences between hypnosis and relaxation (McCuley, Thelen, Frank, Willard, & Callen, 1983) in individuals with chronic pain, found that when hypnosis was compared to relaxation, patients in the hypnosis group saw greater improvements (i.e., less sleep disturbance) than patients who received relaxation alone. However, other aspects related to differences between hypnosis and relaxation (e.g., reduced pain) were not found to be significant. While the researcher of the present study hypothesized that groups would differ significantly in the reduction of pain compared to relaxation only, these findings were not indicated.

All patients in the present study experienced a reduction in their pain level after taking part in the rehabilitation two-week program. These results are similar to other well-established research on the outcomes of interdisciplinary pain rehabilitation programs. A meta-analytic review of the efficacy of chronic pain treatment centers, Flor, Fydrich, and Turk (1992) concluded that multidisciplinary treatment programs are associated with a decrease in pain amongst (37%) participants following treatment compared to individuals in a control group (4%). This study, like others before it, supports that individuals involved in pain rehabilitation have significant reductions in their level of pain.

Disability

      The analysis of group differences in the reduction of disability was non-significant. The measurement of disability in hypnosis research is seldom measured. Therefore an expectation for a significant decrease in disability had no previous research basis. Despite the lack of research findings, the reduction of disability was expected, given other positive outcomes of hypnosis treatment. The present study adds to hypnosis literature by finding that individuals in the present study who received hypnosis treatment, with other psychological treatments for chronic pain, had a reduction in disability. The reduction in disability was not different between hypnosis and standard relaxation treatments, but all participants experienced a significant reduction in disability. This outcome was expected, given previous literature on research related to disability outcomes and chronic pain rehabilitation programs. (Hoffman, Papas, Chatkoff, & Kerns, 2007).

<div align="center">

Study Limitations

</div>

      This study, like all studies, had limitations in the design and methodology. The use of a convenience sample poses several potential limitations. The selection group was limited to those individuals referred to the Spine Center for evaluation. How these individuals are referred to the Spine Center varies from provider referrals throughout the medical center; however the majority of referrals are from within the department of Orthopedics and Rehabilitation. Given the amount of referrals for evaluation at a given time, patient participation in the two-week rehabilitation program can vary greatly. After patients are evaluated for participation, a percent of individuals are deemed appropriate to participate in the two-week rehabilitation program. The individuals recruited for the

present study were a fairly homogenous group, less representative of the general population. In addition, much of the sample consisted of individuals engaged in the workers' compensation process. There are characteristics of this population that may have affected the outcomes of this study group.

As previously noted, much of the study consisted of a workers" compensation sample. There have been inferences perpetuated about individuals in the workers' compensation process that regards these individuals as neurotic and malingering. Melzack, Katz, and Jeans (1985) describe three characteristics commonly associated with individuals seeking workers' compensation. These characteristics are as follows: 1) pain exaggeration; 2) increased psychopathology; and 3) intent to return to work once compensated. Despite the stigmas around individuals in the process of workers' compensation, data has shown that compensated and non-compensated patients have similar scores on measures of pain (i.e., MPQ). Additionally, workers' compensation patients also have less affective evaluative ratings of their pain (Melzack, Katz, & Jeans, 1985).

The risks of individuals who receive work-related injuries resulting in chronic back pain are a concern for insurance payers. Research has shown that patients injured at work who receive intervention 2-3 months after injury have the best outcomes in reducing potential for chronic disability. However, the cost of immediately intervening with each injured individual is not an effective approach; therefore intervening with individuals who have a higher risk of long-term disability is optimal. Turner et al. (2006) conducted a review of common risk factors associated with chronic disability. The researchers of this study cited poor work relations, high levels of fear avoidance, and

catastrophizing. A low recovery expectation of workers has also been shown to be one of the most significant factors in predicting long-term disability of injured workers (Turner et al., 2006).

Another study (Lanes, Gauron, Spratt, Wernimont, Found, & Weinstein, 1995) examined return to work in a long-term follow-up of patients who participated in a chronic pain rehabilitation program and found that 68% of participants who participated in the rehabilitation program who were out of work returned to work with 77% of those patient returning to their previous employment. However, only 49% of those patients who returned to work reported a good overall job outcome, which was related to the length of time off work (i.e., if a patient's time off work was greater than two years, the less likely the patient was to have a good outcome with return to work). These findings were similar to Vora and colleagues (2012) findings that time since injury were a significant factor in outcomes and rehabilitation.

In the present study, the lack of precision concerning the participants who were in the process (e.g., how long an individual was injured, where he/she was in the claim process, and expectations for recovery) may have introduced confounding variables, and results should be viewed in light of the limitations and/or benefits of a large workers' compensation sample.

In regard to methodology and design, the principal investigator of this study was also the treating therapist. Bias may have been introduced by having the principal investigator serve in both roles. For example, participants may have been more likely to report positive follow-up results given that rapport was built with the treating therapist and it was known to participants that the treating therapist served in both roles. In effort

to reduce bias, the principal investigator was not present when participants completed outcome measures.

Low numbers of individuals enrolled in the two-week rehabilitation program negatively impacted the sample size of this study. During the year of recruitment, the Spine Center two-week rehabilitation program saw a 1.6% decrease in patients participating in the rehabilitation program. Given the decrease in patients available, the study sample size was further limited. Having a small sample reduced the overall chance of uncovering specific mean differences, if these differences did exist between groups.

In line with a limited sample size, the size of various groups differed greatly throughout the program with the most being seven individuals and the smallest being one individual. Having other individuals participating in a group undoubtedly impacts the dynamic of an individual's level of participation and attention from clinicians. For a more uniform analysis, group size would have been relatively equal across groups.

Another limitation was that patients' responses to measures were only captured at two distinct points. The patients were measured once prior to entering the rehabilitation program, and the other 6-12 weeks following rehabilitation. It is unknown when changes, if they were present for a given patient, took place (i.e., after one exposure set interventions, or following an individual's complete participation in the program). Additionally, there were no measures recorded after 12 weeks post rehabilitation. Results of this study should be interpreted with the understanding that longitudinal data were not collected, and patient outcomes may or may not have remained stable following the 6-12 week re-measure.

Due to the clinical nature of this study, the researchers did not assess for the level of hypnotizability amongst participants. The clinical setting did not allow for additional time for a measurement of susceptibility, and the types of tasks asked during a measure of hypnotizablity (e.g., suggestions for arm levitation) were deemed to be qualitatively different to the types of inward forms of relaxation for chronic pain management being taught within this treatment program. There is a significant debate among hypnosis researchers about the usefulness of measures of hypnotizability (Jensen & Patterson, 2014). Research suggests that measuring hypnotizability is not always necessary in hypnosis research. Specifically, measuring this construct in clinical settings for chronic pain treatment has been found to yield inconsistent results (Patterson & Jensen, 2003). However, when interpreting results of hypnosis research, a researcher is unable to know whether a given individual's level of hypnotizability influences outcomes and responsiveness to suggestion, which can be seen as a limitation to this study.

Understanding an individual's coping skills is an essential aspect of treatment, and a primary focus of cognitive behavioral interventions. In the present study, all study participants reported the use of one or more relaxation techniques following participation in a rehabilitation program. However, there was no baseline data taken to assess coping skills prior to entering treatment. Many individuals who suffer from chronic pain may have already engaged in both positive (e.g., distraction) and negative (e.g., substance use) coping behaviors prior to treatment. Therefore, it is unknown whether certain skills were gained as a result of treatment or merely reinforced as positive ways to cope with pain. Additionally, the research survey made the assumption that participants could accurately define and report the coping skills in which he/she engaged. If participants were given a

list of coping skills, it may have allowed the researcher to assess for skills that the participants could not spontaneously and instantly recall.

In sum, the most significant limitations of this study were related to the demographics changes and characteristics of the treatment groups. Like many interdisciplinary chronic pain rehabilitation programs around the country, there has been a significant decrease in enrollment, which greatly impacted the researchers ability to find significant difference between treatment groups. In addition, a large percent of the study was comprised of a workers' compensation sample. There are many characteristics of a workers' compensation sample that are similar to the general population of patients who experience chronic pain. However, workers' compensation sample have unique characteristics that (e.g., recovery expectations and time since work related injury) that may be presented confounding variable to the outcomes of this study.

Implications for Clinical Practice

Much of the importance of research is to inform clinical practice. While differences between groups were not significant, there are several implications that can still be drawn from this research. Firstly, the workers' compensation population was a large part of this rehabilitation program and is a large part of many chronic pain rehabilitation programs around the country. Patient outcomes from participation within a comprehensive program have the ability to impact an individual's quality of life, with employment status playing a large role in one's life quality. Psychologists should truly consider the implications of one's employment status and the corresponding ability and/or motivation to engage in and respond to psychological interventions. For example, one's inability to work can lead to psychological distress (e.g., depression and anxiety).

Psychologists should also consider how one's vocational identity may impact functioning and make necessary referrals for vocational counseling when deemed necessary.

Secondly, a variety of hypnosis scripts exist to manage chronic pain. Many psychologists develop scripts based on the needs of a patient population and the published scripts available. There are no data on which scripts are most useful in clinical settings, and most practitioners tailor scripts to a given group of individuals. Jensen and Patterson (2014) discussed critical aspects of hypnosis in clinical trials and offered several implications for clinicians. In particular, the authors discussed the role of suggestions and in particular utilizing suggestions that discuss long-term pain relief. In many cases, clinicians focus on short-term pain relief when there is evidence that hypnosis can provide long-term (i.e., greater than 3 months) pain relief for patients. In the present study, the clinician provided suggestions for short-term pain relief. Clinicians should consider adding long-term suggestions to hypnosis scripts to maximize patient benefits during and after treatment. Jensen and Patterson (2014) also provide other suggestions for hypnosis scripts in the areas of mood and functioning. The authors posit that scripts should cover the entire essence of an individual's experience of pain and include suggestions that reinforce coping skills and increase activity during and after treatment.

Hypnotizability in clinical practice can be viewed through another lens. For example, in clinical practice, particularly group rehabilitation programs, it would be unlikely for a clinician to assess the group's level of hypnotizability prior to providing an intervention. This would be similar to a clinician assessing for an individual's response to any form of relaxation intervention prior to conducting a relaxation exercise. In practice,

clinicians tend to utilize direct patient feedback as a guide to effectiveness of interventions, rather than not providing an intervention if an individual is deemed unlikely to receive benefit. Clinicians should continue to grapple with the usefulness of measuring hypnotizability in a clinical setting, and continue to consider the utility of such measures (i.e., are there changes made to treatment depending on an individual's level of hypnotizability).

As noted above, the individuals in the hypnosis group practiced hypnosis less than other relaxation exercises. It is considered that individuals may have experienced less comfort in utilizing self-hypnosis once returning home. Clinicians should engage in an open dialogue with patients to assess for barriers related to utilizing hypnosis following treatment. Participants should be given the opportunity to ask questions and have them answered. In addition, the treating therapist should continue to educate the patient about hypnosis, as needed, with an attempt to dispel myths that the patient holds after he/she is initially educated about hypnosis prior to the first hypnosis intervention.

<div align="center">**Implications for Research**</div>

There has only been one study to this date that examines the added effects of hypnosis in the treatment of chronic pain, and no studies prior have examined the added effects of hypnosis within a chronic pain rehabilitation program. Experts in hypnosis believe that the examination of these effects is clearly warranted (Jensen & Patterson, 2014), and more studies should continue to examine the benefits of utilizing hypnosis interventions as an aspect of care. Future studies in this area should attempt to recruit larger sample sizes and follow-up with patients at more than 12-week after treatment.

Scripts for chronic pain and hypnosis should be measured for their essential characteristics. For example, scripts that include long-term suggestions should be compared with scripts that do not utilize these suggestions at a long-term follow up. In addition a dose effect, which was proposed by Patterson and Jensen (2003) for the number of hypnosis interventions needed to produce change, should be considered along with the analysis of the suggestions.

Psychological characteristics play a large role in a patient's experience of chronic pain, and research shows that these patients also experience co-occurring depression and/or anxiety. If psychiatric symptoms are not adequately managed, outcomes of research could possibly be confounded. However, when engaging in clinical research it would be nearly impossible to exclude patients with chronic pain experiencing psychological distress prior to treatment. Rather researchers should account for psychiatric considerations, such as depression and anxiety, and measure symptoms pre- and post-treatment. In many cases, research has found that there is a reduction in depression and anxiety as a result of chronic pain interventions (Hoffman, Papas, Chatkoff, & Kerns, 2007). Future hypnosis studies that utilize suggestions, which address mood and coping, should specifically examine the impact of such suggestions on a person's affective state following treatment.

A large subset of hypnosis research happens within a laboratory setting, which has benefits of reducing confounds encountered within clinical settings. With the benefits, there are definite limitations to extrapolating results from laboratory settings to clinic settings. Clinical research provides a wide range of additional data regarding usefulness of hypnosis outside of a laboratory. However, when working within a clinical

setting, a researcher is in many cases under the constraints of a clinic and limited in control of sample characteristics. These factors, including others (i.e., the differences between chronic pain programs and treatment) make it difficult to replicate. Despite limitations, much can be learned from continued research on hypnosis and chronic pain in a laboratory or clinical setting. For example, future research will help to broaden the understanding and knowledge around the specific aspects of hypnosis that aid in the improvement of chronic pain.

Researchers should consider examining populations of individuals that are underrepresented in the literature. Literature on chronic pain and underrepresented groups (e.g., racial ethnic minorities, lower socioeconomic status, and disabled individuals) reveals that underrepresented persons experience a greater impact of pain and disability. The multifaceted nature of an individual's pain should be considered by examining the many cultural implications that would impact treatment outcomes. In addition, differences in response to interventions should be assessed by researchers with an aim to provide insight to treatment modalities used in the care of patients.

Measurement of pain and improvement should be considered in future research in the area of chronic pain interventions. Pain measurement is primarily subjective and may vary from patient to patient. Other measures (i.e., ODQ and SF-36) of pain continue to be critical in the measurement of chronic pain. Researchers should also consider the inclusion of well-validated return-to-work measures to assess not only decreasing pain but also improved functioning to the extent of returning to work.

There continues to be a need for more longitudinal data on the outcomes of interdisciplinary chronic pain rehabilitation programs. Also, there is a lack of literature

that examines long-term outcomes on hypnosis for the management of chronic pain. While it is difficult to conduct longitudinal research for many reasons, researchers need to attempt various means of examining long-term outcomes to provide more evidence of the treatment approaches offered; examples of treatment consortia using the same basic outcome measures combining their long term data over time.

Overall, outcomes were positive and patients experienced decreased disability and pain and increase physical and mental functioning. Consistent with previous literature, clinical interventions that include psychoeducation and relaxation are beneficial for patients with chronic pain. This study found that despite the clinicians approach (i.e., adding hypnosis interventions vs. standard of care) patients made improvements.

Conclusion

The present study has demonstrated that chronic spine pain has a significant impact on the lives and functioning of many individuals. All groups in the study reported a significant impact of interventions related to pain management. While differences between groups were not detected, this study supports findings that the addition of hypnosis interventions yielded equivalent outcomes as general standard of care within a chronic pain rehabilitation program. Based on the results of this study, it is suggested that clinicians consider the social and psychological aspects impacting individuals experiencing chronic pain. Clinicians providing hypnosis should give suggestions that address long-term pain management and well-being. Chronic pain continues to be a significant problem in our society, and clinicians and researchers should continue to strive to find the best practices to aid individuals in improving their functioning and quality of life.

REFERENCES

Alladin, A. (2007). *Handbook of cognitive hypnotherapy for depression: An evidence based approach*. Philadelphia, PA: Lippincott Williams and Wilkins.

Allison, T. R., Symmons, D. P. M., Brammah, T., Haynes, P., Rogers, A., Roxby, M., & Urwin, M. (2002). Musculoskeletal pain is more generalised among people from ethnic minorities than among white people in Greater Manchester. *Annals of the rheumatic diseases*, *61*(2), 151-156. doi:10.1136/ard.61.2.151

Arnetz, B. B., Sjögren, B., Rydéhn, B., & Meisel, R. (2003). Early workplace intervention for employees with musculoskeletal-related absenteeism: a prospective controlled intervention study. *Journal of occupational and environmental medicine*, *45*(5), 499-506.

Baker, D., Pynsent, P., &Fairbank, J. (1989). The Oswestry Disability Index revisited: its reliability, repeatability and validity, and a comparison with the St. Thomas's Disability Index. In: M. Roland & J. Jenner (Eds.), *Back Pain. New Approaches To Rehabilitation And Education* (pp. 174–187). Mancheter, England: Manchester University Press.

Ballantyne, J. C., & Mao, J. (2003). Opioid therapy for chronic pain. *The New England Journal of Medicine, 34*(9), 1943–53. doi: 10.1056/NEJMra025411

Barabasz, A. F., & Barabasz, M. (2008). Hypnosis and the brain. In M. R. Nash & A. J.Barnier (Eds.), *The Oxford handbook of hypnosis* (pp. 337–364). New York, NY: Oxford University Press.

Barber, J. (1980). Hypnosis and the unhypnotizable. *American Journal of Clinical Hypnosis, 23*(1), 4-9. doi:10.1080/00029157.1980.10404012

Barber, J., & Mayer, D.J. (1977). Evaluation of the efficacy and neural mechanism of a hypnotic analgesia procedure in experimental and clinical dental pain. *Pain, 4*, 41-48. doi:10.1016/0304-3959(77)90085-9

Barnes, P. M., Powell-Griner, E., McFann, K., & Nahin, R. L. (2004). Complementary and alternative medicine use among adults: United States, 2002. *Seminars in Integrative Medicine*, *2*(2), 54–71. doi:10.1016/j.sigm.2004.07.003

Becker, N., Bondegaard Thomsen, A., Olsen, A. K., Sjøgren, P., Bech, P., & Eriksen, J. (1997). Pain epidemiology and health related quality of life in chronic non-malignant pain patients referred to a Danish multidisciplinary pain center. *Pain*, *73*(3), 393-400. doi:10.1016/s0304-3959(97)00126-7

Block, A. R., Gatchel, R. J., Deardorff, W. W., & Guyer, R. D. (2003). *The psychology of spine surgery*. Washington, DC: American Psychiatric Association. .

doi:10.1037/10613-000

Boslaugh, S. (n.d.). National Health Interview Survey. Encyclopedia of Epidemiology. doi:10.4135/9781412953948.n307

Bowers, P. (1982). The classic suggestion effect: Relationships with scales of hypnotizability, effortless experiencing, and imagery vividness. *International Journal of Clinical and Experimental Hypnosis*,*30*(3)*,* 270-279. doi: 10.1080/00207148208407264

Bradshaw, D. H., Empy, C., Davis, P., Lipschitz, D., Nakamura, Y., & Chapman, C. R. (2008). Trends in Funding for Research on Pain: A Report on the National Institutes of Health Grant Awards Over the Years 2003 to 2007. *The Journal of Pain, 9*(12), 1077–1087.e8. doi:10.1016/j.jpain.2008.09.008

Brodsky, A. M., & McNeil, D. W. (1984). Hypnotizability and volunteering for hypnosis experiments. *American Journal of Clinical Hypnosis*, *26*(3), 206-211. doi:10.1080/00029157.1984.10404164

Brox, J. I., Sørensen, R., Friis, A., Nygaard, Ø., Indahl, A., & Keller, A., et al. (2003). Randomized clinical trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration. *Spine*, *28*(17), 1913-1921. doi:10.1097/01.BRS.0000083234.62751.7A

Brox, J. I., Reikerås, O., Nygaard, Ø., Sørensen, R., Indahl, A., Holm, I., Keller, A., et al. (2006). Lumbar instrumented fusion compared with cognitive intervention and exercises in patients with chronic back pain after previous surgery for disc herniation: a prospective randomized controlled study. *Pain*, *122*(1), 145-155. doi:10.1097/01.brs.0000083234.62751.7a

Butler, L. D. (2006). Normative dissociation. *Psychiatric Clinics of North America, 29*(1), 45. doi:10.1016/j.psc.2005.10.004

Cano, A., Mayo, A., & Ventimiglia, M. (2006). Coping, pain severity, interference, and disability: the potential mediating and moderating roles of race and education. *Journal of Pain*, *7*(7), 459–68. doi:10.1016/j.jpain.2006.01.445

Coe, W. C., & Ryken, K. (1979). Hypnosis and risks to human subjects. *American Psychologist, 34*(8), 673-681. doi:10.1037/0003-066X.34.8.673

Coe, W.C., & Sarbin, T.R. (1991). Role theory: Hypnosis from a dramaturgical and narrational perspective. In S.J. Lynn & J.W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp.303-323). New York, NY: Guilford.

Cosser, C. (2002). Hypnosis in the treatment of chronic pain: An ecosystem approach.

Australian Journal of Clinical and Experimental Hypnosis, *30*(1), 156–169.

Crasilneck, H. B. (1979). Hypnosis in the control of chronic low back pain. *American Journal of Clinical Hypnosis, 22*(2), 71–78. doi:10.1080/00029157.1979.10403201

Crawford, H. J., Knebel, T., Kaplan, L., Vendemia, J. M. C., Xie, M., Jamison, S., & Pribram, K. H. (1998). Hypnotic analgesia: 1. somatosensory event-related potential changes to noxious stimuli and 2. transfer learning to reduce chronic low back pain. *International Journal of Clinical and Experimental Hypnosis, 51*, 92-132. doi:10.1080/00207149808409992

Dahl, J., Wilson, K. G., & Nilsson, A. (2004). Acceptance and Commitment Therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: A preliminary randomized trial. *Behavior Therapy, 35*(4), 785–801. doi:10.1016/S0005-7894(04)80020-0

Davis, L. W., & Husband, R. W. (1931). A study of hypnotic susceptibility in relation to personality traits. *Journal of Abnormal and Social Psychology, 26*(2). doi: 175-182. 10.1037/h0074985

Dersh, J., Gatchel, R. J., Mayer, T. G., Polatin, P. B., & Temple, O. W. (2006). Prevalence of psychiatric disorders in patients with chronic disabling occupational spinal disorders. *Spine, 31*(10), 1156–1162. doi:10.1097/01.brs.0000216441.83135.6f

Descartes, R. (1644). *Principia philosophiae*. Cambridge, England: Cambridge University Press.

Derbyshire, S. W. G., Whalley, M. G., & Oakley, D. A. (2009). Fibromyalgia pain and its modulation by hypnotic and non-hypnotic suggestion: An fMRI analysis. *European Journal of Pain, 13,* 542–550. doi:10.1016/j.ejpain.2008.06.010

Edelson, J., & Fitzpatrick, J. L. (1989). A comparison of cognitive behavioral and hypnotic treatments of chronic pain. *Journal of Clinical Psychology, 45*, 316-323. doi:10.1002/1097-4679(198903)45:2<316::AID-JCLP2270450221>3.0.CO;2-5

Ehrlich, G. E. (2003). Fibromyalgia and the conundrum of disability determination. *Journal of Occupational and Environmental Medicine, 45*(10),1030-1033. doi:10.1097/01.jom.0000088879.70638.14

Fairbanks, J. C. T., Davies, J. B., Couper, J., & O'Brien, J. P. (1980). The Oswestry Low Back Pain Disability Questionnaire*, Physiotherapy, 66*, 271-273.

Faymonville, M. E., Laureys, S., Degueldre, C., DelFiore, G., Luxena, A., Franck, G., Lamy, M., & Maquet, P. (2000). Neural mechanisms of antinociceptive effects of

hypnosis. *Anesthesiology 92*(5), 1257–1267.

Flor, H., & Birbaumer, N. (1993). Comparison of the efficacy of electromyographic biofeedback, cognitive-behavioral therapy, and conservative medical interventions in the treatment of chronic musculoskeletal pain. *Journal of Consulting and Clinical Psychology*, *61*(4), 653. doi:10.1037/0022-006X.61.4.653

Flor, H., Birbaumer, N., Schulte, W., & Roos, R. (1991). Stress-related electromyographic responses in patients with chronic temporomandibular pain. *Pain*, *46*(2), 145-152. doi:10.1016/0304-3959(91)90069-A

Flor, H., Fydrich, T., & Turk, D. C. (1992). Efficacy of multidisciplinary pain treatment centers: A meta-analytic review. *Pain, 49*(2), 221- 230. doi:10.1016/0304-3959(92)90145-2

Fordyce, W. E. (1976). *Behavioral Methods in chronic pain and illness*. St. Louis, MO: C. V. Mosby.

Fordyce, W. E., Fowler, R. S., Lehmann, J. R., & DeLateur, B. J. (1968). Some implications of learning in problems of chromc pain. *Journal of Chronic Diseases*, *21*(3), 179 190. doi:10.1016/0021-9681(68)90015-5

Gatchel, R. J. (2001). A biopsychosocial overview of pretreatment screening of patients with pain. *The Clinical Journal of Pain, 17*, 192-199. doi:10.1097/00002508-200109000-00002

Gatchel, R. J., & Okifuji, A. (2006). Evidence-Based Scientific Data Documenting the Treatment and Cost-Effectiveness of Comprehensive Pain Programs for Chronic Nonmalignant Pain. *The Journal of Pain, 7*(11), 779–793. doi:10.1016/j.jpain.2006.08.005

Gatchel, R. J., McGeary, D. D., McGeary, C. A., & Lippe, B. (2014). Interdisciplinary chronic pain management: Past, present, and future. *American Psychologist*, *69*(2), 119. doi:10.1037/a0035514

Gatchel, R. J., & Okifuji, A. (2006). Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *The Journal of Pain*, *7*(11), 779-793. doi:10.1016/j.jpain.2006.09.010

Gatchel, R., Peng, Y., Peters, M., Fuchs, P., & Turk, D. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin, 133*(4), 581–624. doi:10.1037/0033-2909.133.4.581

Gatchel, R. J., & Turk, D.C. (1996). *Psychological approaches to pain management: A*

practitioner's handbook. New York, NY: Guilford Press.

Gravitz, M. A. (1991). Early theories of hypnosis: A clinical perspective. In S. J. Lynn and I. W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp. 19-42). New York, NY: Guilford.

Gravitz, M.A., & Gerton, M.I. (1981). Freud and hypnosis: reports of prost-rejection use. *Journal of History and Behavioral Sciences, 17*, 68-74.

Green, C. R., Anderson, K. O., Baker, T. A., Campbell, L. C., Decker, S., Fillingim, R. B., Kaloukalani, D., et al. (2003). The unequal burden of pain: confronting racial and ethnic disparities in pain. *Pain medicine*, *4*(3), 277-294. doi:10.1046/j.1526-4637.2003.03034.x

Green, J. P., Barabasz, A. F., Barrett, D., & Montgomery, G. (2005). Forging ahead: the 2003 APA Division 30 definition of hypnosis. *Journal of Clinical and Experimental Hypnosis, 53*(3), 259-264. doi:10.1080/00207140590961321

Greenberg, P. E., Leong, S. A., Birnbaum, H. G., & Robinson, R. L. (2003). The economic burden of depression with painful symptoms. *Journal of Clinical Psychiatry, 64*(7), 17–23.

Gronblad, M., Lukinmaa, A., & Konttinen, Y. T. (1989). Chronic low-back pain: intercorrelation of repeated measures for pain and disability. *Scandinavian Journal of Rehabilitation Medicine, 22*(2), 73–77.

Hardt, J., Jacobsen, C., Goldberg, J., Nickel, R., & Buchwald, D. (2008). Prevalence of chronic pain in a representative sample in the United States. *Pain Medicine*, *9*(7), 803-812. doi:10.1111/j.1526-4637.2008.00425.x

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd Ed.). New York, NY: Guilford Press.

Herbert, J. D., & Forman, E. M. (2011). The evolution of cognitive behavior therapy: The rise of psychological acceptance and mindfulness. *Acceptance and mindfulness in cognitive behavior therapy: understanding and applying the new therapies*, 1-25. doi:10.1002/9781118001851.ch1

Herman, P. M., Poindexter, B. L., Witt, C. M., & Eisenberg, D. M. (2012). Are complementary therapies and integrative care cost-effective? A systematic review of economic evaluations. *BMJ open*, *2*(5). doi:10.1136/bmjopen-2012-001046

Hilgard, E. R. (1986). Divided consciousness: *Multiple controls in human thought and action (*expanded ed.). New York, NY: Wiley.

Hilgard, E. R. (1991). A neodissociation interpretation of hypnosis. In S. J. Lynn & 1. W. Rhue (Eds.), Theories of hypnosis: Current models and perspectives (pp. 83-104). New York, NY: Guilford Press.

Hilgard, E., & Hilgard, J. (1994). *Hypnosis in the relief of pain: Revised*. Palo Alto, CA: Kaufman.

Hilgard, E. R., Macdonald, H., Morgan, A. H., & Johnson, L. S. (1978). The reality of hypnotic analgesia: A comparison of highly hypnotizables with simulators. *Journal of Abnormal Psychology, 84*(3), 239-246. doi:10.1037/0021-843X.87.2.239

Hoffman, B. M., Papas, R. K., Chatkoff, D. K., & Kerns, R. D. (2007). Meta-analysis of psychological interventions for chronic low back pain. Health Psychology, 26(1), 1–9. doi:10.1037/0278-6133.26.1.1

Hull, C. L.(1933). *Hypnosis and suggestibility*. New York, NY: Appleton-Century. Jenness, A. J. (1944). Hypnotism. In J. McV. Hunt (Ed.), *Personality and the behavior disorders.* New York, NY: Ronald Press.

Jenness, A. (1944). *Hypnotism.* Personality and the Behavior Disorders, 1.New York, NY: Ronald Press.

Jensen, M. P., & Patterson, D. R. (2014). Hypnotic approaches for chronic pain management: Clinical implications of recent research findings. American Psychologist, 69(2), 167–177. doi:10.1037/a0035644

Jensen, M. P., Turner, J. A., Romano, J. M., & Karoly, P. (1991). Coping with chronic pain: A critical review of the literature. *Pain, 47*(3), 249- 283. doi.org/10.1016/0304-3959(91)90216-K

Johannes, C. B., Le, T. K., Zhou, X., Johnston, J. A., & Dworkin, R. H. (2010). The Prevalence of Chronic Pain in United States Adults: Results of an Internet-Based Survey. *The Journal of Pain, 11*(11), 1230–1239. doi:10.1016/j.jpain.2010.07.002

Judd, F. K., Burrows, G. D., & Dennerstein, L. (1986). Clinician's perceptions of the adverse effects of hypnosis: A preliminary survey. *Australian Journal of Clinical and Experimental Hypnosis, 13*(1), 49-60.

Kessler, R. C., Davis, R. B., Foster, D. F., Van Rompay, M. I., Walters, E. E., & Wilkey, S. et al. (2001). Long-term trends in the use of complementary and alternative medical therapies In the United States. *Annals of internal medicine*, *135*(4), 262-268. doi:10.7326/0003-4819-135-4-200108210-00011

Kitsch, I., Montgomery, G., & Sapirstein, G. (1995). Hypnosis as an adjunct to cognitive

behavioral psychotherapy: A meta-analysis. *Journal of Consulting and Clinical Psychology, 63*(2), 214-220. doi:10.1037/0022-006X.63.2.214

Lang E. V., Benotsch, E. G., Fick, L. J., Lutgendorf S., Berbaum M. L., Berbaum, K. S., Logan H., & Spiegel D. (2000). Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomized trial. *Lancet, 355*(9214), 1486-90. doi:10.1016/S0140-6736(08)61345-8

Lang E. V., Joyce J. S., Spiegel D., Hamilton D., & Lee K. K. (1996). Self-hypnotic relaxation during interventional radiological procedures: effects on pain perception and intravenous drug use. *International Journal of Clinical Experimental Hypnosis, 44*(2), 106-19. doi: 10.1080/00207149608416074

Loeser, J. D. (1990). Desirable characteristics for pain treatment facilities. Pain, 41, S479. doi:10.1016/0304-3959(90)93070-e

Lou H. C, Kjaer T. W, Friberg L., Wildschiodtz G., Holm S., & Nowak M. (1999). A 15O H2O PET study of meditation and the resting state of normal consciousness. *Human Brain Mapping, 7*(2), 98-105. doi:10.1002/(SICI)1097-0193(1999)7:2<98::AID-HBM3>3.0.CO;2-M

Ludwig, A. M. (1966) Altered states of consciousness. *Archives of General Psychiatry*, *15*(3), 225-234. doi:10.1001/archpsyc.1966.01730150001001

Lynch, M. (2001). Pain as the fifth vital sign. *Journal of Infusion Nursing*, *24*(2), 85 -94.

Lynn S. J., Green, J. P. (2011). The sociocognitive and dissociation theories of hypnosis: toward a reapproachment. *International Journal of Clinical Experimental Hypnosis, 59*(3)*,* 277–293. doi:10.1080/00207144.2011.570652

Lynn, S. J., & Kirsch, I. (2006). *Essentials of clinical hypnosis: An evidence-based approach.* Washington, DC: American Psychological Association.

Lynn, S. J., Kirsch, I., & Hallquist, M. N. (2008). Social cognitive theories of hypnosis. In M. R. Nash & A. Barnier (Eds.), *Oxford handbook of hypnosis* (pp. 111–139). Oxford, England: Oxford University Press.

Lynn, S. J., Martin, D. J., & Frauman, D. C. (1996). Does hypnosis pose special risks for negative effects? A master class commentary. *International Journal of Clinical and Experimental Hypnosis, 44*(1), 7-19. doi:10.1080/00207149608416064

McCauley, J. D., Thelen, M. H., Frank, R. G., Willard, R. R., & Callen, K. E. (1983). Hypnosis compared to relaxation in the outpatient management of chronic low back pain. *Archives of Physical Medicine and Rehabilitation, 64*(11), 548–552.

McCracken, L.M., MacKichan, F., & Eccleston C. (2007). Contextual cognitive behavioral therapy for severely disabled chronic pain sufferers: Effectiveness and clinically significant change. *European Journal of Pain, 11*(3), 314-322. doi:10.1016/j.ejpain.2006.05.004

McCracken, L. M., & Turk, D. C. (2002). Behavioral and cognitivebehavioral treatment for chronic pain: Outcome, predictors of outcome, and treatment process. *Spine, 27*(22), 2564–2573. doi:10.1097/00007632-200211150-00033

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2005). Acceptance-based treatment for person with complex long standing chronic pain: A preliminary analysis of treatment outcome in comparison to waiting phase. *Behavior Research and Therapy, 43*, 1335-1346. doi:10.1016/j.brat.2004.10.003

Meldrum, M. L. (2007). Brief history of multidisciplinary management of chronic pain, 1900-2000. *Chronic pain management: guidelines for multidisciplinary program development*,   1-15.

Melhorn, J. M., Wilkinson, L., & Riggs, J. D. (2001). Management of musculoskeletal pain in the workplace. *Journal of occupational and environmental medicine*, *43*(2), 83-93.

Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain, 1*(3), 277-299. doi:10.1016/0304-3959(75)90044-5

Melzack, R. (1987). The short form of the McGill Pain Questionnaire. *Pain, 30*, 191 197. doi: 10.1016/0304-3959(87)91074-8

Melzack, R. (1999). Pain and stress: A new perspective. In R. J. Gatchel & D. C. Turk (Eds.), *Psychosocial factors in pain: Critical perspectives* (pp. 89-106). New York, NY: Guilford Press.

Melzack R., & Katz J. (2001). The McGill Pain Questionnaire: appraisal and current status. In: Turk DC, Melzack R (Eds.), *Handbook of pain assessment* (pp. 35–52). New York, NY: Guilford Press.

Melzack, R., Katz, J., & Ellen Jeans, M. (1985). The role of compensation in chronic pain: Analysis using a new method of scoring the McGill pain questionnaire. Pain, 23(2), 101–112. doi:10.1016/0304-3959(85)90052-1

Melzack, R., & Wall, P. D. (1967). Pain mechanisms: a new theory. *Survey of Anesthesiology*, *11*(2), 89-90.

Montgomery, G. H., Duhamel, K. N., & Redd,W.H. (2000). A meta-analysis of hypnotically induced analgesia: How effective is hypnosis?. *International Journal of Clinical and Experimental Hypnosis, 48,* 138–153.

doi:10.1080/00207140008410045.

Morley S., Eccleston C., Williams, A. C. (1999). Systematic review and metaanalysis of randomized controlled trials of cognitive behavior therapy for chronic pain in adults, excluding headache. *Pain, 80*(1-2), 1–13. doi:10.1016/S0304-3959(98)00255-3

Murphy, P. L., & Volinn, E. (1999). Is occupational low back pain on the rise?. *Spine*, *24*(7), 691-697.

Nash, M., & Barnier, A. (2008). *The Oxford handbook of hypnosis: Theory, research, and practice*. Cary, NC: Oxford University Press, USA.

Nash, M. R., Johnson, L. S., & Tipton, R. D. (1979). Hypnotic age regression and the occurrence of transitional object relationships. *Journal of Abnormal Psychology, 88*(5), 547-555. doi:10.1037/0021-843X.88.5.547

Nash, M. R., Lynn, S. J., Stanley, S., Frauman, D., & Rhue, J. (1985). Hypnotic age regression and the importance of assessing interpersonally relevant affect. *International Journal of Clinical and Experimental Hypnosis, 33*(3*)*, 224-235. doi:10.1080/00207148508406651

Nusbaum, F., Redoute', J., Le Bars, D., Volkmann, P., Simon, F., Hannoun, F., Ribes, G., Gaucher, J., Laurent, B. N., & Sappey-Marineir, D. (2011). Chronic low-back pain modulation is enhanced by hypnotic analgesia suggestion by recruiting an emotional network: A PET imaging study. *International Journal of Clinical and Experimental Hypnosis, 59*(1): 27–44. doi: 10.1080/00207144.2011.522874

National Center for Health Statistics (1999). National Health Interview Survey: research for the 1995–2004 redesign. *Vital Health Stat*.1999*;(126)*:1–119

National Center for Health Statistics (2002). 1999 National Health Interview Survey, public use data release. Hiattsville, MD: CDC, NCHS.

National Center for Health Statistics (2007). *National Health Interview Survey*. Retrieved from: http://www.cdc.gov/ nchs/about/major/nhis/ nhis_2007_data_release.htm

Oakley, D. A., & Halligan, P. (2010). Psychophysiological foundations of hypnosis and suggestion. In S. J. Lynn, J. W. Rhue, & I. Kirsch (Eds.), *Handbook of clinical hypnosis* (pp. 79–177). Washington, DC: American Psychological Association.

Patterson, D. R., & Jensen, M. P. (2003). Hypnosis and clinical pain. *Psychological bulletin*, *129*(4), 495. doi:10.1037/0033-2909.129.4.495

Pearl, E. R. (2007). Ideas about pain, a historical view. *Nature Reviews of Neuroscience*,

8, 71–80. doi:10.1038/nrn2042

Pintar, J., & Lynn, S. J. (2008). Hypnosis: A Brief History. Chichester, West Sussex : Wiley Blackwell.

Price, D. D. (1999). *Psychological mechanisms of pain and analgesia*. Seattle, WA: ASP Press.

Rainville, P., Duncan, G. H., Price, D. D., Carrier, B., & Bushnell, M. C. (1997). Pain affect encoded in human anterior cingulate but not somatosensory cortex. *Science, 277*, 968–971. doi:10.1126/science.277.5328.96

Vora, R. N., Barron, B. A., Almudevar, A., & Utell, M. J. (2012). Work-Related Chronic Low Back Pain—Return-to-Work Outcomes After Referral to Interventional Pain and Spine Clinics. *Spine*, *37*(20), E1282-E1289. doi:10.1097/brs.0b013e318265a930

Raz, A., & Shapiro, T. (2002). Hypnosis and neuroscience: A crosstalk between clinical and cognitive research. *Archives of General Psychiatry*, *59*(1), 85–90. doi:10.1001/archpsyc.59.1.85

Revonsuo, A., Kallio, S., & Sikka, P. (2009). What is an altered state of consciousness?. *Philosophical Psychology, 22*(2), 187–204. doi:10.1080/09515080902802850

Sarbin, T. (1991). Hypnosis: A fifty year perspective. *Contemporary Hypnosis, 8*(1*)*,1-15.

Schofferman, J. (1993). Long-term use of opioid analgesics for the treatment of chronic pain of nonmalignant origin. *Journal of pain and symptom management*, *8*(5), 279-288. doi: 10.1016/0885-3924(93)90156-P

Sharp, T., J. (2001). Chronic pain: a reformulation of the cognitive-behavioural model. *Behavior Reserach and Therapy*, 39, 787–800. doi.org/10.1016/S0005-7967(00)00061-9

Sherrington, C. S. (1906). *The integrative action of the nervous system.* New Haven, CT: Yale University Press.

Skinner, B. F. (1969). *Contingencies of reinforcement: A theoretical analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Spanos, N. P., & Chaves, J. F. (1991). History and historiography of hypnosis. In S. J. Lynn & J. W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp. 43-78). New York, NY: Guilford Press.

Spiegel, H.(1972). An eye-roll test for hypnotizability. *American Journal of Clinical Hypnosis*, *15*(1), 25-28. doi:10.1080/00029157.1972.10402206

Spiegel, D. (2009). Intelligent design or designed intelligence? Hypnotizability as neurobiological adaptation. In M. R. Nash & A. J. Barnier (Eds.), *The Oxford handbook of hypnosis* (pp. 179–199). New York, NY: Oxford University Press.

Spinhoven, P., Ter Kuile, M. M., Linssen, C. G., & Gazendam, B. (1989). Pain coping strategies in a Dutch population of chronic low back pain patients. *Pain, 37*(1), 77-83. doi:10.1016/0304-3959(89)90155-3

Smith, D. (1999). *Approaching psychoanalysis*. London, England: H. Karnac Books.

Spanos, N. P., Radtke, H. L., Hodgins, D. C, Bertrand, L. D., Stam, H. J., & Moretti, P. (1983). The Carleton University Responsiveness to Suggestion Scale: Relationship with other measures of hypnotic susceptibility, expectancies, and absorption. *Psychological Reports, 53*, 723-734. doi:10.2466/pr0.1983.53.3.723

Strand, L. I., Ljunggren, A. E., Bogen, B., Ask, T., & Johnsen, T. B. (2008). The Short-Form McGill Pain Questionnaire as an outcome measure: Test-retest reliability and responsiveness to change. *European Journal of Pain, 12*, 917-925. doi: 10.1016/j.ejpain.2007.12.013

Stanos, S. (2012). Focused review of interdisciplinary pain rehabilitation programs for chronic pain management. *Current pain and headache reports*, *16*(2), 147-152. doi:10.1007/s11916-012-0252-4

Stengers, I., & Lapidus, R. (1990). The Deceptions of Power: Psychoanalysis and Hypnosis. *SubStance*, 81-91.

Tan, G., Fukui, T., Jensen, M. P., Thornby, J., Waldman, K. L., & DeBakey, M. (2010). Hypnosis treatment for chronic low back pain. *International Journal of Clinical and Experimental Hypnosis, 58*(1), 53-68. doi:10.1080/00207140903310824

Tart, C. T. (1990). Introduction to the first edition. In C. T. Tart (Ed.), *Altered states of consciousness.* San Francisco, CA: Harper Collins.

Thomas, S. A., Stone, W. E., & Greenwood, K. (1990). Australian workers with back injury. International Journal of Rehabilitation Research, 13(3), 186–204. doi:10.1097/00004356-199009000-00002

Tindle, H. A., Davis, R. B., Phillips, R. S., & Eisenberg, D. M. (2005). Trends in use of complementary and alternative medicine by US adults: 1997-2002. *Alternative Therapies in Health & Medicine*, *11*(1). doi:10.1016/j.ctim.2005.04.005

Turk, D. C. (2002). A diathesis-stress model of chronic pain and disability following traumatic injury. *Pain Research and Management, 7*(1), 9-19.

Turk, D. C., & Melzack, R. (2001). *The measurement of pain and the assessment of people experiencing pain*. New York, NY: Guilford Press.

Turk, D. C., & Okifuji, A. (1998). Treatment of chronic pain patients: Clinical outcome, cost-effectiveness, and cost-benefits. *Critical Reviews in Physical Medicine & Rehabilitation, 11*(2), 181–208.

Turk, D. C., & Okifuji A. (2002). Psychological factors in chronic pain: evolution and revolution. *Journal Consulting Clinical Psychology, 70*(3), 678–690. doi:10.1037/0022-006X.70.3.678

Turk, D. C., & Wilson, H. D. (2010). Fear of pain as a prognostic factor in chronic pain: conceptual models, assessment, and treatment implications. *Current pain and headache reports*, *14*(2), 88-95. doi:10.1002/9780470479216.corpsy0177

Turner, J. A. (1982). Comparison of group progressive-relaxation training and cognitive behavioral group therapy for chronic low back pain. Journal of Consulting and Clinical Psychology, 50(5), 757–765. doi:10.1037/0022-006x.50.5.757

Turner, J., Franklin, G., Fulton-Kehoe, D., Wu, R., Gluck, J., & Sheppard, L., et al. (2006). The Journal of Pain, 7(4), S90. doi:10.1016/j.jpain.2006.01.364

Turner J. A., Jensen, M. P., & Romano, J. M. (2000). Do beliefs, coping, and catastrophizing independently predict functioning in patients with chronic pain? *Pain, 85*(1-2), 115–125. doi:10.1016/S0304-3959(99)00259-6

U. S. Department of Health and Human Services (2011, March 29). Healthy people 2020. Retrieved from http://www.healthypeople. gov/hp2020/.

Volinn, E., Van Koevering, D., & Loeser, J. D. (1991). Back Sprain in Industry: The Role of Socioeconomic Factors in Chronicity. *Spine*, *16*(5), 542-548.

Von Korff, M., Dworkin, S. F., Le Resche, L., & Kruger, A. (1988). An epidemiologic comparison of pain complaints. *Pain*, *32*(2), 173-183. doi:10.1016/0304-3959(88)90066-8

Vowles, K. E., McCracken, L. M., & Eccleston, C. (2008). Patient functioning and catastrophizing in chronic pain: The mediating effects of acceptance. *Health Psychology, 27,* 136-S143. doi:10.1037/0278-6133.27.2

Vowles, K. E., Wetherell, J. L., & Sorrell, J. T., (2008). Targeting acceptance, mindfulness, and values-based action in chronic pain: Finding of two preliminary trials of an outpatient group-based intervention. *Cognitive and Behavioral Practice, 16*, 49-58. doi:10.1016/j.cbpra.2008.08.001

Wall, P., & Melzack, R. (1999). *Textbook of Pain.* Edingburgh, London: Churchill

Livingstone.

Ware, J. E., Kosinski, M., & Keller, S. (1994). *SF-36 physical and mental health summary scales: a user's manual*. Health Assessment Lab.

Ware, J. E., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2002). *How to score version 2 of the SF-12 health survey (with a supplement documenting version 1)*. QualityMetric Incorporated.

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care*, 473-483.

Webster, B. S., & Snook, S. H. (1994). The cost of 1989 workers' compensation low back pain claims. *Spine*, *19*(10), 1111-1115.

Weitzenhoffer, A. M. and Hilgard, E. R. 1959. *The Stanford Hypnotic Susceptibility Scale, Forms A and B*, Palo Alto, Calif.: Consulting Psychologists Press.

White, R. W. (1941). A preface to the theory of hypnotism. *The Journal of Abnormal and Social Psychology*, *36*(4), 477. doi: 10.1037/h0053844

Wicksell, R. K., Dahl, J., Magnusson, B., & Olsson, G. L. (2005). Using acceptance and commitment therapy in the rehabilitation of an adolescent female with chronic pain: a case example. *Cognitive and Behavioral Practice*, *12*(4), 415-423. doi:10.1016/S1077-7229(05)80069-0

Wittink, H., Turk, D. C., Carr, D. B., Sukiennik, A., & Rogers, W. (2004). Comparison of the redundancy, reliability, and responsiveness to change among SF-36, Oswestry Disability Index, and Multidimensional Pain Inventory. *The Clinical journal of pain*, *20*(3), 133-142.

Woody, E. Z., & Sadler, P. (2008). Dissociation theories of hypnosis. *The Oxford handbook of hypnosis: Theory, research, and practice*, 81-110.

Wright, K. D., Asmundson, G. J., & McCreary, D. R. (2001). Factorial validity of the short-form McGill pain questionnaire (SF-MPQ). *European Journal of Pain*, *5*(3), 279-284. doi:10.1053/eujp.2001.0243

Zarren, J.I., & Eimer, B.N. (2001). Brief cognitive hypnosis: Facilitating the change of dysfunctional behavior. New York, NY: Springer Publishing Company.

APPENDIX A

INFORMED CONSENT

INFORMED CONSENT DOCUMENT
Project Title: **Effectiveness of Adding Hypnosis Interventions to an Interdisciplinary Spine Rehabilitation Program**

Principal Investigator: Courtney Cornick/courtney-cornick@uiowa.edu

Research Team Contact: Elizabeth Altmaier, PhD/ (319) 335-5566
Valerie Keffala, PhD/ (319) 353-7695

This consent form describes the research study to help you decide if you want to participate. This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.

> If you have any questions about or do not understand something in this form, you should ask the research team for more information.

> You should discuss your participation with anyone you choose such as family or friends. Do not agree to participate in this study unless the research team has answered your questions and you decide that you want to be part of this study.

WHAT IS THE PURPOSE OF THIS STUDY?
This is a research study. We are inviting you to participate in this research study because you because   you have spine pain, and you are participating in a spine rehabilitation program.

The purpose of this research study is to learn about the effectiveness of adding hypnosis interventions to spine rehabilitation programs. We hope that the findings of this study will help clinicians and researchers to better understand the usefulness of different relaxation methods in spine rehabilitations programs.

HOW MANY PEOPLE WILL PARTICIPATE?
Approximately 80 people will take part in this study conducted by investigators at the University of Iowa.

HOW LONG WILL I BE IN THIS STUDY?
If you agree to take part in this study, your involvement will last for the two-weeks of the spine rehabilitation program and your half-day 6-week follow-up visit.

WHAT WILL HAPPEN DURING THIS STUDY?
During your time in the Spine Rehabilitation Program you will be asked to take part in psychological coping skills groups and relaxation groups. You will complete different measures during the two-weeks and at your follow-up visit 6-weeks after the program.

We would like to use your responses from the measures you complete during your time in the program and during your follow-up visit. No additional time will be requested of you to participate in this study. Also data from the physical measures will not be used in this study.

WHAT ARE THE RISKS OF THIS STUDY?
There are minimal risks associated from taking part in this study. However when hypnosis is used, research shows that there may be disadvantages to using hypnosis under certain conditions. Certain types of hypnosis techniques (insight focused or age regression) may be associated with a small percent of patients experiencing headache, dizziness, and nausea. There have also been less common complaints of panic and anxiety from the use of certain hypnosis techniques. This study will not use any techniques which are commonly associated with adverse affective reactions. There may also be unknown risks that we did not anticipate, associated with being in this study.

WHAT ARE THE BENEFITS OF THIS STUDY?
You will not benefit from being in this study. However, we hope that, in the future, other people might benefit from this study because we hope to have a better understanding about useful interventions for spine rehabilitation programs.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?
You will not have any costs for being in this research study.

WILL I BE PAID FOR PARTICIPATING?
You will not be paid for being in this research study.

WHO IS FUNDING THIS STUDY?
The University and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

WHAT ABOUT CONFIDENTIALITY?
We will keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people such as those indicated below may become aware of your participation in this study and may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you.
- federal government regulatory agencies,
- auditing departments of the University of Iowa, and
- the University of Iowa Institutional Review Board (a committee that reviews and approves research studies)

To help protect your confidentiality, data will only be accessible by research team members, and we will keep all data on a password locked computer in a password locked file. All hard copy data will be stored in a locked file cabinet within the spine center. All personally identifiable information will be removed when your data is entered. It will not

be possible to link your responses to you once the data is coded. If we write a report or article about this study or share the study data set with others, we will do so in such a way that you cannot be directly identified.

IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part at all. If you decide to be in this study, you may stop participating at any time. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify

WHAT IF I HAVE QUESTIONS?

We encourage you to ask questions. If you have any questions about the research study itself or e, please contact: Courtney Cornick, courtney-cornick@uiowa.edu. If you experience a research-related injury or problems, please contact: Elizabeth Altmaier, PhD, (319) 335-5566.

If you have questions, concerns, or complaints about your rights as a research subject or about research related injury, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail irb@uiowa.edu. General information about being a research subject can be found by clicking "Info for Public" on the Human Subjects Office web site, http://research.uiowa.edu/hso. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

This Informed Consent Document is not a contract. It is a written explanation of what will happen during the study if you decide to participate. You are not waiving any legal rights by signing this Informed Consent Document. Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

Subject's Name (printed):

_____

Do not sign this form if today's date is on or after $STAMP_EXP_DT.

_____   _____
(Signature of Subject)   (Date)

Statement of Person Who Obtained Consent

I have discussed the above points with the subject or, where appropriate, with the subject's legally authorized representative. It is my opinion that the subject understands the risks, benefits, and procedures involved with participation in this research study.

_____   _____

(Signature of Person who Obtained Consent)   (Date)