HYPNOSIS FOR PAIN: LIVE VERSUS AUDIO RECORDED INDUCTIONS

By

RACHEL ELIZABETH ROBERTSON

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The members of the Committee appointed to examine the dissertation of RACHEL ELIZABETH ROBERTSON find it satisfactory and recommend that it be accepted.

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Arreed Barabasz, Ph.D., Chair

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Marianne Barabasz, Ed.D.

_____

Dennis Warner, Ph.D.

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Abstract

by Rachel Elizabeth Robertson, Ph.D.
Washington State University
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Chair: Arreed Barabasz

The effects of live versus audio recorded hypnosis inductions for low and high hypnosis groups were tested in response to experimentally induced ischemic pain. One hundred and seventy one individuals were administered the Harvard Group Scale of Hypnotic Susceptibility (HGSHS, Shor & Orne, 1963) during the first session. One hundred twenty five participants who scored either 0 to 5 or 8 to 12 qualified for participation in the study. Of these 125 participants, 84 chose to participate. Next, the Stanford Hypnotic Susceptibility Scale (SHSS:C, Weitzenhoffer & Hilgard, 1962) was administered to determine their hypnotizability score. Fifty-one individuals qualified for further participation by obtaining either high 9 or greater or low 3 or below SHSS:C scores and participated in the study. Participants were assigned in balanced order and exposed to either a live or audio recorded hypnosis induction and administered and an ischemic pain task. Twenty four high hypnotizables and 24 low hypnotizables completed the study. The highs showed significantly ($p < .05$) lower pain scores than the lows. Participants in the live hypnosis conditions reported significantly ($p < .05$) lower pain scores than participants in the audio recorded hypnosis induction condition. Within the high hypnotizability participants, live hypnosis produced significantly lower mean pain reports in contrast to the audio recorded hypnosis induction condition.

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Chapter 1

Introduction

Pain is a natural part of human existence. Whether a child falls down and skins his/her knee or an adult suffers a major injury, all individuals experience pain. More than 48 million Americans suffer with chronic pain each year ("National Pain Survey", 1999). An estimated $70 to $120 billion dollars is lost annually as a result of pain (Stanos & Houle, 2006) and more importantly, pain leads to an increased likelihood of death (Liebeskind, 1991). Tang and Crane (2006) have found that chronic pain patients have double the risk of death by suicide compared to control subjects and that such patients show a high prevalence of suicidal ideation (20%) as well as having a lifetime prevalence of suicide attempt between 5% and 14%. Additionally, a survey completed by the American Pain Society showed that only 25% of people who experience chronic pain receive appropriate treatment and that treatment is often ineffective or underutilized ("Chronic Pain in America Survey", 1999). Due to the current importance of treating pain, whether chronic or acute, several treatment options have been developed, researched, and implemented to address pain and its associated suffering.

Hypnosis is one method used to treat and relieve pain and suffering (Patterson & Jensen, 2003). Hypnosis has been found to be successful for treating various types of pain and is used with individuals of all ages, cultures, and ethnicities. In surveying the literature, several authors (Barabasz & Watkins, 2005; Elkins, Jensen, & Patterson, 2007; Hilgard & Hilgard, 1994; Jensen & Patterson, 2006; Patterson & Jensen, 2003) concluded that hypnosis has been found effective in treating both acute and chronic pain as well as more specifically in surgical pain, childbirth pain, dental pain, low-back pain, headaches, cancer, intractable pain, arthritis, multiple sclerosis, pain experienced by children, mixed chronic pain, and other types of pain. Barabasz and Watkins (2005) conclude that hypnosis is an "effective analgesic in many types of cases and should be an integral part in virtually any program of pain control" (p. 232).

A current interest within the hypnosis and pain literature is the use of a "collaborative care" treatment method (Kessler & Stafford, 2008). Walker, Brawer, Solomon, and Seay (2008) as well as Kessler and Stafford (2008) describe the benefits of collaboration among physicians, surgeons, neurologists, anesthesiologists, physical therapists, psychologists, insurance companies, and patients in which all parties involved take a multidisciplinary approach to the patients' pain management. Collaborative care methods have been found to be cost-effective (Walker et. al., 2008) and meta-analyses of such programs (Flor et. al., 1992) have shown that patients treated in collaborative care models are almost twice as likely to return to work compared to untreated or single modality treated patients. More recent reviews (Kessler & Stafford, 2008; Turk, 2002) found that multidisciplinary programs have found treatment to be associated with fewer disability claims, lower health care costs, and a higher rate of return to work. Hypnosis is one important treatment option within pain management and is often used within collaborative care.

People who use hypnosis as a treatment for pain have often used hypnosis both in their individual sessions and outside of sessions in order to reduce patient's pain and suffering. Barber (1996) calls for pain interventions that include four components, one of which consists of "enable[ing] patients to learn to use the treatment themselves so that they become more self-reliant and less dependent on the health care system" (p. 9). In addition, assessment as to whether to include the use of hypnosis in treatment should focus on whether or not the patient is willing to take responsibility for treatment and commit to the significant effort it may take to engage in frequent and repeated use of hypnosis (Barber, 1996). An example of such treatment consists of patients being taught self-hypnosis and the use of audio recordings for hypnosis and pain treatment (Barabasz & Watkins, 2005; Elkins, Jensen, & Patterson, 2007). Audio recorded

inductions are sometimes used to prepare patients for future pain relief; therapists and hypnotists sometimes tape record their hypnosis sessions in order to send the patient home with a tape, which is hypothesized to assist in further treatment of their pain (Elkins, Jensen, & Patterson, 2007; Barabasz & Watkins, 2005). Barabasz and Watkins (2005) make recommendations for using audio recordings with patients who need pain relief on an ongoing, consistent basis. Yet, no fully controlled research exists on the effectiveness of audio recorded hypnosis inductions as compared to live inductions for the relief of pain and suffering (Montgomery et. al., 2002). Some research does exist on the use of audio recorded hypnosis inductions only (Enqvist et. al., 1995; Enqvist et. al, 1997; Enqvist & Fischer, 1997; Field, 1974; Ghoneim, et. al., 2000; Hart, 1980), but research has never specifically examined the effectiveness of audio recorded inductions versus live inductions.

Montgomery, David, Winkel, Silverstein, and Bovbjerg (2002) performed a meta-analysis on several hypnosis and pain studies and found that there was no difference in the effectiveness of studies employing audio recorded inductions versus studies employing live inductions. In addition, Elkins, Jensen, and Patterson (2007) reported that various studies in the treatment of chronic pain include instruction of self-hypnosis, which usually includes providing audio recordings of hypnosis sessions and instructions for home practice of self-hypnosis and these authors also point out that no research exists on either self-hypnosis practice or audio recorded sessions versus live sessions (Elkins, Jensen, & Patterson, 2007). Montgomery et al. (2002) call for research that directly compares the efficacy of audio recorded inductions compared to live inductions for pain management.

Research on types of hypnosis induction, especially live versus audio recorded inductions, for pain management is almost non-existent and several researchers call for more

research on the nature of inductions and suggestions used (Elkins, Jensen, & Patterson, 2007; Jensen & Patterson, 2006; Patterson & Jensen, 2003). Montgomery et. al's meta-analysis (2002) found no difference in effectiveness of studies comparing those using live inductions versus audio-recorded inductions, but, again, no studies compare live and audio recorded inductions directly using the same methodology (i.e. the same induction and suggestions with the only difference being one is live and one is audio-recorded). Providing a rationale for using audio recorded hypnosis sessions in pain management rests upon whether audio recorded hypnosis inductions are able to effectively manage pain as compared to live inductions and as stated previously, this research is lacking. The current study aims to address this lack of research by comparing live versus audio recorded inductions for pain management.

In order to understand the treatment of pain with hypnosis it is important to first understand both hypnosis and pain separately and together. The present chapter will address hypnosis, pain, and the importance of the current study while Chapter 2 will provide more detailed information relating to hypnosis and pain, past and recent research findings, and gaps within the literature.

Pain

An important factor of pain is that it is both useful and harmful. Pain allows a person to become aware of something to avoid or that something is damaged or not functioning properly and is in need of repair. Therefore, pain is useful because the source of the pain can be located and something can be done about it; it also protects from further injury until the cause of the pain improves. If a person felt no pain the consequences would be devastating; a broken bone would be beyond repair, a painful brain tumor would grow so large as to lead to death, and a child's pain would not be felt and treated in order to save the child's life. Pain is adaptive and is a way

for human beings to realize that something is wrong and needs to be addressed. Alternatively, both chronic and acute pain can be debilitating and destructive. It can lead to depression, negatively affect the human organs, including the kidneys, heart, gastric and colonic processes, as well as disrupt heart regularity and blood pressure (Hilgard & Hilgard, 1994). As a result of pain, people may exhibit reduced efficiency and/or attendance at work, disrupted relationships, lowered enjoyment of life, and general distress in several areas of their lives. Most people can observe first or second hand the harmful effects pain has on a person and have probably at some point in their lives personally experienced such effects of pain.

Defining pain can be difficult because of the varied types of pain and the varied experiences of different individuals. While pain has a sensory component, the actual felt experience of pain does not completely capture the entire picture of pain. Hilgard and Hilgard (1994) describe pain as consisting of a triad of distress, which includes sensory pain, suffering, and mental anguish. Sternbach (1978) said he found it extremely difficult to define pain. He settled on a definition that included three components: (a) a component that points to pain as the source of a harmful stimulus signaling possible damage, (b) a pattern of responses that permit the pain to be recognized by another person (external observer), and (c) the subjective or personal feeling of hurt.

Barabasz and Watkins (2005) outline the experience of pain by describing the two key components of pain, which the patient may or may not distinguish between: sensory pain and suffering. Sensory pain "provides needed information to the individual that something is wrong…the key cues as to the specific location and descriptors of the pain…and serves a protective purpose to the organism and should not be eliminated" (Barabasz & Watkins, 2005, p.219-220). Suffering is the "affective component of pain", which "describes how disturbing or

bothersome the pain is" and the "overall impact and interpretation of suffering" (Barabasz & Watkins, 2005, p. 220).

Hypnosis

The American Psychological Association's (APA) Division 30, the Society of Psychological Hypnosis (Green, Barabasz, Barret, & Montgomery, 2005), provides the following definition and explanation of hypnosis:

> 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, though 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, Barret, & Montgomery, 2005, p. 262-263).

Although this definition is currently under debate by a panel of fellows of the Society for Clinical and Experimental Hypnosis (Barabasz et. al., 2007) and by other published authors (Barabasz, 2005/2006; Daniel, 2005/2006; Spiegel & Greenleaf, 2005/2006) the current definition used by the American Psychological Association stands.

Hypnosis has become widely accepted, used, and studied in various settings, with numerous different clinical applications and populations. One of the once most widely debated topics in the field of hypnosis is the issue of hypnosis as a state. Socio-cognitivists object to hypnosis as a special state of consciousness while state-trait theorists would imply that hypnosis is different than a normal state (Hilgard & Hilgard, 1994). Socio-cognitivists believe that hypnotic responses are a result of mere suggestibility, not hypnotizability. A trait theory of hypnotic responsiveness explains how individual differences that characterize the more and the less hypnotizable correspond to an ability component (Hilgard & Hilgard, 1994). Most current hypnosis practitioners believe hypnosis is aligned with a state-trait theory (Christensen, 2005). A state-trait theory of hypnosis allows one to view hypnosis as both trait and state in which there can be differences in hypnotizability, while also believing that even the most highly hypnotized person is not in a hypnotic state all the time (Barabasz & Watkins, 2005; Hilgard & Hilgard, 1994). Hilgard and Hilgard (1994) point out that a practical consequence of objecting to hypnosis as a state (held by sociocognitivists) leads to minimization of the importance of a hypnotic induction since there is no state to enter into. Yet, subjects are found to be more responsive after an induction than if given suggestions alone (Hilgard & Hilgard, 1994), which demonstrates that induction is important and that hypnosis seems to be different than a normal waking state. A state-trait approach would say that, although someone may be highly hypnotizable they are not always in a hypnotic state, they might go into a hypnotic state

spontaneously, and an induction may not necessarily always produce a hypnotic state. It is generally accepted as an altered state of consciousness that is an expression of the trait of hypnotizability (Christensen, 2005). Therefore, although sociocognitivists hold on to their view of hypnosis as a non-state, "there is general agreement as to the behavioral and perceptual changes possible once one is experiencing a state of hypnosis" (Barabasz & Watkins, 2005, p. 27). Recent investigation has demonstrated that most hypnosis practitioners view hypnosis in terms of a state and prefer the term hypnotizability to suggestibility (which is preferred by socio-cognitivists) (Christensen, 2005). Many studies have produced dependable findings that show physiological responses associated with hypnosis only and that role-playing and suggestions alone do not produce associated physiological responses (Barabasz & Barabasz, 2008). Such physiological responses associated with hypnosis reveal the subjective perceptual experiences of altered consciousness (Barabasz & Watkins, 2005). Some authors have concluded that hypnosis should be viewed as a state in light of such evidence (Killeen & Nash, 2003).

Another important consideration regarding hypnosis, and of particular importance to the current study, is a persons relation to the hypnotist or therapist. In The Heart and Soul of Change, Bachelor and Horvath (1999) argue that the therapeutic relationship, or the alliance between therapist and patient, appears to be unequivocally necessary for effective psychotherapy. Hence, when using hypnosis for pain relief, the therapeutic alliance is of utmost importance. Hilgard and Hilgard (2004) describe the complex issue of control, including a person's ability to achieve adequate hypnotic depth for certain tasks and their level of hypnotizability, and how this issue may depend in part on the nature of the rapport between the hypnotist and the patient or subject.

Barabasz and Watkins (2005) point out that scripted hypnotic inductions, particularly those administered by people with little clinical experience with hypnosis are not likely to create

true hypnotic responsiveness. Barabasz et. al (2003) found that experienced clinicians evoked significantly greater evidence of age regression to age 5 compared to Ph.D. students who were ineffective in producing such age regression effects. Barabasz and Christensen (2006) found that other issues, such as the efficacy of scripted versus tailored inductions, also relate to rapport development. Therefore, the therapist, doctor, or hypnotist who is involved in the treatment of a patient needs to be experienced, able to establish sufficient rapport with the patient, invested in the therapeutic alliance, and knowledgeable about the type of induction to use with each particular patient.

These issues raise the question of whether audio recordings of hypnosis inductions are able to establish a therapeutic alliance (Frederick & McNeal, 1999) and assist in hypnosis treatment as well as a live session with the therapist, in which a live induction is used. Barabasz and Watkins (2005) elucidate that if you look at hypnosis as an "intensive interpersonal relationship experience" (p. 211) then the patient often introjects the voice of the therapist and the therapist's teachings, interpretations, and suggestions become internalized within the patient. Barber (1996) argues that effective use of hypnosis for the clinical treatment of pain requires an individualized approach. Perhaps the use of audiotapes, or audio recorded hypnosis inductions, may benefit some patients and not others. Yet, as stated previously, there is no fully controlled research that compares the use of audio recorded hypnosis inductions with live inductions for hypnotic analgesia and pain management. Such research is needed to create a foundation of findings relevant to the effectiveness of audio recorded hypnosis inductions and the use of audio recorded hypnosis sessions.

Purpose

The purpose of the current study was to address the lack of research related to the use of audio recorded hypnotic inductions for pain management. The lack of research on this topic is remarkable. The current research attempted to further inform pain researchers, clinicians, and physicians who are involved in the research and management of pain as well as to direct future research and create a foundation of findings related to the use of audio recorded inductions and hypnosis sessions for pain management. Lang, Berbaum, Faintuch, Hatsioloulo, Halsey, Li, Berbaum Laser, and Baum's recent research (2006) found that hypnosis is able to provide pain and anxiety relief without undue cost, which makes it attractive for outpatient pain management. Lang and Rosen (2002) examined the cost of adjunctive self-hypnotic relaxation with sedation during outpatient interventional radiology procedures compared to standard intravenous conscious sedation and found that the use of hypnosis with sedation reduces cost. The cost associated with standard sedation during procedures was $638 while sedation with adjunctive hypnosis cost $300 (Lang & Rosen, 2002). Lang and Rosen also found that hypnosis remained cost-effective even if it added an additional 58.2 minutes to the room time and found that adjunct hypnosis actually reduced the amount of room time. In addition, many researchers and clinicians have argued for the importance of research to inform and affect the clinical treatment of pain. The current study attempted to provide such information. Use of audio recordings of hypnosis, especially inductions, could potentially be a time-saving, cost-reducing treatment for both acute and chronic pain as well as assist in creating a standard protocol for pain research.

Chapter 2

Review of Literature

Several studies have used audio recorded hypnosis inductions (Enqvist et. al., 1995; Enqvist et. al, 1997; Enqvist & Fischer, 1997; Field, 1974; Ghoneim, et. al., 2000; Ginandes et. al., 2003; Hart, 1980) and research does demonstrate that both audio-recorded or live inductions, independently, are effective, but no controlled research exists on whether audio recorded or live hypnosis inductions are superior. Amidst hypnosis practitioners and researchers it is clinical lore that live inductions are the most effective, but no experimentally controlled data exists. Although hypnosis practitioners provide patients with audio recorded hypnosis inductions for pain relief, no studies have compared live versus audio recorded inductions in the same study when the inductions and suggestions are identical and the only difference is whether it is live versus audio-recorded. Montgomery et. al.'s (2002) meta-analysis examined the effectiveness of audio recorded and live inductions by comparing studies using different methodologies and found no difference between audio recorded inductions and live inductions. The failure to find significant differences can possibly be attributed to the different methodologies in the different studies, differences in hypnotizability, and/or differences in inductions; therefore, carefully controlled research is still needed on the effectiveness of live versus audio-recorded inductions. The focus of the present study was to determine whether there are differences between live and audio-recorded hypnotic inductions for the management of pain.

The current literature review focuses on the history of the use of hypnosis for pain management, the foundational and recent studies that have informed both the clinical and research fields related to hypnosis and pain, and research specifically related to audio recorded versus live and scripted versus tailored hypnosis inductions. On the basis of the research extant on the use and effectiveness of audio recorded hypnosis sessions this literature review provided

the rationale, theoretical basis, and methodological basis for the present study on audio recorded versus live hypnosis inductions for management of pain.

Hypnosis is widely accepted as an adjunct or sole intervention for pain management on the basis of an enormous number of research studies (reviewed by Patterson & Jensen, 2003). However, research is still needed on the use of audio recorded hypnosis inductions and whether or not such inductions could be a time-saving, cost-reducing treatment for the management of pain, as well as within hypnosis research. As previously discussed, Lang, Berbaum, Faintuch, Hatsioloulo, Halsey, Li, Berbaum Laser, and Baum's recent research (2006) found that hypnosis is able to provide pain and anxiety relief without undue cost, which makes it attractive for outpatient pain management. Lang et. al. (2006) found that hypnosis is able to provide pain and anxiety relief without undue cost and may be a useful, and less costly, treatment for pain management. Researchers examined self-hypnotic relaxation for outpatient medical procedures with women undergoing large core breast biopsies and found that anxiety decreased significantly in the hypnosis group as compared to both the control group and empathy group (Lang et. al, 2006). The authors noted that "self-hypnotic relaxation was the more powerful of the interventions tested" (p. 160), was the least expensive, and did not add procedure time or side-effects (Lang et. al., 2006). Lang and Rosen (2002) examined the cost of adjunct self-hypnotic relaxation with sedation during outpatient interventional radiology procedures compared to standard intravenous conscious sedation and found that the use of hypnosis with sedation reduces cost. The cost associated with standard sedation during procedures was $638 while sedation with adjunct hypnosis cost $300 (Lang & Rosen, 2002). Lang and Rosen also found that hypnosis remained cost-effective even if it added an additional 58.2 minutes to the room time and found that adjunct hypnosis actually reduced the amount of room time. With the ever-increasing costs,

time, and manpower associated with the management of pain the current study intended to shed further light on this issue.

Hypnosis and Pain

Hypnosis can be understood in terms of Hilgard's neodissociation theory (Barabasz & Watkins, 2005; Barber, 1996; Hilgard & Hilgard, 1994). The neodissociation theory proposes that dissociation is a necessary feature of cognitive processes that cause hypnosis. It further proposes that hypnotic analgesia is a function of the disruption, or the dissociation, of sensory information on its way to conscious awareness. A patient who experiences hypnotic analgesia feels both the change in perception of pain (either the affective or sensory component or both) and, usually, the automaticity of that change (Barber, 1996). Hilgard's original focus on dissociation as a necessary feature of hypnosis for pain management was based upon two decades of National Institute for Health (NIH) supported research at Hilgard's Stanford Lab (Barabasz & Watkins, 2005; Hilgard, 1979).

Hilgard and Hilgard demonstrated that, when analgesic suggestions were given in hypnosis, subjects showed little evidence of overt pain, while the actual experience and memory of the pain was covertly recorded and could be reported by what they termed a hidden observer (Barabasz & Watkins, 2005; Hilgard & Hilgard, 1994). Hilgard's theory explained the hidden observer in terms of an underlying cognitive structural system and proposed that an individual's personality is divided into cognitive control systems in which the covert pain is able to be recorded by a secondary cognitive control system that does not usually have communication with the outside world or with the primary cognitive system, which has been hypnotized (Barabasz & Watkins, 2005). Hence, the secondary cognitive control system is dissociated, the pain is out of conscious awareness, and the perceived hurt of such pain is gone (Hilgard & Hilgard, 1977).

Hilgard's findings related to the hidden observer and the neodissociation theory are able to explain the underlying processes of hypnosis as well as how hypnosis assists in pain relief. In addition, Hilgard and Hilgard (1994) describe their research and related findings supporting that a participant's hypnotizability predicts the ability to reduce painful stimuli through hypnotic analgesia. Hilgard and Hilgard's findings, as well as others' research, can be viewed in terms of the trait theory of hypnotizability, which has demonstrated that hypnotizability is a measurable construct that is highly stable [i.e., .80-.90 test-retest correlations after 10 years (Hilgard & Hilgard, 1994)]. Many studies reviewed and the current study, rely on the basis that hypnotizability is stable; it allows for researchers to group highly hypnotizable and low hypnotizable participants into varied conditions to test the effects of hypnosis on pain.

Recent articles, book chapters, and entire books have been devoted primarily to the issue of hypnosis and pain (Barabasz, Bolland, & Olness, 2010; Barabasz & Watkins, 2005; Barber, 1996; Elkins, Jensen, & Patterson, 2007; Hilgard & Hilgard, 1994; Jensen & Patterson, 2006; Patterson & Jensen, 2003). Elkins, Jensen, and Patterson (2007) provide an overview of thirteen controlled studies on the use of hypnosis for the management of chronic pain, excluding studies on headaches. They found that hypnosis interventions consistently produce significant decreases in pain associated with a variety of problems, such as cancer pain, low-back pain, arthritis pain, sickle cell disease, temporomandibular pain, fibromyalgia, disability-related pain, and mixed chronic pain problems. In each study reviewed, hypnosis was shown to be more effective than a no-treatment condition in reducing chronic pain. Based upon their review of the literature, the authors conclude that hypnosis for chronic pain results in significant reductions in perceived pain and can, in some case, be maintained for several months.

Patterson and Jensen (2003) review the literature on hypnosis and clinical pain and discuss methodological issues of the research and how to better integrate hypnosis into comprehensive pain treatment, with a focus on randomized, controlled clinical studies. They found that research on neurophysiological correlates of hypnotic analgesia suggests that high hypnotizables show different patterns of cortical responding than low hypnotizables and that hypnotic analgesia invokes physiological inhibitory processes in the brain, through multiple mechanisms. Patterson and Jensen also found that several methodological problems exist within anecdotal and clinical reports and that the best conclusion they can make is that some individuals with clinical pain problems may benefit from hypnotic analgesia. In their review of acute pain studies, the authors found that there is extensive evidence and well controlled studies that support the use and efficacy of hypnosis for acute pain problems. Out of seventeen studies, the authors found that eight studies demonstrated that hypnosis was more effective than no treatment, standard care, or attention control conditions. Three studies demonstrated that hypnosis is no better that a control condition and one study showed mixed results. Compared to other treatments for pain, such as cognitive behavioral therapy (CBT), relaxation training, distraction, and emotional support, hypnosis was shown to be superior four times out of eight; no study demonstrated that any other condition was superior to hypnosis. Patterson and Jensen also review hypnosis used for chronic pain, which will be later reviewed based upon their more recent work (Jensen & Patterson, 2006). Overall, the authors conclude that "at this point the available evidence indicates that hypnosis is a viable intervention for both acute and chronic pain conditions" (Patterson & Jensen, 2003, p. 517).

Jensen and Patterson (2006) reviewed controlled studies on hypnosis for chronic pain and found that, overall, hypnotic analgesia results in significantly greater decreases in pain compared

to no-treatment and to some other interventions, such as medication management, physical therapy, and education/advice. The authors reviewed nineteen studies and, for all but one study, hypnosis resulted in more pain reduction as compared to no treatment and, although, the magnitude of pain reduction varied across studies, some changes in pain were considerable. They also found that decreases in chronic pain, from hypnosis, were maintained for anywhere from three to twelve month periods and that in every study reviewed, with differing pain diagnoses and conditions, there were individuals who benefited from hypnosis. When comparing hypnosis to other treatments, such as relaxation, progressive muscle relaxation training, and autogenic training no treatment differences are found. The authors note that it is interesting that hypnotizability tends to predict better outcome for patients who receive hypnosis as well as relaxation or autogenic training, but not for patients who receive standard care. They also found that imagery vividness predicts outcome for hypnosis and relaxation treatment. Based upon these two findings the authors conclude that there is preliminary support for treatments labeled as hypnosis, relaxation, and autogenic training being more similar than different and may possibly operate through shared mechanisms. Overall, Jensen and Patterson (2006) demonstrated that "despite significant differences in the hypnotic interventions used between studies, and in the populations of patients studied, hypnotic analgesia treatment for chronic pain results in significant reductions in perceived pain that maintain for at least several months, and possibly longer", while "such changes in pain are not observed in patients who do not receive hypnosis treatment" (p. 122).

Recently, several authors have made recommendations related to future research on hypnosis and pain. Some of the main recommendations include measuring hypnotizability, standardizing hypnotic induction and interventions, and/or clearly identifying hypnotic

inductions and interventions, considering effects of medication dosage, increasing sample sizes, and using more rigorous controls (Elkins, Jensen, & Patterson, 2007; Jensen & Patterson, 2006; Patterson & Jensen, 2003). Future research needs to carefully consider the large body of research on hypnosis and pain and recent recommendations from hypnosis and pain researchers. The current study intended to shed light on the issue of types of hypnosis inductions.

Foundational Research on Hypnosis and Pain

To test whether or not hypnosis is more than mere suggestibility and response to social cues/placebo, M. T. Orne created the real-simulator research design (Orne, 1959). This design has been repeatedly used, cited, and replicated in numerous research studies; associated findings have repeatedly shown that hypnosis for pain produces effects beyond those wrought by suggestion/placebo. Orne (1959) conducted a study using a real-simulator design in which clearly defined groups of low and high hypnotizable participants were identified and used as a real hypnosis group (high hypnotizables based upon the findings that they could achieve top scores on a standardized test of hypnotizability) and a simulator group (low hypnotizables based upon the fact that they scored in the very lowest range of a standard hypnotizability scale) in order to determine if hypnosis adds something to the behavior of the hypnotized person that distinguishes him/her from the unhypnotizable person. It was hypothesized that if the high hypnotizable participants, the reals, show a talent produced by hypnosis, which was not the result of social demand cues from the experimenter, then the experiment is relevant and informing to the state non-state debate, which has since been, essentially, resolved (Christensen, 2005). Experimenters remained blind as to the nature of the group and their ability to actually experience hypnosis. The simulator/low hypnotizability group was instructed to simulate hypnosis just as they believed an excellent hypnotic participant would behave. They were

additionally asked not to reveal that they were unaffected by hypnosis either during hypnosis or amidst instructions for awakening and were told that the experimenter would discontinue the experiment if they knew the participant was faking hypnosis. After receiving instructions the participants were sent to another experimenter who administered the hypnotic induction (Orne, 1959).

Orne (1959) demonstrated that highly hypnotizable participants were able to eliminate pain completely while the simulators, low hypnotizable participants, were not able to eliminate or effectively reduce pain through hypnosis. This study provided a basis for hypnosis as a state since the low hypnotizable participants were not able to achieve pain relief with hypnosis as were the high hypnotizable participants. It demonstrated that there are effects produced by hypnosis, which are significantly greater than those resulting from social demand cues placed on the participant by the experimenter or hypnotist, resulting from a change in a person's perception of pain. Orne's study was pivotal in the state-trait debate as well as in the hypnosis and pain literature. It contributed to the enormous body of research supporting hypnosis as an effective clinical treatment for pain for those persons who are hypnotizable and provided a solid research design for future researchers wanting to investigate or demonstrate the effectiveness of hypnosis in varied treatment settings.

One of the most important foundational studies on hypnosis and pain examined the nature of hypnotic analgesia and placebo response to painful stimuli in high hypnotizable participants and low hypnotizable participants (McGlashan, Evans, & Orne, 1969). The study was designed to test the hypothesis that two mechanisms are involved in hypnotic analgesia. The authors argue that the first mechanism can be accounted for by nonspecific effects of the placebo response related to hypnosis while the second mechanism is hypothesized to be a result of the distortion of

the perception of pain sensation explicitly stimulated during deep hypnosis. High hypnotizable participants (N=12) and low hypnotizable participants (N=12) (both determined by the Harvard Group Scale of Hypnotic Susceptibility: Form A (HGSHS:A) and the Stanford Hypnotic Susceptibility Scale: Form C (SHSS: C)) experienced induced ischemic muscle pain in two different sessions. High hypnotizables were defined as those participants who "consistently experienced all classic hypnotic phenomena" and had "at least two consecutive ratings of 5 on a five point diagnostic scale" (p.231); the mean scores for the highs were10.08 on the HGSHS:A and 10.25 on the SHSS:C. Low hypnotizables were defined as those participants who were "consistently insusceptible to hypnosis", "received no higher ratings than 2", and "consistently failed to respond to any suggestion except the simplest ideomotor items" (p.231); the mean scores for the lows were 3.17 on the HGSHS:A and 1.75 on the SHSS:C.

McGlashan, Evans, and Orne's (1969) used a repeated measures design and included three experimental conditions: (a) baseline pain response measures including pain threshold and pain tolerance, (b) hypnotic analgesia, and (c) placebo. The hypnotic analgesia condition required the highly hypnotizable participants to achieve effective hypnotic glove analgesia, which was first measured by a response to moderate electric shock that was applied to the participant's dominant forearm during session 1. First, waking pain threshold was determined and then hypnosis was induced and analgesic suggestions were given. The low hypnotizable participants were told that they were good participants for the purpose of the study in order to motivate them for hypnotic analgesia. The experimenter's determined low hypnotizables waking threshold and then a shock, above threshold level, was administered and the participants were told that this was the level of shock to be used in the actual experiment. Then, the researchers induced hypnosis with a different induction procedure, based upon relaxation, in order to

convince the low hypnotizable participants that the new procedure was effective. Hypnotic analgesia was then suggested and a shock half way between threshold and the previously administered, above threshold, shock was given. The participants who were convinced that they had actually received the same level of shock as they had previously and believed they experienced glove analgesia qualified for the study.

The hypnotic analgesia condition (session 2) induced hypnosis for approximately 15 minutes, using an induction involving eye fixation and counting that had been used previously with the participants. Analgesic suggestions for the dominant arm were given for approximately seven minutes and the ischemic pain test was administered. Then hypnosis was ended and the participants were asked to rate the intensity of the pain and their own estimated depth of hypnosis on ten point scales. Afterwards the experimenter read the participants a brief introduction on the experimental pain relief pill to be used in the third session and its use as a control procedure in order to determine the effectiveness of the hypnotic analgesia. During the third session, the placebo condition, the pain relief pill was described as superior to hypnotic analgesia. The participant ingested the pill and 35 minutes later the experimenter returned and administered the ischemic pain task and obtained the pain intensity ratings, as used previously. The ischemic pain task consisted of applying a tourniquet to the upper arm, squeezing a bulb, which was connected to a flask filled with water in order to induce "work" in the arm (p. 232), in time to a metronome, and having the participant report the point at which pain is first perceived (threshold) and again when the participant could no longer squeeze the bulb because the pain was too great (tolerance). The amount of water displaced and the time it took to get to the tolerance level were recorded.

McGlashan, Evans, and Orne (1969) used such special procedures to form believable expectations in both groups that both treatments, hypnotic analgesia and the "powerful analgesic drug", could successfully decrease pain. In addition, the researchers made an attempt to convince the low hypnotizable participants that they would be able to achieve hypnotic analgesia in order to create as much placebo response in the hypnotic analgesia condition as possible. The researchers hypothesized that if high hypnotizable participants showed a greater analgesic response in the hypnosis condition compared to the low hypnotizables then the actual hypnotic experience would be the reason for the achieved analgesic response. The placebo response condition was used in order to determine to what extent there are placebo effects in hypnotic analgesia and hypnosis in general. As previously noted, the differing conditions were conducted to further elucidate the mechanisms behind hypnosis and hypnotic analgesia. All participants were told that the "powerful analgesic drug" (which was actually a placebo) would produce the most pain relief possible so that the researchers could compare such pain relief to the hypnotic analgesia condition in order to evaluate whether hypnosis is a meaningful treatment for pain. The experimenter administering the placebo condition was told that half of the participants would get the actual drug and the other half of the participants would receive a placebo and yet, all subjects actually received a placebo, which created a double blind condition. During the hypnotic analgesia and placebo response conditions, changes in pain threshold and pain tolerance (compared to baseline) were measured and related to changes in the participant's subjective ratings of pain intensity.

The results of McGlashan, Evans, and Orne's (1969) study provided evidence that there are two different mechanisms underlying hypnosis and hypnotic analgesia. Results showed that reductions in pain intensity were significantly higher in high hypnotizable participants compared

to the low hypnotizable participants in the hypnosis condition. Lows did not show decreased subjective pain intensity ratings. The findings showed that reductions in pain intensity existed, and were statistically similar, for low and high hypnotizable participants in the placebo condition, but high hypnotizables actually achieved less pain relief in the placebo condition compared to the lows. In addition, high hypnotizable's pain intensity ratings in the placebo condition were higher than those found with the low hypnotizable participants in the hypnosis condition. The authors conclude that the results support the hypothesis that there are two components involved in hypnotic analgesia in which one component can be thought of as the placebo effects of using hypnosis as a treatment for pain and the second component can be viewed as a distortion of perception (known as dissociation in modern terminology) created in deep hypnosis. It appears that the placebo response is more effective for low hypnotizables than high hypnotizables and that the two groups actually use differing mechanisms to achieve pain relief. Most importantly, hypnosis accounted for more of an effect than the placebo response, which demonstrates that hypnosis is something other than suggestibility. These findings are both important to the current research and to the clinical management of pain.

Another early foundational study on the modifiability of hypnotizability, using electrically induced pain as a criterion measure, is Barabasz's (1982) experiment on restricted environmental stimulation technique (REST). The study tested REST with 10 participants and REST's effects on hypnotizability (assessed via the Stanford Hypnotic Clinical Scale: Adult, SHCS), pain threshold, and pain tolerance. The study aimed to first, further explore whether or not REST enhances hypnotic performance and second, to build upon previous REST studies by addressing methodological limitations. The primary dependent variables were hypnotizability and pain tolerance; secondary dependent variables included occipital EEG alpha, skin

conductance, and peripheral, core, and chamber temperature data, which were measured and collected prior to REST, immediately after REST, and during a follow-up period 10-14 days later. A control group of 10 participants was used to measure the effects of repeated hypnosis upon hypnotizability scores and control for potential demand characteristics of the experiment. A multivariate analysis of variance was used to assess the effects of REST on the dependent variables. The analysis showed that SHCS scores (hypnotizability) and pain tolerance were both significantly increased for participants exposed to REST immediately after and during the 10-14 days later follow-up measure. A post experimental inquiry showed that demand characteristics did not account for the results. Although the psychophysiological measures were not the primary focus of the study, the SCL, peripheral temperature, chamber temperature, and hand-scored EEG alpha scores showed significant changes as a result of REST. Barabasz viewed these findings as consistent with Hilgard's neodissociation theory of hypnosis and "imaginative involvement findings" (p. 162). The author hypothesized that sensory restriction forces a person to focus on internally generated imaginal activity as a possible mechanism used to cope with reduced outside stimulation, which once learned might account for a higher level of hypnotizability and maintenance of such hypnotic gains over time.

The major finding of the study (Barabasz, 1982) was that hypnotizability can be significantly enhanced by REST. One of the limitations of Barabasz's study (1982) is the pain threshold and tolerance tests employed. Pain tolerance was assessed by instructing participants to report when they felt the electrical stimulation at an intensity "just below the maximum they could endure" (p. 153). Yet, some people can experience higher stimulation for their reported level of pain threshold, hence this is not a uniform measure. In regards to pain tolerance, as Barabasz (1981) points out, there is a problem of heroism because of the nature of measuring

tolerance and some participants reporting that they can continue to experience more pain past their actual tolerance level. Many studies have used visual analogue scales (VAS) which require participants and patients to report pain on a 1-10 closed ended scale with varying verbal descriptors used as anchors, but such a scale also causes psychometric problems with compression toward the end (9-10 range) of the scale. Therefore, it is important to assess subjective pain through reporting on a linear, open-ended, scale, which produces more psychometrically sound data and allows a participant to report additional pain. Overall, Barabasz's REST research (1982) has demonstrated important significant effects, which have further clarified and contributed to current hypnosis and pain research and clinical management of pain. Barabasz's study (1982) is important for the current study because it is a controlled, well-designed research study on hypnosis and pain that used assessment of pain by participant self-report and use of pain tolerance and threshold measures.

Recent Research on Hypnosis and Pain

Studies on hypnosis and pain have more recently included physiological measures related to felt pain and pain reduction, including sympathetic responses, electro cortical activity, and regional blood brain flow. As foreshadowed by Barabasz (1982) when he suggested a better criterion measure might be EEG ERP's (p.160), physiological responses to painful stimuli are more consistent than participants' subjective reports. Some researchers have suggested that the lack of consistent, significant effects of hypnosis on sympathetic responses means that hypnosis does not affect felt sensory pain and actually only affects a person's willingness to report it (Patterson et al., 2003). Yet, sympathetic responses alone are only a subset of physiological responses to pain. Hilgard and Hilgard (1994) note that such findings do not truly speak to the effects of hypnosis on experienced pain and pain treatment. Furthermore, more recent research

examining sensory versus affective pain postulates that neurophysiological changes are associated with hypnotic analgesia in high hypnotizable individuals. The research also explains how several physiological mechanisms seem to play a role in reduced experienced pain that is achieved as a result of hypnotic analgesia (Patterson et al., 2003). Some of the most advanced, methodologically sound research on hypnosis and pain has been conducted at the University of Rome, La Sapienza by Vilfredo DePascalis and his associates. Their research designs were of particular interest for the current research and their findings illuminated the hypnosis and pain field. In this writer's opinion, DePascalis's research has also contributed to the continued need for more methodologically sound research on related topics, including the issue of types of hypnosis inductions.

DePascalis, Magurano, and Bellusci (1999) examined pain perception and its relation to hypnotizability, somatosensory event-related potentials, and skin conductance response and used electrical stimulation for the administration of pain. They used 10 high, 9 mid, and 10 low hypnotizable participants selected by the SHSS:C and the authors included five differing conditions of hypnotic suggestions: waking, deep relaxation, dissociated imagery, focused analgesia, and placebo. Behavioral measures were used to evaluate task performance and included: sensory threshold (felt as a detectable pin prick), pain threshold (felt as a distinct sharp painful pin prick), reaction time to a button press, and omission errors (number of missed presses to target presentation). The resulted demonstrated that greater inhibitory processing to painful stimulation, assessed through physiological measures, occurred specifically during hypnotic analgesia as compared with other conditions. The authors also reported that the high hypnotizable participants showed the most significant reductions in pain and distress levels when compared to their mid and low hypnotizable counterparts in the focused analgesia hypnosis

condition. These replicated previous researcher findings on high hypnotizable's ability to use hypnosis for pain management and further supports the use of hypnosis as a treatment for pain.

Recent methodological and technological advances, such as the use of electrical stimulation to administer a pain stimulus and neuroimaging advances, have greatly contributed to advances in the field of hypnosis and pain and permitted researchers to create more methodologically controlled designs. Such advances have allowed hypnosis and pain research and associated findings to provide concrete evidence for hypnosis as an effective treatment for pain management. Although the DePascalis et. al (1999) study has greatly contributed to the current literature, improvements could have been made. Most importantly, the study lacks any detail on the specific types of suggestions used in the hypnosis conditions or the specifics of the inductions used. These limitations, especially the lack of detail on hypnosis inductions, make replication difficult. Recent research has shed light on the issue of how the type of induction, e.g. tailored versus scripted, affects a participant's ability to achieve hypnosis at a level of depth necessary to perform difficult hypnotic tasks (Barabasz & Christensen, 2005). Therefore, it is important for current and future research to delineate their hypnosis suggestions and types of inductions.

DePascalis, Cacace, and Massicolle (2004) examined somatosensory event-related phase-ordered gamma oscillations during painful stimuli with high, medium, and low hypnotizable participants during waking, hypnosis, and post-hypnosis conditions. The authors found that high hypnotizables, compared to medium and low hypnotizables, experienced significant pain and distress reduction during the hypnosis-analgesia condition and even more reduction during the post-hypnosis analgesia condition. They also found that high and medium hypnotizables showed reductions in their phase-ordered gamma patterns for the hypnosis-analgesia and post-hypnosis

analgesia conditions, but the effect was significantly more prominent in high hypnotizables. The authors describe how the reductions in phase-ordered gamma patterns in high hypnotizables are paralleled by the significant reductions in pain and distress ratings. They suggest that the results support the view that hypnosis involves the suspension of a high order attention system, which could be important in light of the hypnosis debates between the sociocognitivists and state-trait theorists. Such discussion and research findings could point researchers and theorists toward adopting a view of hypnosis, which is more aligned with state-trait theorists because hypnosis can be viewed not as a response to social demand cues, but rather one involving changes within a higher order attention system and cognitive functioning. This is consistent with a recent survey from published practitioners and researchers who are members of the preeminent Society for Clinical and Experimental Hypnosis (Christensen, 2005).

In the description of the pain treatment conditions (DePascalis, Cacace, and Massicolle, 2004), the authors reported they used a NRS-sensory scale, provided the citation for the measurement, and described the measurement, but did not report the reliability, validity, or reasoning behind using this particular scale. The use of this scale can be questioned because of other research (Hilgard & Hilgard, 1994) which provides evidence that limiting responses to painful stimuli to a 10 point scale results in a non-linear scale. It is psychometrically sounder when an open ended scale of measurement for pain ratings is used (Hilgard & Hilgard, 1994). Another issue is the author's description of the treatment conditions. In hypnosis research, suggestions or directions used with participants need to be described in detail, often verbatim, for a study to be replicable. The authors failed to do this and the study could benefit if scripts for each condition were included in appendix format. These issues relate to the current study because it is very important to identify the type, nature, and details of the inductions and

suggestions given. In light of recent research on types of hypnosis inductions, using different types of inductions can affect outcome (Barabasz & Christensen, 2006). The current study aimed to build a foundation for future research on types of induction used.

The DePascalis and Cacace (2005) study proposed to examine the neural mechanisms underlying pain perception and the anti-nociceptive effects of mental imagery, more carefully. A number of limitations in the study need to be addressed. The authors used the NRS, a numerical rating scale, to collect participant's pain and distress ratings, but no reliability, validity, or rationale was provided. Based upon previous research findings, noted by Barabasz & Watkins (2005), it appears that the NRS creates a non-linear measurement due to limiting response to painful stimuli to a maximum of 10. An open-ended scale is more desirable and useful for pain ratings in pain studies (Barabasz & Watkins, 2005). Again, most importantly, the lack of detail regarding the specific suggestions used in the different conditions makes replication difficult and complicates the study because differences in type of induction or instructions could also account for the results. In addition, hypnosis was not actually induced in the obstructive imagery condition, yet the authors used the hypnosis literature and previous obstructive imagery findings to provide a rationale for the current use of obstructive imagery. Such rationale allowed for the authors' assumption that hypnosis works as a modulator, but hypnosis was not formally induced. If the types of inductions were described in detail and hypnosis was inducted in the obstructive imagery condition, the author's argument would be even more highly supported.

De Pascalis, Bellusci, Gallo, and Magurano (2004) also investigated pain-reduction strategies in hypnotic context, which more similarly represents differing types of hypnosis inductions. Pain scores were reported by 10 low, 10 medium, and 10 highly hypnotizable participants (based upon mean scores of participants tested as a larger sample in the DePascalis laboratory via the

Stanford Hypnotic Susceptibility Scale, Form C) who were holding a painful cold bottle in their left hand. Participants were exposed to pain reduction treatments while performing a secondary auditory target detection task. Three pain reduction treatments were administered within two conditions, (a) a hypnotic-context condition without a hypnotic induction and (b) after receiving a hypnotic induction, which constituted the hypnosis condition. The three pain treatments consisted of relaxation/no-analgesia suggestions, dissociative imagery suggestions, and focused analgesia suggestions. The hypnotic context condition consisted of participants being informed that they would engage in cognitive-attentional strategies that are "hypnotic in nature and effective at reducing pain" (p. 348). The study found that focused analgesia produced the most pain reduction in high, but not medium or low, hypnotizable subjects. The findings were found to be consistent with the dissociated control model of hypnosis, which assumes that pain is effectively reduced by dissociated control and more high level cognitive resources remain available for execution of a secondary task. DePascalis et. al (2004) used scripted treatment suggestions in order to give identical suggestions to each participant. Although the authors briefly describe the treatments, e.g. types of suggestions, used they do not describe in detail the type of hypnosis inductions used. In light of recent research (Barabasz & Christensen, 2006), the type of hypnosis induction used is an important variable that affects research findings and clinical outcomes and, thereby, needs to be carefully described.

Lang and Rosen (2002) examined the cost of adjunctive self-hypnotic relaxation with sedation during outpatient interventional radiology procedures compared to standard intravenous conscious sedation and found that the use of hypnosis with sedation reduces cost. Seventy nine patients were randomly assigned to a group that used standard intravenous, conscious sedation and 82 patients were randomly assigned to a hypnosis group that had added self-hypnotic

relaxation to the standard sedation. Hypnosis was performed while the patient was preparing for the surgical procedure by four different providers and used a scripted hypnotic induction that last 5-10 minutes. Lang and Rosen (2002) use a decision tree to analyze the effects of additional changes to the surgical procedure, such as an additional hypnosis provider, room time and post procedure observation time, and the probability of over sedation during standard treatment. Overall, the authors found that the cost associated with standard sedation during procedures was $638 while sedation with adjunct hypnosis cost $300 (Lang & Rosen, 2002). They also found that hypnosis remained cost-effective even if it added an additional 58.2 minutes to the room time, that adjunct hypnosis actually reduced the amount of room time, and even if an additional person was added to the hypnosis condition cost savings would still be $290 for one person. Lang and Rosen's research (2002) has provided further evidence that hypnosis is effective for pain management and suggests that because of the reduced costs and time it may even be a preferable method of pain management.

Research on types of hypnotic inductions

Although there is a lack of research on the rationale for and effectiveness of audio recorded hypnosis sessions for the treatment of pain, studies using audio recorded inductions within their research design do exist. Field (1974) investigated the effects of tape recorded hypnotic preparation for surgery. The day prior to orthopedic surgery, 60 hospitalized patients were randomly assigned to an experimental or control condition and were individually interviewed. After the interview, each patient listened to a tape recording. The experimental condition patients listened to a 20-minute recording including suggestions of relaxation, sleep, eye closure, comfort, freedom from pain during and after the operation, quick recovery, and confidence as well as simple descriptions of the procedures of the operation. Yet, the researchers

did not measure hypnotizability, either to assist in identifying if hypnosis was actually induced or determine if there were hypnotizability differences between the experimental and control condition. The control condition participants heard a 15 minute description of hospital related information, including facilities and therapies available at the hospital. All patients received chemical anesthesia and preoperative medication; they were also interviewed again, between two to seven days after the operation, and were asked questions relating to their reactions to the use of the tape. No significant differences were found between the experimental and control condition; more easily relaxed patients were less nervous during the operation and recovered faster, but these findings could not be attributed to the differences between the hypnotic and control recordings. Since no evidence exists as to whether hypnosis was actually induced and there was no assessment of hypnotizability the findings are not surprising. While only one of the thirty patients in the control group felt that the control tape helped them during the operation, seventeen of the thirty patients in the experimental group mentioned one or more features of the tape recording that had been helpful during the surgery. The authors note that the individual differences in response to the tape recordings suggest that individualized (i.e. tailored) hypnosis with select patients will have significant advantages over "blanket preparation of all patients" (Field, 1974, p. 59)

Hart (1980) investigated the efficacy and utility of an audio recorded hypnotic induction treatment on the recovery of open heart surgery patients (N=40). The audio recorded hypnosis induction procedure was designed to preoperatively prepare patients for surgery and consisted of a twenty minute audio recorded hypnotic treatment that included suggestions of relaxation, quick recovery, and visual imagery describing a successful post surgical recovery. To determine the effectiveness of the hypnosis treatment, assessment was performed on "(a) relaxation ratings

measured by daily sphygmomanometer recordings of diastolic and systolic blood pressure; (b) recovery ratings measured by the total units of blood required by each [participant] postoperatively; (c) state and trait anxiety ratings measured by the State-Trait Anxiety Inventory (STAI) postoperatively…; and (d) patient locus of control ratings measured by [locus of control] IPC Scales (Levenson, 1972) postoperatively" (p. 325-326). The control participants received limited, general verbal and written information from the nursing staff upon arrival at the hospital; the information included orientation information, surgical information, and discharge plans. The experimental condition (tape recorded hypnotic induction) participants received the same limited, general verbal and written information as well as additional introductory comments that stated, "This treatment has been prescribed by your cardiologist and heart surgeon to promote your relaxation and facilitate a faster recovery following your surgery. This treatment has had numerous cases of success, so please listen closely to the tape-recording and follow the instructions carefully" (p. 326).

Following the introductory comments, a nurse instructed the patient on how to operate a tape-recorder, assisted the patient in adjusting the headphones, tilted the bed slightly forward, asked the patient to remain as quiet ands motionless as possible while listening to the relaxation tape recording, dimmed the lights, and left the room (Hart, 1980). Each participant in the experimental condition received a total of five spaced pre-operative tape-recorded hypnosis sessions (two sessions on first day at the hospital and three sessions on the second day, the day prior to surgery). The first audio recorded session consisted of a 10-minute introduction to the benefits of hypnotic relaxation and a 20-minute hypnotic induction, as described above. The other four sessions used the 20-minute hypnotic induction alone. The participants in the control group received no treatment prior to or following surgery. Post surgical assessment was

performed, using the procedures described above, by the nurse on duty that was blind to the nature of the study and patient assignment to control or experimental conditions.

The results of Hart's study (1980) showed that only diastolic blood pressure was found to be statistically different between conditions over the first three days of hospitalization; the experimental group showed lower average blood pressure (approximately 74, 75, 77 for the first three days respectively) as compared to the control group (approximately 80, 79, and 79 for the first three days respectively). The experimental group also showed a lower volume of blood required post surgically for patients who used the hypnosis tapes and they reported significantly less transitory emotional states (anxiety) compared to the control group. Hart noted that because hypnotizability was not assessed in this study it was not possible to determine between the effects of relaxation and hypnosis on surgical recovery. It is important to note that, again, there is no way to determine if hypnosis was actually induced. Hart called for more controlled research to further investigate the effectiveness of audio recorded hypnosis inductions for surgery and post surgical recovery. The study lacks a rationale for the use of hypnosis tapes in general and demonstrates that it is important to conduct carefully controlled research in order to determine the effectiveness of hypnosis tapes and audio recorded inductions. Based upon his findings and recommendations, it may be important to look at the use of audio recorded hypnosis inductions experimentally, rather than within clinical situations, first in order to provide a rationale for the use of audio recorded hypnosis inductions within clinical settings. The current study aimed to address such limitations and examined the effectiveness of audio recorded hypnosis inductions compared to live hypnosis inductions in order to determine if a rationale for the use of audio recorded hypnosis inductions exists.

Enqvist, von Konow, and Bystedt (1995) examined pre-and perioperative suggestion on surgical recovery, blood loss, and blood pressure in maxillofacial surgical patients (N=60), where the upper and lower jaws are surgically moved to new positions on the face. The study attempted to investigate (a) if preoperative hypnotherapy can improve recovery and influence bleeding, heart rate, and blood pressure during surgery (performed under general anesthesia), (b) if direct therapeutic suggestions given during anesthesia can also influence these factors, and (c) if the combination of both preoperative hypnotherapy and suggestions given under anesthesia can increase beneficial responses. Eighteen patients were administered a hypnosis tape containing only preoperative therapeutic suggestions (group A), eighteen patients were administered hypnosis tapes with pre-and postoperative therapeutic suggestions (group B), and 24 patients were administered a hypnosis tape containing only perioperative suggestions (group C). A control group of 60 patients who were operated on during the same period and by the same surgeon were used as a comparison group. Two weeks before surgery patients in Groups A and B were instructed to listen to an audio recorded hypnotic induction once or twice daily. The audio recorded induction was followed by "direct and indirect suggestions, metaphors, and so on directed at improved healing, less bleeding, and faster recovery" (p. 287), as well as suggestions aimed at keeping blood pressure low during the surgery and instructions in self-hypnosis and relaxation. The audio recording was a total of seventeen minutes. Patients in Group B also listened to an additional audio recording during the operation while under anesthesia, which included suggestions similar to the preoperative audio recording as well as assurances that the surgery and anesthesia were well controlled. Patients in Group C listened to the anesthesia audio recording only. Data relating to blood pressure, amount of blood loss, duration of surgery, heart rate, fever, consumption of analgesic drugs, and postoperative days in hospital were obtained

from the case notes in the patients' files. In addition, to determine if a connection between hypnotizability and somatic response existed, 19 patients from Groups A and B (considered to be high bleeders and low bleeders) were tested with the Stanford Hypnotic Susceptibility Scale (SHSS: Form C; Weitzenhoffer & Hilgard, 1962).

The results of the Enqvist, von Konow, and Bystedt (1995) study demonstrated that no differences were found among Groups A, B, and C and control groups on preoperative blood pressure or duration of surgery and no conclusions could be made based upon patients SHSS:C scores. Preoperative hypnosis was associated with reduction of blood loss (Groups A and B), perioperative blood pressure was reduced when preoperative hypnosis was combined with perioperative suggestion (Group B), and perioperative suggestion only (Group C) was also associated with reduction of perioperative blood pressure. One of the main limitations of the study is the issue of whether hypnosis was actually experienced. The authors note that several questions relating to the study cannot be answered, including whether the effects were due to a general relaxation response and what the role of specific hypnotic suggestions were. To further determine the effectiveness of hypnosis with surgical patients the methods of the studies need to be carefully controlled and the types of inductions and hypnotic suggestions given need to be considered and described in detail.

Enqvist and Fischer (1997) evaluated the effects of preoperative hypnosis used by patients undergoing surgical removal of third mandibular molars to reduce preoperative stress and improve healing and rehabilitation. Patients were first examined three weeks before surgery and were randomly assigned to either an experimental (hypnosis) condition (N = 33) or a control condition (N = 36) by use of an envelope technique. The experimental group received an envelope with information, protocols, and the audio recorded hypnosis tape; the envelope given

to the control was exactly the same except it did not include the hypnosis tape. The audio recorded hypnosis induction and suggestions included:

> 1. A hypnotic relaxation induction, which guided the patients to experience mental and physical relaxation. 2. Suggestions to find a safe place or state. 3. Suggestions to enhance what the body already knows regarding control of bleeding, coagulation, and healing. 4. Instructions regarding how dissociation and direct suggestion can alleviate pain. 5. Instructions regarding how to choose a personal way to access the relaxed state by means of breath control, by calming words, or pictures, or by combinations of what the patient prefers. 6. A training segment occurred after coming back from the trance state. The patient was asked to choose his or her "own model" and try this for 120 seconds until soft music indicated that the patients could return to their usual state of mind. (Enqvist & Fischer, 1997, p. 104)

Although the authors provide this description of the audio recorded hypnosis induction and suggestions, the exact wording, induction, and suggestions are still not clear. It was recommended that the patients in the experimental group listen to the hypnosis tape daily during the week prior to surgery. They were given the hypnotherapist's phone number in case of unexpected reactions. The researchers collected data using a visual analogue scale (VAS) on the initial examination day and the day of surgery, surgeon observations, and patient self-reports of the use of the hypnosis tape (via mail postoperatively). A detailed description of the VAS is not provided, but appears to have been used to assess anxiety (worst possible to very calm), prior experiences with anesthesia (very negative to very positive), well-being (very good to very bad), pain (no pain to worst possible pain), opinion of the effectiveness of the audiotape (negatively influenced to positively influenced), and appreciation of the audiotape (did not like at all to liked very much). The results of the study demonstrated that preoperative anxiety in the control group increased significantly from baseline to the day of the surgery, whereas the hypnosis group's preoperative anxiety remained at baseline. In addition, the postoperative consumption of

analgesic drugs (on postoperative days one through five) was significantly lower for the hypnosis group compared to the control group even though pain ratings did not differ between the groups. Only three percent of the experimental group consumed three or more doses of analgesics, while twenty-eight percent of the control group consumed three or more doses of equipotent analgesic drugs. The authors noted that the pain experiences did not differ between the conditions, but do not report the pain ratings of participants or means for each condition. The patients in the experimental group reported listening to the hypnosis tape at least 3 times ((M = 5.5), but the authors also noted that it was not possible to measure hypnotizability or how often participants used the self-hypnosis suggestions. The main limitation of the Enqvist and Fischer (1997) study is that there is no way to know if hypnosis was actually the cause of reduced anxiety and analgesic use. The authors note that the proposed techniques for stress reduction could have been used by the patients on a cognitive level, independent of a hypnotic state, but based upon the design of the study there is no way to determine if the findings resulted from hypnosis. Future research needs to assess hypnotizability, assess level of hypnotic depth, use carefully controlled methods, and describe in detail all induction procedures. The current study attempted to address these limitations.

Another study used audio recordings to administer hypnosis for surgery. Enqvist, Bjorklund, Engman and Jakobsson (1997) investigated the use of preoperative hypnosis and mental preparation, by use of an audio recording, for postoperative nausea and vomiting (PONV) before elective breast reduction surgery. Fifty women were randomly assigned to either a control group (N=25) or hypnosis group (N=25) prior to admission for elective breast reduction surgery. The hypnosis group was given a hypnosis tape with instructions six to eight days before surgery; it was recommended to listen to the tape daily. The hypnosis tape was twenty minutes long and

started with a relaxation induction, followed by "guidance into mental and physical relaxation" (p. 1029). Suggestions were given which were incompatible with nausea and vomiting, "e.g. that a feeling of hunger or thirst was not consistent with nausea or vomiting" (p. 1029). Instructions were also given on how to dissociate from pain and how to use self-hypnosis or relaxation to reduce stress, anxiety, and pain and at the end of the tape the patients were asked to use their own model to return to a relaxed state. The researchers assessed PONV and medication usage from the ICU during the first 24 hours post surgery; nausea was rated on a ten degree VAS, from worst possible feeling to feeling OK and vomiting was registered by the ICU staff and afterward by the patient through use of a questionnaire. Preoperative hypnosis, for the hypnosis group, resulted in significantly less vomiting and nausea postoperatively as well as a reduction in consumption of analgesic drugs postoperatively as compared to the control group. Once again, the main limitation of the study is that it is unknown whether or not hypnosis was actually induced and there is no way to distinguish whether the findings are due to relaxation or hypnosis. The authors also note that "further research is needed to evaluate whether a hypnosis tape is better than direct influence from the anesthetist, when the same or similar suggestions are given" (p. 1031). Again, future research needs to explicitly induce hypnosis, use carefully controlled methods, and describe in detail all induction procedures. The current study assessed hypnotizability and level of hypnotic depth, used an established, controlled methodological design, and provided detailed procedures, including verbatim description of inductions and suggestions used.

Ghoneim, Block, Sarasin, Davis, and Marchman (2000) examined the usefulness of audio recorded hypnosis instructions on perioperative outcome in patients scheduled for third molar surgery. Sixty patients who were scheduled for third molar surgery were randomly assigned to

either an experimental/hypnosis group (N = 30) or a control group (N =30). The experimental group received an audio tape that contained a "hypnotic relaxation-induction in which patients were guided to mental and physical relaxation; suggestions to find a tranquil state of mind; suggestions to enhance the body's mechanisms for control of bleeding and healing; and instructions on how direct suggestions can alleviate pain and enhance well-being" (p. 64-65). The hypnosis group was instructed to listen to the tape every day for one week prior to surgery, including the morning of the surgery, and the control group was not given any tape. Anxiety was assessed using Spielberger's State-Trait Anxiety Inventory (STAI) and nausea and pain were measured by use of a VAS that was anchored by verbal descriptors of "no nausea" and "very nauseous" as well as "no pain" and "worst pain imaginable" (p. 65). The surgeon recorded the ease of surgery on a VAS anchored by the descriptors "easy" and "most difficult" (p. 65), blood pressure and heart rate were measured, and the number of analgesic pills used by patients were reported and confirmed by a pill count. Vomiting incidences were reported by the patients and complications were reported by the surgeon. The researchers found that a significant difference existed between groups only on the preoperative STAI measure; the hypnosis group had significantly less anxiety as compared to the control group right before surgery. The authors note that information related to whether or not the patients were actually experiencing hypnosis while listening to the tape is non-existent and, therefore, this needs to be explored in further studies. Ghoneim et. al. (2000) discuss how their data show that audio recorded hypnosis inductions, "an easy, cost-effective method" can reduce preoperative anxiety, but state that "the value of the tape-recorded hypnosis instructions as administered in this study is questionable" (p. 67). Therefore, future research needs to explicitly induce hypnosis, use carefully controlled methods, and describe in detail all induction procedures. The current study aimed to address this lack of

consistently, carefully, controlled research on the use and effectiveness of audio recorded hypnotic inductions.

Ginandes, Brooks, Sando, Jones, and Aker (2003) examined whether medical hypnosis can accelerate post-surgical wound healing; they compared the effectiveness of an adjunctive hypnotic intervention, supportive attention, and usual care on early post-surgical wound healing. Eighteen women who were scheduled to undergo reduction mammaplasty at a private plastic surgery office were randomly assigned to usual care only, usual care plus supportive attention, or usual care plus hypnosis. The supportive care and hypnosis groups received eight weekly, thirty minute individual sessions that started two weeks prior to having surgery and continued for six weeks post surgery. The hypnosis group was provided with identical audiotapes containing the week's hypnotic suggestions during each session in order to practice hypnosis at home. The hypnotic suggestions "targeted decreased inflammation, visible soft tissue wound repair, and accelerated tissue remodeling" (Ginandes et. al, 2003, p. 337) and also included psychological suggestions for increased comfort and a sense of well-being. The researchers also assessed hypnotizability using the Hypnotic Induction Profile (HIP). The supportive care sessions paralleled the hypnosis sessions, but focused on open-ended questions and discussion of thoughts and feelings about the surgery. Medical personnel, the study nurse and three collaborating surgeons, assessed wound healing at one week and seven weeks post surgery using the Wound Assessment Inventory (WAI); participants also provided self ratings of wound healing at one and six weeks post surgery. In addition, participants completed a self report questionnaire that was used as a measure of subjective impressions of general health. The hypnosis group participants hypnotizability scores feel into the mid range of hypnotizability (M=6.5) with thirty three percent categorized as high, fifty percent as medium, and seventeen percent as low.

The results of the study (Ginandes et. al, 2003) showed that the hypnosis group showed more healing than the usual care (control) group and scored lowest on the WAI, which demonstrates the most healing over time. The usual care control group showed the smallest amount of healing with the highest WAI scores. The groups differed at both one and seven weeks, with the hypnosis group healing more than the control group. In addition, the hypnosis group reported that they healed the most, based upon self-report assessment of wound healing, followed by the supportive attention group and then the usual care group. Overall, Ginandes et. al (2003) demonstrated that the addition of hypnosis was associated with faster wound healing. The study would further support hypnosis as an adjunctive treatment, and shed light on the effectiveness of audio-recorded hypnosis, if the authors provided detailed information on how often the at home hypnosis tape was used and detailed descriptions of the inductions and suggestions used. The current study aimed to provide such information in order to determine the effectiveness of audio-recorded versus live hypnotic induction.

Johnson and Wiese (1979) were some of the first authors to specifically examine live versus audio recorded hypnosis inductions. They reported that prior research (Ulett, Akpinar, and Itil, 1971) studied whether there were differences in hypnotic depth for live versus audio recorded and showed that few differences existed between live and audio recorded hypnosis inductions used in experimental procedures. Therefore, Johnson and Weise (1979) researched the effectiveness of live versus audio recorded hypnosis for generating hypnotic responsiveness. The authors compared hypnotic responsiveness of patients who had been hospitalized for pain and physical rehabilitation issues with the administration of the Stanford Hypnotic Clinical Scale (SHCS) (Hilgard and Hilgard, 1975). Forty two inpatients volunteered for participation; 17 participants were experiencing back pain, five had other primary pain problems, and eight were

experiencing pain as a secondary problem. Prior to the first session ,“rapport for hypnosis was established through comments designed to allay any worries about hypnosis and the specific procedures to be used” (Johnson and Wiese, 1979, p. 76). Experimenters informed the patients that the test might lead to using hypnosis for pain management, but this was not promised and they were told this was not the main purpose of their participation in the study.

Therefore, it is important to note that this study (Johnson and Wiese, 1979) was not actually testing live or audio recorded hypnosis for pain management; it was only determining whether live versus audio recorded hypnosis resulted in differing levels of hypnotic responsiveness, as assessed through the SHCS. 30 patients received and completed the administration of the live and audio recorded SHCS in individual sessions in a counterbalanced order. Participants received a score of zero to five on the SHCS, determining their level of hypnotic responsiveness or hypnotizability, which was the dependent measure. A t-test was performed to compare the effects of the live versus audio recorded SHCS. Results showed that participants achieved higher SHCS scores, denoting higher hypnotizability, with live hypnosis as compared to audio recorded hypnosis. Participant’s mean SHCS scores for live hypnosis were 1.77 and 1.33 for audio recorded hypnosis. The authors also reported that differences between live and audio recorded hypnosis were not found for those scoring low on the SHCS, but differences in SHCS scores did exist for those scoring into the medium and high groups. The findings showed that participants who scored in the high range on the SHCS scored higher with live hypnosis (M = 4.60) as compared to audio recorded hypnosis (M = 2.60). Participants scoring in the medium range on the SHCS also scored higher with live hypnosis (M = 2.50) as compared to audio recorded hypnosis (M = 1.88).

The results of the study (Johnson and Weise, 1979) also demonstrated that there was a larger difference in SHCS scores when live hypnosis was presented prior to audio recorded hypnosis, as compared to when audio recorded hypnosis was presented prior to live hypnosis. It was noted that, "the live induction may be superior to the [audio]-recorded induction when presented before rather than after it" (Johnson and Wiese, 1979, p. 76). The authors also discussed how it can not be assumed that live and audio recorded hypnosis are similar and therefore audio recorded hypnosis may not be an adequate substitute in research with clinical populations. The current study aimed to build on such research by testing live and audio recorded hypnosis inductions specifically for pain management in order to determine if differences exist between these types of inductions. Previous research, such as the Johnson and Wiese (1979) study, failed to employ stringent controls. Therefore, the current study also attempted to produce powerful results through the use of uniform pain procedures, a uniform pain scale, and an experimentally controlled design.

More recent research has also investigated different types of hypnotic inductions in order to determine the effectiveness of differing types of hypnotic inductions. Barabasz and Christensen (2006) investigated the effects of tailored versus scripted hypnotic inductions on an age regression task. The authors noted that it is important to view hypnosis from the experience of the patient or participant to facilitate a true hypnotic response, which corresponds to the need to tailor an individual's pain treatment with hypnosis. The 2006 study is based upon previous research findings including, for example, Barabasz et. al (1986), which demonstrated that the people who had individualized treatments conducted by psychologists and psychiatrists with several years of experience using hypnosis showed results that were significantly better than

participants who received manualized (scripted) hypnotic inductions conducted by clinical psychology interns with minimal training in hypnosis.

Barabasz and Christensen (2006) experimentally tested the differences in tailored and scripted inductions. Twenty participants from a university community sample were debunked about hypnosis, assessed for hypnotizability using the Stanford Hypnotic Clinical Scale (SHCS), and assigned to either the tailored induction group or the scripted induction group. The researchers did not use a control group. The age regression induction for the scripted induction group consisted of the standard induction from the SHCS read verbatim with instructions for the participant to return to age five. Then Strang's test (Dodd & Strang, 1966) was administered and participants were asked to point to which picture (using the first two realistic figure items of the Strang test) was upside down and focal point dependency was measured. After the administration, participants were age progressed to their current age and then awakened from hypnosis using the instructions from the SHCS. For the tailored induction group the "induction type and manner of administration was opined on the basis of clinical experience and clinical intuition gained from observation of each individual participant during the debunking of false beliefs about hypnosis, reactions to pre-hypnotic induction experiences, and responses observed during the second author's administration of the [SHCS]" (p. 256). The authors reported that the induction types varied across the range of reported types described in the Barabasz and Watkins (2005) text. The authors describe the different types of inductions used with the tailored group, but did not elucidate how clinical experience allowed them to determine how to tailor the induction. In addition, to an initial tailored induction the participants were also led through the age regression induction in an individualized manner and were awaked from hypnosis using the SHCS procedure, but it was not read verbatim as it was with the scripted participants.

The results of the study showed that, although the two groups of participants did not differ significantly on their hypnotizability test scores, they did differ significantly on focal point dependency. The tailored induction group showed greater focal point dependency, which was characteristic of five year olds, as compared to the scripted induction group. The authors used tailored versus scripted inductions that included the age regression component as part of each induction; hence, the tailored induction included a tailored age regression component and the scripted induction included a scripted age regression component. A factor that could have influenced the results of the study, which were not accounted for or presented as a limitation, is the time of the age regression instructions. How long was the tailored age regression versus the scripted age regression and could this have affected the significant findings? The significantly high focal point dependency scores, revealing age specific regression for the tailored group, showed that the scripted group did not achieve as significant a hypnotic level of depth as did the tailored group due to induction type. The reasons underlying the difference could possibly be accounted for by other variables such as time of inductions and verbal and nonverbal cues from the researcher; the researchers did not include such a discussion of such limitations or other possible reasons that may have contributed to the results. The findings of Barabasz and Christensen's (2006) study are clearly important: the type of induction used in hypnosis is crucial. Such findings begin to provide a basis for different induction types being more or less effective. This suggests that more carefully controlled research on induction type is needed. The current study attempted to further investigate the effectiveness of differing types of hypnosis inductions.

In addition to the Barabasz and Christensen (2006) study, several other studies have used differing types of inductions, including audio recorded inductions, but none that specifically test

the effectiveness of audio recorded versus live inductions. Montgomery David, Winkel, Silverstein, and Bovbjerg (2002) performed a meta-analysis of published controlled studies that used adjunctive hypnosis with surgical patients to determine its effectiveness, which included an examination of induction type. The specific purpose of the meta-analysis was to determine "1) overall, whether hypnosis has a significant beneficial impact, 2) whether there are outcomes for which hypnosis is relatively more effective, and 3) whether the method of hypnotic induction (live versus audiotape) affects hypnosis efficacy" (p.1639). The authors identified studies from previous reviews of such literature and by a computer search of the Medline and PsychLIT databases during June 2001; they entered the search terms hypnosis and surgery, hypnosis and operation, hypnotherapy and surgery, and hypnotherapy and operation. The authors inclusion criteria consisted of "1) an explicitly defined hypnosis intervention that was administered to at least one group of subjects undergoing surgery, 2) the inclusion of a no-treatment, routine care, or attention control group in the study design, and 3) sufficient data (e.g. means, SD, and inferential statistics) were reported to allow calculation of effect sizes" (Montgomery et. al., p. 1640). The authors note that hypnosis was typically administered by using a relaxing induction phase with suggestions for control of side effects (e.g. pain, nausea, and distress) following the induction. Twenty-two effect sizes were calculated from 20 papers (3 effect sizes were calculated from one paper that included three hypnosis groups), which were based upon 1624 patients, and were calculated as the mean effect for each paper (except for the previously mentioned paper). A secondary analysis of differences between clinical outcome categories was performed on negative affect, pain, pain medication, physiological indicators, recovery, and treatment time.

The Montgomery et. al.(2002) meta-analysis determined that hypnosis significantly benefited surgical patients. Surgical patients in hypnosis groups had better outcomes compared

to 89 percent of control group patients, but no significant differences were found between methods of the types of induction used (live versus audio recorded). Within the sample of studies 14 of the hypnosis inductions were inducted by "live administration by a health care professional" (p. 1641), whereas 6 of the studies (including a total of 8 interventions) used only audio recorded inductions. The authors did not examine in detail differences between live and taped hypnotic inductions and do not describe the inductions in any detail beyond live versus taped. They discussed the lack of research comparing live versus audio recorded hypnosis interventions and explain the lack of significant findings on type of induction as possibly being influenced by the variability among studies and the comparison of a small number of studies, but do not explain such variability. Montgomery et. al. (2002) state that "the more conservative interpretation of these data is that both audio recorded and live hypnosis interventions are effective, and the potential reduction in effect size because of audio recorded hypnosis is unknown at this time" (p. 1643). They call for more research to determine cost effectiveness and beneficial effects of audio recorded hypnosis interventions. The six studies that Montgomery et. al. (2002) reviewed (Enqvist et. al. 1997; Enqvist, von Konow, & Bystedt, 1995a, 1995b; Field, 1974; Ghoneim et. al., 2000; Hart, 1980) represent a large portion of the research studies that have used audio recorded hypnosis inductions, but none have examined live versus audio recorded inductions specifically.

Conclusion

The purpose of the current study was to address the lack of research related to the use of audio recorded hypnotic inductions for pain management. The lack of research on this topic is remarkable. The current research attempted to further inform pain researchers, clinicians, and physicians who are involved in the research and management of pain as well as to direct future

research and create a foundation of findings related to the use of audio recorded inductions and hypnosis sessions for pain management. In addition, many researchers and clinicians have argued for the importance of research to inform and affect the clinical treatment of pain; the current study attempted to provide such information. Use of audio recorded hypnotic inductions could potentially be a time-saving, cost-reducing treatment for both acute and chronic pain as well as assist in creating a standard protocol for pain research. On the basis of the literature the following hypotheses for the current study were generated:

1) Live hypnotic inductions would be significantly ($p<.05$) more effective than audio recorded inductions for the relief of experimentally induced pain.
2) Highly hypnotizable participants would show significantly lower pain scores than the low hypnotizables exposed to both audio recorded and live hypnotic inductions.

Chapter 3

Methodology

Participants

University community volunteers were recruited through classroom solicitation, campus flyers, and advertisements in the community. Participants were informed that the study involved hypnosis and the management of experimentally induced pain. Participants were further informed that they would be exposed to a mild pain stimulus, comprised of ischemic pain from a blood pressure cuff on their non-dominant upper arm. The participants were informed that the study had been approved by the Human Subjects Institutional Review Board (IRB), that they could withdraw from the study at any time with no explanation needed on their part, and they would be asked to review and sign a consent form. At the time of soliciting participation all participants were screened, through the experimenter's assessment of participants self report, in order to rule out possible health issues that may have served as a contra indicator for the administration of ischemic pain. Anyone with a history of severe psychological disorders (e.g. DSM IV-TR diagnosis) or medical contraindications, such as heart disease, high cholesterol, high blood pressure, and diabetes, as well as people currently taking pain medication, prescribed and/or recreational drugs, were ruled out by informing possible participants of the exclusion criteria and allowing them to de-select themselves at that time. Informed consent was obtained by all participants prior to engaging in any aspect of the study other than the provision of initial recruitment information and screening process. Participants first attended a group hypnosis screening that included debunking myths about hypnosis. If participants met study criteria they attended a second session in which individual hypnotizability was assessed, and if they again met study criteria they attended a third session in which the pain task was administered.

One hundred and seventy one individuals participated in the current study and were administered the HGSHS during the first session. Participants mean age was 23.67, SD = 6.82,

age ranged from 18 to 50 years old, and 73.1% of participants were female and 26.9% of participants were male. Participants self reported ethnicity consisted of the following: 85.96% Caucasian, 5.85% Asian American, 4.68% Latino/a, 2.34% African American and 1.17% Native American. Participants mean HGSHS score was 6.14, SD = 3.22. 125 individuals obtained a HGSHS score, either 5 and below (low hypnotizability) or 8 and higher (high hypnotizability) on the 12 point scale, to qualify for further participation in the study. Of the 125 participants who obtained HGSHS scores to qualify for the second part of the study, 84 participants chose to participate and the SHCS:C was administered to determine their hypnotizability score. 51 individuals qualified, by obtaining a SHCS:C score of either 3 and below (low hypnotizability) or 9 and higher (high hypnotizability), and participated in the final data collection consisting of the hypnosis induction, live versus audio, and the pain task. Therefore, 33 individuals did not meet hypnotizability criteria for further participation in the study after administration of the SHCS:C. During the pain administration task three participants dropped out of the data collection; two participants dropped out of the low/live condition and one participant dropped out of the low/audio recorded hypnosis condition. All three participants that chose to drop out of the study reported the experimentally induced pain as too painful during the pain administration task and asked to have the blood pressure cuff removed. These participants were not included in the final data analysis due to missing and incomplete data.

Therefore, 48 individuals participated in the final collection of data in which hypnosis was induced through live or audio recorded inductions and the experimental pain protocol was administered. Participants in the final data collection stage mean age was 25.6, SD = 7.98 , age ranged from 18 years old to 50 years old, and 25% of the participants were male and 75% of the participants were female. The final participant sample's self reported ethnicity was the

following: 89.58% Caucasian, 6.25% Asian American, 2.08% African American and 2.08% Native American. Additionally, there were 12 participants in each condition. Participants in the high hypnotizable and live hypnosis condition had a mean SHSS:C score of 9.67 (*SD* = 0.78), participants in the high hypnotizable and audio recorded hypnosis condition had a mean SHSS:C score of 9.5 (*SD* = 0.80), participants in the low hypnotizable and live hypnosis condition had a mean SHSS:C score of 1.42 (*SD* = 1.07), and participants in the low hypnotizable and audio recorded hypnosis condition had a mean score of 1.67 (*SD* = 1.16).

Experimenters

This investigator served as the primary experimenter and had a graduate course providing 60 hours of training in hypnosis, theory, research, and hypnosis techniques. The primary experimenter ran the participants through the initial screening, the assessment of hypnotizability with the Harvard Group Scale of Hypnotic Susceptibility, Form A (SGSHS:A) (Shor & Orne, 1963), the Stanford Hypnotic Susceptibility Scale: Form C (SHSS:C) (Weitzenhoffer & Hilgard, 1962), and the pain task. An assistant experimenter, a doctoral level psychologist, was present during the administration of the HGSHS:A (see procedure below); the primary experimenter provided training for the assistant experimenter related to hypnosis, including necessary information and duties to be performed, in order to assist the primary experimenter during the group assessment of hypnotizability.

Instruments

The Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) (Shor & Orne, 1962) is an adaptation of the Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer & Hilgard, 1959) for group administration. It can be administered to groups of unlimited size and uses self report scoring. The HGSHS:A includes a traditional relaxation induction and 12 items,

which characterize hypnotized individuals. It was standardized on 132 undergraduate students in the Boston area who volunteered to participate in studies involving hypnosis and the scale was administered in groups of five to forty individuals (Shor & Orne, 1963). Hypnotizability measured by the HGSHS:A has a reliability of r=0.80 and a validity of r=0.74 (Shor & Orne, 1963). Findings demonstrate that norms derived from the HGSHS:A are congruent with norms from the individually administered scale (SHSS:A). The test is one of the most widely used scales in hypnosis research and provides an easy method of obtaining low and high hypnotizables (Barabasz & Watkins, 2005) as well as determining the most prominent candidates for hypnotic training (Shor & Orne, 1963).

The SHSS:C (Weitzenhoffer & Hilgard, 1962) has 12 items associated with a hypnotized person. The scale was standardized on a sample of 102 female and 101 male undergraduate students and hypnotizability, as measured by the SHSS:C, has a test-retest reliability of r=0.83, internal consistency reliability of 0.85, and a high face validity (Hilgard, 1965). The SHSS:C includes comprehensive pretest instructions that assist in maximizing development of rapport, alleviating anxiety about the test, and maximizing the probability of obtaining an accurate measure. Different speeds of participant's responses to the induction are taken into account through a lengthy set of eye closure induction procedures. The SHSS:C test items include hand lowering, moving hands apart, mosquito hallucination, taste hallucination, arm rigidity, dream, age regression, immobilization of the right arm, anosmia to ammonia, hallucinated voice, negative visual hallucination, and posthypnotic amnesia (Weitzenhoffer & Hilgard, 1962). The SHSS:C was designed to increase the variety of hypnotic experiences assessed by the test in comparison to the previously used Stanford Hypnotic Susceptibility Scale, Form A. During the administration of the scale the experimenter reads out loud the induction (which is not part of the

scoring system and therefore can be administered differently) and suggestions, while evaluating participant's responses to each subtest item of the scale. Each item is scored with either a 1 or 0 and the individual scores are added up to determine a person's total hypnotizability score, ranging from a possible 0 to 12. The SHSS:C has difficult items, which requires higher levels of performance, and is also one of the most widely used scales in hypnosis research (Barabasz & Watkins, 2005). The SHSS:C is considered by many researchers to be the best assessment tool for hypnotizability (Sanchez-Armass & Barabasz, 2006; Sanchez-Armass, Barabasz, & Barabasz, 2007).

Pain report scale

A standard assessment of reported experience of pain was used (Hilgard & Hilgard, 1994) in which participants rated their pain, every 5 seconds for 90 seconds, on a scale of 1-10 and then are asked to keep reporting after 10. It has become a widely used method of assessment of pain in hypnosis research (Barabasz & Watkins, 2005). In the current study, the pain report scale was administered directly after ischemic pain was experimentally induced (see procedure below). Every 5 seconds participants were asked to rate their pain on a numerical scale, where 0 represented no pain to a rating of 10 as a critical or anchoring value where the participant would very much like to remove the painful stimulus (Hilgard & Hilgard, 1994). Participants can tolerate more pain than what is reached at 10. Participants were asked to keep reporting past 10 and they continued to count (Hilgard & Hilgard, 1994). This provided psychometrically sound, linear data in comparison to a scale that only uses a 1-10 report because of such a scale's non-linearity. Therefore, an open ended 1-10 scale in which the participants can continue to report past 10 is psychometrically advantageous and thus was the preferred method of assessing pain (Barabasz & Watkins, 2005). Hilgard and Hilgard (1994) note that there are many sources of

evidence that have found that the use of this simple numerical scale provides a dependable measure of felt pain.

Apparatus

The current study administered ischemic pain, through the use of a sub maximal effort tourniquet technique as employed by the Stanford Laboratory of Hypnosis Research (Hilgard & Hilgard, 1994) and several other researchers (Barabasz & Barabasz, 1989; Barabasz & Watkins, 2005). A standard sphygmomanometer (blood pressure cuff) and a Techex hand dynamometer were used.

Procedure

After participants were recruited they were scheduled by the experimenter to attend an initial group screening where they signed the consent form, were provided with information regarding the purpose of the study, and the experimenter debunked myths about hypnosis and answered participant's questions. Participants were then assessed for level of hypnotizability using the HGSHS:A within small groups of people. The principle experimenter and an assistant experimenter were present during the administration of the group scale for safety reasons; an assistant experimenter assisted in debriefing participants who choose to withdraw during administration so there was no negative sequela. No participant chose to withdraw during the group screening and no participant reported negative sequelae; participants were also offered a counseling session if necessary, but no participant requested such as session. Participants who scored 5 or below on the group scale or 8 or higher on the group scale were then scheduled for an individual session with the principal investigator to assess hypnotizability using the more stringent SHSS:C. The principle experimenter explained that the participant would be administered an individual assessment of hypnotizability, which would determine if the participant qualified for participation in the pain task portion of the study. The experimenter then

administered the SHSS:C. After the experimenter determined the participant's hypnotizability score participants were grouped to a high versus low hypnotizability group. Highs were chosen based upon a SHSS:C score of 9 or higher while the lows were chosen based upon a score of 3 or lower; all other participants (not highs or lows) were then excluded from the rest of the study. At this point lows and highs were alternately assigned to the live versus audio-recorded conditions based upon their appointment and arrival to the study. Participants were then immediately led through the third session, including the live or audio recorded hypnosis induction, the pain task, and a post experimental inquiry, as described below.

In the third session, the experimenter initially reviewed the pain task and the pain reporting scale, which were both described in detail for the participant. The principle experimenter showed the participant a visual image of the pain reporting scale with 0 anchoring one end stating "no pain at all" and a 10 anchoring another end stating "you want the pain to stop" with the line continuing on to the right of the scale to depict the open ended nature of the scale visually. Participants were reminded they could withdraw from the study at any time. Participants were then exposed to the live or audio-recorded SHCS induction. Next, suggestions for numbing and pain relief were given. They included the following suggestions:

> First I want you to focus all your attention on your right hand. Notice your right hand, all the way from your fingers to your wrist, is becoming more comfortable and more relaxed… Now imagine that your right hand is becoming numb, starting with your fingertips. Your fingertips are becoming numb, possibly tingly at first….more and more relaxed….and numb and comfortable… And it's hard for you to notice any sensations in your fingers…. Your whole left hand is comfortably relaxed and the numb

> sensations begin to move up your hand… more and more numb….more and more numb… as if you applied numbing cream on your entire hand….And now the numb feelings are moving up your hand… up your wrist… to your forearm…more and more relaxed and numb…now to the top of the right lower arm and the bottom of the lower arm…as if the numbing cream protected your hand and your forearm from all outside elements so that you can no longer feel anything on your hand… more and more numb. Your fingers…your palm…the back of your hand…your wrist…your forearm….your entire right lower arm becoming more and more numb and pleasantly relaxed. Now, your whole hand, wrist, and lower arm area are completely relaxed and numb…Gradually the numbness is moving up your right arm…more and more relaxed and completely numb…and now it is at your elbow. Up from your lower arm, to above your elbow, still moving up your arm, all the way up your arm, toward your shoulder, your whole right arm becoming more and more numb. Your arm is becoming comfortably numb…all the way from your fingers to your wrist, to your elbow to your upper arm, comfortably and completely numb. Now your entire body is continuing to become more and more relaxed and more deeply hypnotized. Any stiffness is gone and your arm continues to be relaxed and completely numb, heavy and relaxed. Your whole body going deeper, down, down, down, more relaxed and pleasantly hypnotized. Your right arm more heavy, heavy, heavy, and numb.

Then the pain task was administered by the experimenter. Ischemic pain was induced using the submaximum tourniquet technique, which approximates the postoperative pain experienced by surgical patients and responds to chemical analgesics as does clinical pain. A standard

sphygmomanometer cuff (blood pressure cuff) was placed on the participant's non-dominant arm, which was inflated to 240mm/Hg, and the participants squeezed a hand dynamometer to a load of 8Kg for 20 squeezes. Pain reports were taken at 5 second intervals based upon the pain rating scale, as previously described (Hilgard & Hilgard, 1994), for a total of 90 seconds. The participants were asked to continue to report their level of pain past 10 in order to obtain further pain reports (Hilgard & Hilgard, 1994). The pain stimulus was then removed and the experimenter awoke the participant from hypnosis following the SHCS procedure, read verbatim. A post experimental inquiry was conducted, which asked participants the following questions: On a scale of 0 to 10 with 0 not being hypnotized at all and 10 being as hypnotized as possible, what number would you say represents how hypnotized you were, and any other important comments you feel is needed to explain your experience? At this time the participants were thanked for their participation and reminded that they could contact the researchers named on the informed consent form they received.

Design

Participants were alternatively assigned, based upon scheduling of the study, to one of the two treatment conditions: (a) live induction and (b) audio-recorded induction. Participants were administered the pain task following the hypnosis induction, live or audio recorded. Dependent measures of pain ratings were obtained during the administration of the pain task. The study employed a between groups (2 hypnotizability levels x 2 hypnosis induction conditions) design.

Chapter 4

Results

The data analyses were performed using Predictive Analytics SoftWare (PASW) 17, formerly known as Statistical Package for the Social Sciences (SPSS). Pain report data, collected over a period of 90 seconds at 5 second intervals, resulted in 18 individual pain reports. Since this study did not make any predictions related to the pain report data over time, the pain reports were added and a mean for each individual's pain report was determined. This resulted in an overall pain report for each participant. The overall pain report was used in the primary analysis in order to determine differences in pain reports for participants between conditions. Additional analyses were performed, which used pain reports from the thirty, sixty, and ninety second pain rating periods.

Hypotheses Tested

In order to test the hypotheses that live hypnotic inductions will be significantly ($p<.05$) more effective than audio recorded inductions for the relief of experimentally induced pain and that highly hypnotizable participants will show significantly lower pain scores than the low hypnotizables exposed to both audio recorded and live hypnotic inductions, A 2x2 ANOVA was conducted. Table 1 presents the means and standard deviations of the overall pain report results as a function of hypnosis induction type and hypnotizability.

Table 1

Overall Pain Report Results as a Function of Hypnosis Induction Type and Hypnotizability

	M	*SD*
Low		
Live	8.06	1.12
Audio recorded	8.68	1.11
High		
Live	2.89	1.13
Audio recorded	3.72	0.92

The results of the ANOVA indicated a significant main effect for hypnotizability, F (1, 44) = 268.40, p<.001 (Partial Eta Squared = .86) and hypnosis induction type (live versus audio recorded) F (1, 44) = 5.51, p<.05 (Partial Eta Squared = .11), yet no significant interaction was found between hypnotizability and hypnosis induction type, F (1, 44) = 0.12, p=.73 (Partial Eta Squared = .003). Therefore, the two main effects of the ANOVA were further examined to further elucidate findings related to the hypotheses. The significant main effect of hypnosis induction type, live versus audio recorded, supported hypothesis one, that live hypnotic inductions will be significantly (p<.05) more effective than audio recorded inductions for the relief of experimentally induced pain, and showed that participants in the live hypnosis induction condition reported significantly lower pain (M=5.48, SD = 2.86) than participants in the audio recorded hypnosis induction condition (M= 6.20, SD = 2.72). The significant main effect of hypnotizability supported hypothesis two, that highly hypnotizable participants will show significantly lower pain scores than the low hypnotizables exposed to both audio recorded and live hypnotic inductions. Participants who had high hypnotizability scores reported lower pain overall (M=3.31, SD = 1.09) than participants who had low hypnotizability scores (M=8.37, SD = 1.13). Figure 1 shows the significant main effects of hypnotizability and induction type. In addition, it demonstrates the findings that the group with the lowest pain reports overall was the high hypnotizables in the live hypnosis induction condition followed by the high hypnotizables in the audio recorded hypnosis induction condition. The pain reports were significantly higher in the low hypnotizables and within this condition the participants in the live condition had lower pain reports than participants in the audio recorded condition. Therefore a follow up test was performed in order to clarify such differences.

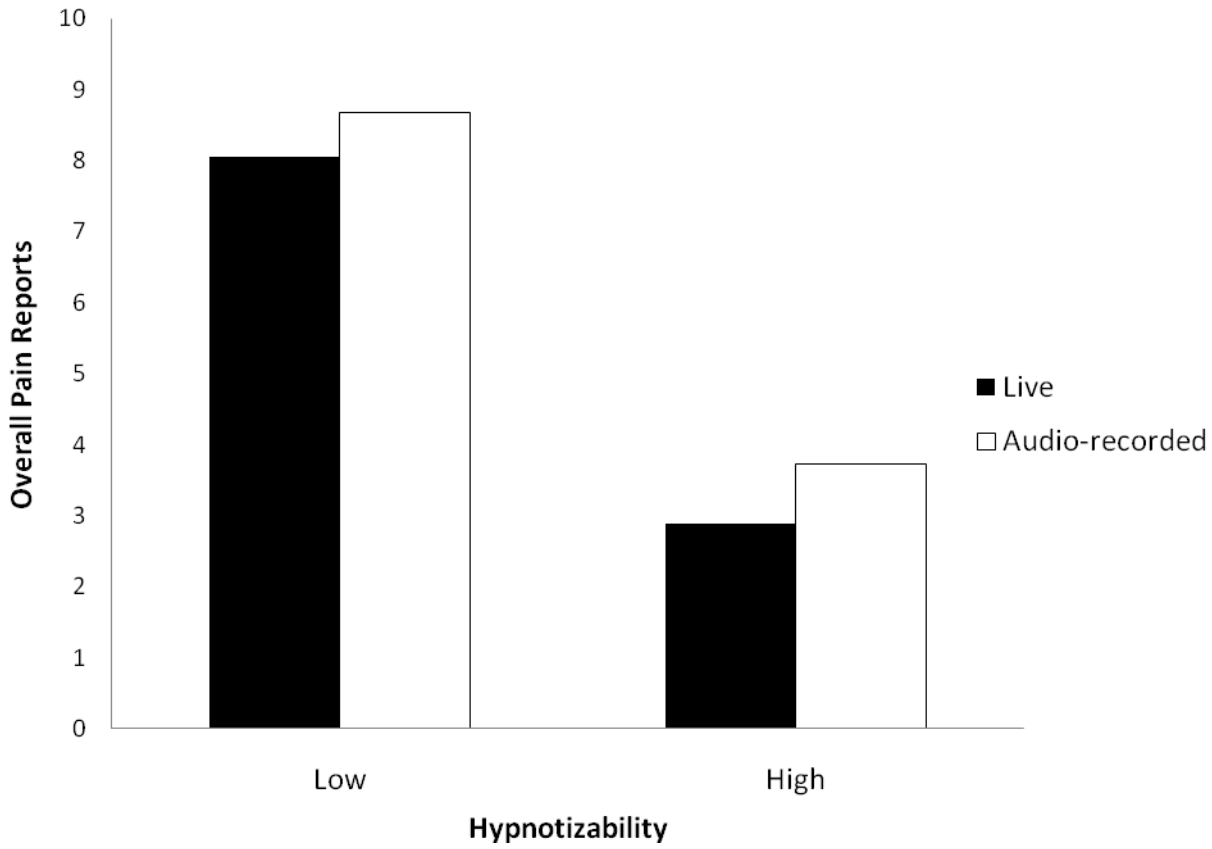

Figure 1. Differences in Means of Overall Pain Reports for Low Hypnotizables and High Hypnotizables in the Live and Audio Recorded Conditions

Analyses were also performed to determine if differences existed between conditions for participant's pain reports at the 30, 60, and 90 second pain reporting periods. A 2x2 ANOVA was performed for each pain reporting period. Figure 2 and Figure3 show the differences in means for hypnosis induction type and hypnotizability from these additional analyses. Figure 2 shows the mean pain reports for low and high hypnotizables at the 30, 60, and 90 second pain report time periods. Figure 3 shows the mean pain reports for hypnosis induction type, live versus audio recorded, at the 30, 60, and 90 second pain report time periods.

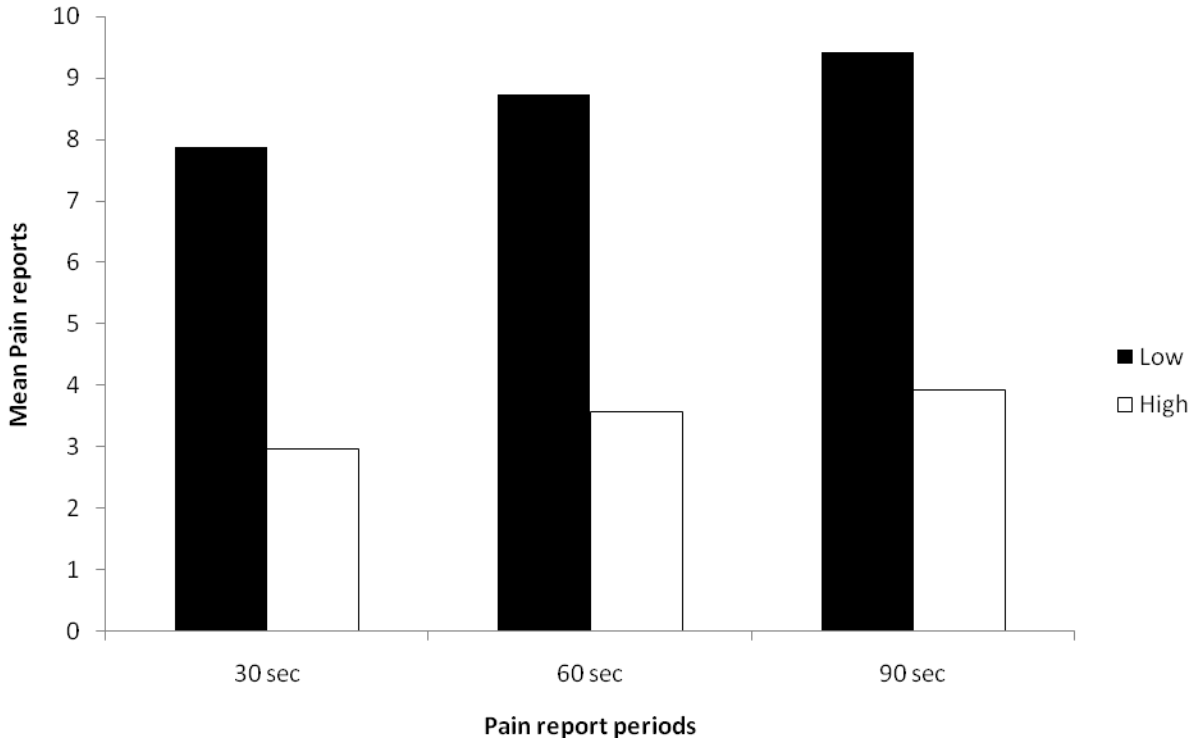

Figure 2. Differences in means of pain reports for low and high hypnotizables at the thirty, sixty, and ninety second pain reporting periods.

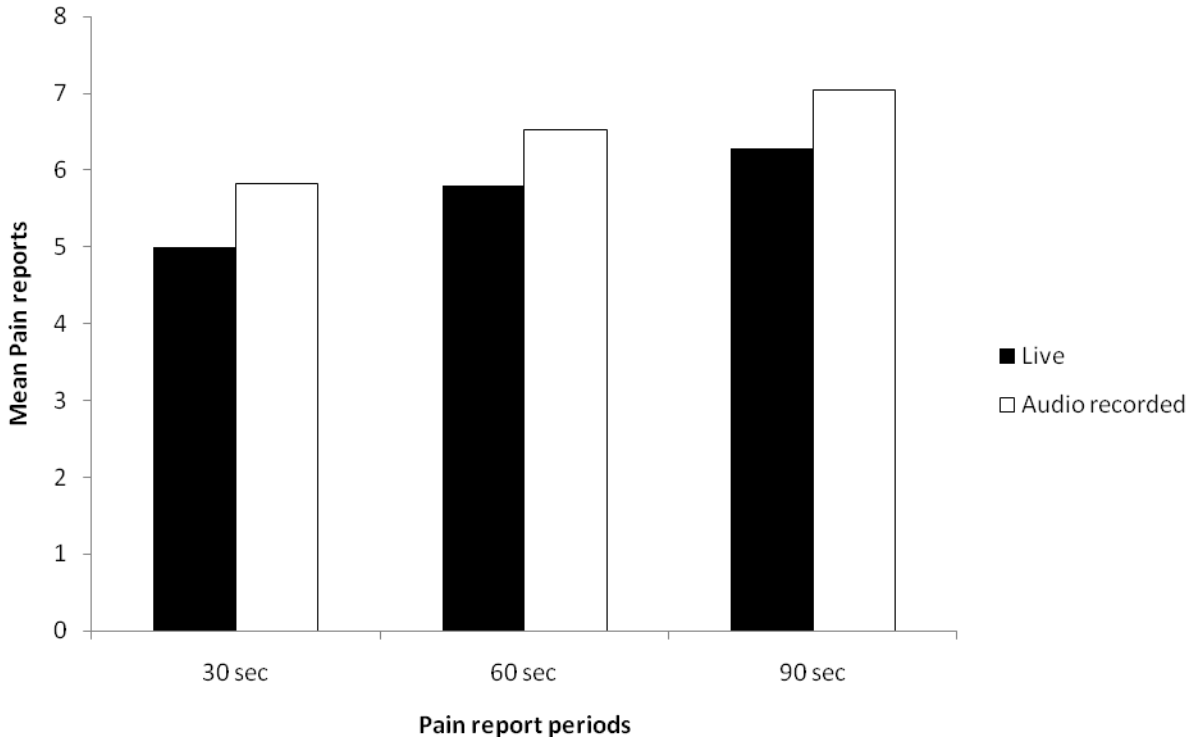

Figure 3. Differences in means of pain reports for live versus audio recorded inductions at the thirty, sixty, and ninety second pain reporting periods.

The results of the ANOVA for the 30 second time period indicated a significant main effect for hypnotizability, F (1, 44) = 259.60, p<.001 (Partial Eta Squared = .86) and hypnosis induction type (live versus audio recorded) F (1, 44) = 7.46, p<.01 (Partial Eta Squared = .15), yet no significant interaction was found between hypnotizability and hypnosis induction type, F (1, 44) = 0.12, p=.73 (Partial Eta Squared = .003). Therefore, the two main effects of the ANOVA for the 30 second time periods were further examined. The significant main effect of hypnosis induction type, live versus audio recorded, supported hypothesis one, that live hypnotic inductions were significantly (p<.05) more effective and resulted in lower pain reports (M=5.00, SD = 2.77) as compared to audio recorded hypnosis inductions (M= 5.83, SD = 2.66) at the 30 second pain reporting period. The significant main effect of hypnotizability supported hypothesis two, that highly hypnotizable participants would show significantly lower pain scores (M=2.96, SD = 1.12) than the low hypnotizables (M=7.88, SD = 1.12) exposed to both audio recorded and live hypnotic inductions.

The results of the ANOVA for the 60 second pain report period indicated a significant main effect for hypnotizability, F (1, 44) = 219.10, p<.001 (Partial Eta Squared = .83) and hypnosis induction type (live versus audio recorded) F (1, 44) = 4.40, p<.05 (Partial Eta Squared = .09), yet no significant interaction was found between hypnotizability and hypnosis induction type, F (1, 44) = 0.09, p=.77 (Partial Eta Squared = .002). Therefore, the two main effects of the ANOVA for the 60 second pain reporting period were further examined to further elucidate findings related to the hypotheses. The significant main effect of hypnosis induction type, live versus audio recorded, supported hypothesis one, that live hypnotic inductions were significantly (p<.05) more effective and resulted in lower pain reports (M=5.79, SD = 2.92) as compared to audio recorded hypnosis inductions (M= 6.52, SD = 2.84) at the 60 second pain reporting period.

The significant main effect of hypnotizability supported hypothesis two, that highly hypnotizable participants would show significantly lower pain scores (*M*=3.58, *SD* = 1.21) than the low hypnotizables (*M*=8.73, *SD* = 1.26) exposed to both audio recorded and live hypnotic inductions.

The results of the ANOVA for the 90 second pain reporting periods indicated a significant main effect for hypnotizability, F (1, 44) = 188.28, p<.001 (Partial Eta Squared = .81), yet no significant main effect was found for hypnosis induction type (live versus audio recorded) F (1, 44) = 3.50, p = .07 (Partial Eta Squared = .07) and no significant interaction was found between hypnotizability and hypnosis induction type, F (1, 44) = 0.04, p=.84 (Partial Eta Squared = .001). Therefore, the one main effect of the ANOVA at the 90 second pain reporting period was further examined. The significant main effect of hypnotizability supported hypothesis two, that highly hypnotizable participants will show significantly lower pain scores (*M*=3.92, *SD* = 1.32) than the low hypnotizables (*M*=9.42, *SD* = 1.50). The non significant effect of hypnosis induction type, live versus audio recorded, at the 90 second pain reporting period failed to support hypothesis one, that live hypnotic inductions would be significantly (p<.05) more effective than audio recorded inductions for the relief of experimentally induced pain. This finding demonstrated that at the 90 second pain report period participants in the live hypnosis induction condition reported similar levels of pain (*M*=6.30, *SD* = 3.21) than participants in the audio recorded hypnosis induction condition (*M*= 7.04, *SD* = 3.03). Therefore, additional analyses, two independent t-test's were performed, due to this finding being discrepant with the 30 second, 60 second, and overall pain report findings.

Additional Analyses

Due to the nature of the study and previous research that demonstrates that high hypnotizables gain significant more pain relief than low hypnotizables, additional analysis, an

independent samples t-test, was conducted in order to determine if differences between high hypnotizables pain reports existed between the live versus audio recorded induction conditions for the overall pain report. The test was significant, $t(22) = 1.97$, $p = .048$ and the findings were consistent with research hypothesis 1, predicting that live hypnotic inductions will be significantly more effective than audio recorded inductions for the relief of experimentally induced pain. The means and standard deviations for pain reports as a function of this factor are presented in the high hypnotizability condition within Table 1 (also graphically represented in Figure 1). The significant difference between the means of high hypnotizables between the hypnosis induction conditions, live versus audio recorded, showed that participants in the live hypnosis induction condition reported less pain overall (M=2.89, SD = 1.13) than participants in the audio recorded hypnosis induction condition (M= 3.72, 0.92). An independent samples t-test was also conducted in order to determine if differences between low hypnotizables pain reports existed between the live versus audio recorded induction conditions. The test was not significant, $t(22) = 1.36$, $p = .19$. Although predictions were made that hypothesized that live hypnotic inductions would be significantly ($p<.05$) more effective than audio recorded inductions for the relief of experimentally induced pain, it appears that this hypothesis was not supported for low hypnotizables. Therefore, results suggest that high hypnotizables report overall lower pain ratings with live hypnosis as compared to audio recorded hypnosis, yet the same finding does not hold true for low hypnotizables for the overall pain report.

An independent samples t-test was also conducted in order to determine if differences between high hypnotizables pain reports existed between the live versus audio recorded induction conditions at the 90 second pain reporting period. The test was not significant, $t(22) = 1.60$, $p = .12$. Therefore, high hypnotizables reported similar reductions in pain ratings within

both the live and audio recorded hypnosis inductions at the 90 second pain reporting period. Another independent sample t-test was conducted in order to determine if differences between low hypnotizables pain reports existed between the live versus audio recorded induction condition at the 90 second pain reporting period. The test was not significant, $t(22) = 1.10$, $p = .29$. Therefore, low hypnotizables also reported similar reductions in pain ratings within both the live and audio recorded hypnosis inductions at the 90 second pain reporting period.

In addition, due to many research studies not assessing participant's level of hypnotic depth, descriptive statistics were performed to determine low and high hypnotizables self reported level of hypnotic depth, as rated on a scale of 0 to 10 with 0 not being hypnotized at all and 10 being as hypnotized as possible. The descriptive statistics analysis showed that high hypnotizables self reported level of hypnotic depth was, $M = 8.79$, $SD = 1.06$, while low hypnotizables reported level of hypnotic depth was, $M = 1.54$, $SD = 1.10$.

Chapter 5

Discussion

Discussion

The results of this study build on previous research findings by further supporting the effectiveness of hypnosis for pain management and contributing to the literature on the effectiveness of different types of hypnosis inductions. The results supported our predictions that high hypnotizables would demonstrate lower pain reports as compared with low hypnotizables, which is consistent with the larger hypnosis and pain literature and which was originally demonstrated by Orne (1959). Within each pain reporting period analyzed, the thirty, sixty, and ninety second markers as well as the overall pain report, high hypnotizables reported significantly less pain than low hypnotizables. After 90 seconds of induced ischemic pain the high hypnotizables achieved 55 percent lower pain ratings as compared to the low hypnotizables, which offers further evidence that for individuals with high hypnotizability, hypnosis is a clinically significant means of managing pain.

Furthermore, the study demonstrated that live hypnosis is significantly better at pain management than audio recorded hypnosis, which supported hypothesis two, that live hypnotic inductions would be significantly more effective than audio recorded inductions for the relief of experimentally induced pain. Although audio recorded hypnosis inductions are still an adequate and effective treatment for pain management, it appears that live hypnosis inductions are significantly better at reducing individual's pain reports when experiencing experimentally induced ischemic pain. Participants in the live hypnosis condition reported almost ten percent lower pain reporting's overall as compared with participants in the audio recorded induction condition. Thus, the differences between live hypnosis and audio recorded hypnosis can be considered both statistically and clinically significant; a ten percent reduction in pain may contribute to an individual's increased quality of life and contribute to improved well being.

There was only one non significant result for the type of hypnosis induction, live versus audio recorded, at the ninety second pain reporting period, which failed to support hypothesis two. This finding demonstrated that at the ninety second pain report period participants in the live hypnosis induction condition reported similar levels of pain than participants in the audio recorded hypnosis induction condition, for both high and low hypnotizables. These findings are opposite of the significant effects in which live hypnosis resulted in lowered pain reports for participants within an overall pain report and at both the 30 second and 60 second pain reporting periods. Yet, the finding approached significance (p = .07). Therefore, it is possible that a larger sample size would have contributed to more clear and robust findings at this pain reporting period.

There are several important issues that likely contributed to the significant findings related to increased effectiveness of live hypnosis inductions. Based upon other research examining hypnotic induction types (Barabasz & Christensen, 2006; Johnson & Wiese, 1979) tailored and live hypnosis inductions have been found to be more effective at achieving significant hypnotic effecta. These findings support an individualized approach to inducing hypnosis. In contrast to audio recorded hypnosis inductions, even when using a scripted induction, as in the current study, live hypnosis includes important components that allow a greater ability to individualize the induction. Examples of such components are the following: voice inflections, tone and sound level, length and pace of the induction, and pauses made by the experimenter in response to observations of the participant. Live hypnosis inductions are able to be individualized to a person because of what the experimenter is observing in the participant. While audio recorded hypnosis is still shown to be effective (Lang, 2002) and better than no

treatment, live hypnosis inductions in the current study, were more effective and contributed to increased effectiveness for pain management.

Level of hypnotic depth is also an important factor that affects individual's abilities to effectively use hypnosis as a pain management strategy. It has been shown that live hypnosis using tailored hypnosis inductions can produce greater hypnotic responding, as compared to audio recorded and scripted hypnosis (Barabasz & Christensen, 2006; Johnson & Wiese, 1979). As discussed above, live hypnosis may be individualized to patients and participants and may therefore achieve higher levels of hypnotic depth. In the current study, the experimenter may have individualized the live hypnosis inductions in a way to allow participants to achieve greater hypnotic depth.

It is clear that adequate hypnotic depth is crucial for effective pain management. Therefore, it is important for individuals to achieve the most significant levels of hypnotic depth possible. The findings suggest that adequate levels of hypnotic depth may be best attained through live hypnosis inductions. As previously discussed, many research studies do not assess hypnotic level of depth and are therefore unable to determine if hypnosis was actually induced or whether participants achieved a level of hypnotic depth resulting in their ability to use hypnosis for the desired outcome. The current study was able to demonstrate that participants achieved levels of hypnotic depth which were consistent with their categorizations in to low and high hypnotizability groups. Employing methodologies that allow for measurement of hypnotic depth would improve future research by more clearly identifying this important factor

Another important issue that likely contributed to the significant finding of live hypnosis inductions resulting in lower pain reports, as compared to audio recorded inductions, is the relationship factor. Live hypnosis inductions appear to involve much more of a personal

relationship compared to audio recorded inductions. Both tailored and live hypnosis inductions are able to be individualized, as discussed above, and seem to be more effective at achieving a greater level of resonance between the hypnotist and the participant. They reflect an ability on the hypnotists' part to engage with a patient or participant in a more meaningful way, where hypnosis can be used moment to moment to moderate the level of depth, focus on or distract from particular components of inductions and suggestions, and achieve the desired outcome. The current study employed methodology in which both live and audio recorded inductions were scripted and the only difference between the conditions was whether the induction was read aloud by the experimenter or presented through audio recording. In contrast, many other hypnosis and pain studies use audio recorded hypnosis where participants are given audio recordings to take home or play themselves. The experimenter in the current study was in the room with participants during both live and audio recorded inductions, which was different than most other studies. Future research should compare the effects of audio recorded inductions administered with the researcher/therapist present ans audio induction given to the participant to self administer.

Although the current study did not formally examine whether live hypnosis inductions resulted in greater resonance with participants it is possible that live hypnosis inductions are more effective at pain management because of a relationship component, in addition to the ability to individualize the induction during live hypnosis. Further research in this area is warranted to explore additional components, including relationship factors such as resonance, which may contribute to greater effectiveness for differing induction types.

Overall, the current study met the criteria for an experimentally controlled pain study. Uniform pain scale and uniform pain procedures resulted in stringent controls which contributed

to significant strengths of this study. The uniform pain procedure, in which all participants experienced similar pain through experimentally induced ischemic pain, resulted in a more controlled measure as compared to many previous research studies in which participants were coping with differing types and levels of pain, including the foundational Johnson and Weise (1979) study. Due to the nature and design of the current study possible limitations exist. Since live hypnosis inductions are able to be more individualized it is possible that researcher bias contributed to the significant results through the use of tailoring as discussed above. It may be helpful for future research to introduce measures or ratings by outside researchers that control for possible confounds. In addition, the researcher was aware of the hypnotizability scores of the participants. Therefore, research with additional experimental controls, such as experimenters masked to participant's hypnotizability scores, would reduce the possibility of researcher bias. In addition, the study did not address the effectiveness of a third group, in which participants would take home audio recorded hypnosis and later use that audio recording during a pain task administration. Additional research in this area would likely contribute to additional meaningful findings in the hypnosis and pain field.

Several implications result due to the findings of the current study. First, it is now known, based upon the current study and previous research that the most effective hypnosis inductions can be thought of as tailored, as compared to scripted, and live, as compared to audio recorded. These findings can be taken into account in order to assist individuals in achieving the most they can from hypnosis through the use of tailored and live inductions. It will also be important for researchers to be aware of how differing types of inductions effect results. Many studies employ audio recorded hypnosis inductions as a primary means of administering hypnosis for pain management. Yet, it will be important for researchers to recognize that audio recorded hypnosis

inductions may be significantly less effective at reducing participant's pain reports as compared to live hypnosis inductions. As suggested in the literature discussed, it will be important for research studies to clearly describe the hypnosis inductions and suggestions in order for studies to be replicable and to determine how hypnosis inductions and suggestions affected results.

Further research examining issues discussed in this study is warranted. First and foremost, additional studies on the effects of audio recorded hypnosis would be especially beneficial. It may be helpful to examine live versus audio recorded hypnosis within studies examining clinical pain and other clinical uses of hypnosis while employing controlled designs. Additional research in the area of hypnotic inductions would likely further our understanding of the crucial components contributing to an individuals' ability to effectively use hypnosis, for both pain management and other outcomes. Virtual reality hypnosis (VRH) has been found to be an effective treatment for pain management (O'Neal, Patterson, Soltani, Teeley, & Jensen, 2008). Therefore, VRH provides new ways in which to study how components related to induction type, such as relationship factors, affect outcome when using hypnosis. Such research may provide additional information on how differing types of inductions affect outcomes.

The findings of the current study provided foundational information to the building literature on types of hypnosis inductions, especially as applied to hypnosis and pain management. The present study provided further information on the effectiveness of differing types of inductions and supported the notion that different types of inductions affect outcomes of hypnosis. Based on the current study and on clinical lore that live hypnosis is more effective, as well as previous research (Johnson & Wiese, 1979), live hypnosis inductions can now be thought of as more individualized, more personalized, and able to achieve more significant hypnotic depth. As cited by Lang (2006), hypnosis can be an effective as well as cost effective treatment

for pain. This study further supported that notion, yet suggested that live hypnosis is more effective at reducing individual's pain reports, as compared with audio recorded hypnosis. Overall, the current study was able to demonstrate new, statistically and clinically significant findings.

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Appendix A

MEMORANDUM

TO: ARREED BARABASZ and Rachel Robertson

FROM: Malathi Jandhyala (for) Kris Miller, Chair, WSU Institutional Review Board (3005)

DATE: 4/15/2008

SUBJECT: Approved Human Subjects New Protocol, IRB Number #10285-001

Your Human Subjects Review Summary Form and additional information provided for the proposal titled "Hypnosis for Pain: Live versus audio inductions", IRB File Number 10285-001 was reviewed for the protection of the subjects participating in the study. Based on the information received from you, the WSU-IRB approved your human subjects protocol on 4/15/2008. This protocol is given Expedited review category.

IRB approval indicates that the study protocol as presented in the Human Subjects Form by the investigator, is designed to adequately protect the subjects participating in the study. This approval does not relieve the investigator from the responsibility of providing continuing attention to ethical considerations involved in the utilization of human subjects participating in the study.

This approval expires on 4/13/2009. If any significant changes are made to the study protocol you must notify the IRB before implementation. Request for modification forms are available online at http://www.irb.wsu.edu/forms.asp.

In accordance with federal regulations, this approval letter and a copy of the approved protocol must be kept with any copies of signed consent forms by the principal investigator for THREE years after completion of the project.

Washington State University is covered under Human Subjects Assurance Number FWA00002946 which is on file with the Office for Human Research Protections.

If you have questions, please contact the Institutional Review Board at (509) 335-3668. Any revised materials can be mailed to the Office of Research Assurances (Campus Zip 3005), faxed to (509) 335-6410, or in some cases by electronic mail, to irb@mail.wsu.edu.

Review Type: New Protocol
Review Category: Expedited
Expedited Category: 45 CFR 46.110 (b)(7)
Date Received: 2/14/2008
OGRD No.: N/A
Agency: N/A

Thank You,

Institutional Review Board

Malathi Jandhyala

Government Assurances Coordinator
Office of Research Assurances
Albrook 205
PO Box 643005, Pullman, WA 99164-3005
E-mail: mjandhyala@wsu.edu
Phone: 509-335-3668
Fax: 509-335-6410

Appendix B

MEMORANDUM

TO: ARREED BARABASZ, , Rachel Robertson and MARIANNE BARABASZ

FROM: Malathi Jandhyala (for) Kris Miller, Chair, WSU Institutional Review Board (3140)

DATE: 3/26/2009

SUBJECT: Approved Continuing Review of Human Subjects Cont Review, IRB Number #10285-003

The information provided for the continuing review of your protocol titled "Hypnosis for Pain: Live versus audio inductions", IRB Number 10285-003 was reviewed for the protection of the subjects participating in the study. Based on the information received from you, the IRB has given approval to continue your human subjects protocol for another year starting 3/26/2009.

The IRB approval indicates that the study protocol as presented in the Human Subjects Form by the investigator is designed to adequately protect the subjects participating in the study. This approval does not relieve the investigator from the responsibility of providing continuing attention to ethical considerations involved in the utilization of human subjects participating in the study.

This approval and the consent use on this approval expires on 3/25/2010. If any significant changes are anticipated to the study protocol you must notify the IRB and receive approval before implementation.

In accordance with federal regulations, this approval letter and a copy of the approved protocol must be kept with any copies of signed consent forms by the researcher for THREE years after completion of the research.

This institution has a Human Subjects Assurance Number FWA00002946 which is on file with the Office for Human Research Protections.

If you have questions, please contact the Institutional Review Board at Office of Research Assurances at (509) 335-3668. Any revised materials can be mailed to Office of Research Assurances (Campus Zip 3005), faxed to (509) 335-6410, or in some cases by electronic mail, to irb@wsu.edu. If materials are sent by email attachment, please make sure they are in a standard file type, (i.e., ASCII text [.txt], or Rich Text Format [.rtf])..

Review Type: Expedited
Review Category: Expedited
Date Received: 2/24/2009
OGRD No.: N/A
Agency: N/A

Thank You,

Institutional Review Board
Malathi Jandhyala
Human Subjects Review Coordinator
Office of Research Assurances

Albrook 205
PO Box 643005, Pullman, WA 99164-3005
E-mail: mjandhyala@wsu.edu
Phone: 509-335-3668
Fax: 509-335-6410

Appendix C

WASHINGTON STATE UNIVERSITY

(Educational Leadership and Counseling Psychology)

INFORMED CONSENT

TITLE OF THE STUDY: Hypnosis and Pain Relief Study

Researchers:

Primary Investigator: Dr. Areed Barabasz, 509-335-8166, E-mail: arreed_barabasz@wsu.edu

Co-Primary Investigator: Dr. Marianne Barabasz, 509-335-3416

Co-Primary Investigator: Rachel Robertson Ph.D. Student, E-mail: rerobertson@wsu.edu

The information in this consent form is provided so that you can decide whether to participate in the study**.** If during the course of the study or thereafter you wish to discuss your participation in or concerns regarding the study you may contact the researchers at the above contact information. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions, you can decide if you want to be in the study or not. You may withdraw your consent to participate without penalty or loss of benefit otherwise entitled, at any time. This process is called 'informed consent.' The Institutional Review Board of Washington State University has approved the participation of subjects for this research.

Purpose and Procedures

The purpose of the study is to explore how individuals with specific levels of hypnotizability respond to pain relief in differing conditions.

You will be assessed for your level of hypnotizability in a group format where a standardized test of hypnotizability developed at Stanford University will be used and you will be provided with information regarding the study. Experimenters will debunk myths about hypnosis, demonstrate hypnosis, and answer any questions you might have. You will then be asked to schedule an individual appointment in which you will engage in an individual standardized hypnotizability test developed at Stanford University. You will be randomly assigned to either the live procedure or the audio-recorded procedure. If you are a low hypnotizable you will be asked to simulate instructions and will be given detailed instructions by the experimenter. You will be further informed about hypnosis and have an opportunity to have all of your questions answered. Most individuals find hypnosis to be a very pleasant and relaxing experience. Additional experimenters, who do not know your hypnotizability score, will administer the live and audio conditions. A blood pressure cuff will be placed on your non-dominant arm and you will be asked to squeeze a hand dynamometer to a pressure of 8 kilograms. You will be asked to report your perception of "pain" on a numbered scale over the next 1 minute. You can terminate the session at anytime.

Risks

The risks of hypnosis are considered minimal with normal university community volunteers. However, in the unlikely event that a counseling session is needed it will be made available, without charge from either Drs. Arreed or , licensed psychologists. Again, you may withdraw your consent to participate without penalty or loss of benefit otherwise entitled, at any time.

You will receive a copy of this form for your records.

Contact Information for Questions

If you have questions about this study or the information in this form, please contact the researchers at contact Rachel Robertson at rerobertson@wsu.edu, at 335-8166 or at 335-3416.

If you have questions about your rights as a research participant, or would like to report a concern or complaint about this study, please contact the Washington State University Institutional Review Board at (509) 335-3668, or e-mail irb@wsu.edu, or regular mail at: Albrook 205, PO Box 643005, Pullman, WA 99164-3005.

Rights as a Research Study Volunteer

Your participation in this research study is completely voluntary. You may choose not to be a part of this study. There will be no penalty to you if you choose not to take part. You may choose not to answer specific questions or to stop participating at any time.

What does my signature on this consent form mean?
Your signature on this form means that:

- You understand the information given to you in this form
- You have been able to ask the researcher questions and state any concerns
- The researcher has responded to your questions and concerns
- You believe you understand the research study and the potential benefits and risks that are involved.

Statement of Consent

I certify that I am in good physical, mental health, and am not taking medication or recreational drugs. I have never undergone counseling or psychotherapy for any psychological/psychiatric issue.

I have read the above comments and agree to participate in this experiment. I give my permission under the terms outlined above. I understand that if I have any questions or concerns about my rights as a participant I can contact the investigators at the above numbers and WSU IRB at the number provided above.

I give my voluntary consent to take part in this study. I will be given a copy of this consent document for my records.

_____ _____

Signature of Participant Date

_____

Printed Name of Participant

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect.

I certify that when this person signs this form, to the best of my knowledge, he or she understands the purpose, procedures, potential benefits, and potential risks of participation.

I also certify that he or she:

- Speaks the language used to explain this research
- Reads well enough to understand this form or, if not, this person is able to hear and understand when the form is read to him or her
- Does not have any problems that could make it hard to understand what it means to take part in this research.

_____ _____

Signature of Person Obtaining Consent Date

_____ _____

Printed Name of Person Obtaining Consent Role in the Research Study

Appendix D

INTERESTED IN HYPNOSIS?

Would you like to experience hypnosis? Participate in a research study examining different hypnosis inductions for pain control! Opportunities to experience group hypnosis, individual hypnosis, and hypnosis for pain relief.

**Group hypnosis
**Individual hypnosis
**Hypnosis for pain relief

This study has been reviewed and approved for human subject participation by WSU IRB

CONTACT:

Rachel Robertson
rerobertson@wsu.edu
Phone number (to be determined)

Appendix E

Experimenter:

_____

LIVE vs **AUDIO** (circle which condition)

Participant:

_____

Date: _____

PAIN REPORTS

Report _____

(5 sec) Report _____

(10 sec) Report _____

(15 sec) Report _____

(20 sec) Report _____

(25 sec) Report _____

(30 sec) Report _____

(35 sec) Report _____

(40 sec) Report _____

(45 sec) Report _____

(55 sec) Report _____

(60sec) Report _____

(65 sec) Report _____

(70 sec) Report _____

(75 sec) Report _____

(80 sec) Report _____

(85 sec) Report _____

(90sec) Report _____

Self reported hypnotic depth: _____

HGSHS Score: _____

SHSS: C Score: _____

Any additional participant comments: