ABSTRACT

Development of a Model for the Conduct
of Randomized Clinical Trials of Hypnotic Intervention

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Research on the efficacy of hypnosis has been limited due to the lack of a sham hypnosis (placebo) for comparison to use as a control in randomized clinical trials. Instead, researchers have had to use a variety of controls, resulting in inconsistency that greatly limits researchers' methodology and makes it difficult to compare study results or make aggregate statements regarding hypnosis' efficacy.

This study consisted of three primary aims: 1) to evaluate whether white noise can be considered an "inert" procedure; 2) to evaluate the credibility of a model of sham hypnosis that uses white noise as a potential form of "hypnosis" when presented within the hypnotic context; and 3) to explore the relationships between participant characteristics and specific outcome measures.

Seventy-five undergraduate students were randomized to one of three groups: hypnosis; sham (white noise presented in the context of hypnosis); or control (white noise in the absence of hypnotic context). Measures of interest involved participants' ratings of: 1) therapist's professionalism; 2) the consistency of the environment with hypnosis;

3) subjects' perception that they received hypnosis; 4) subjects' evaluation of the procedure as pleasant, relaxing, and beneficial 5) participants' perceived acceptability (evaluated by assessing perception of the procedure as acceptable, ethical, effective, of the procedure they received; and 6) shifts in relaxation resulting from each procedure.

In each of the variables of interest, subjects who received sham hypnosis and those who received a hypnotic induction demonstrated significant differences from those assigned to the white noise control, with effect sizes ranging from .165 to .852. However, there were no significant differences between participants' ratings of the sham and hypnosis procedure in any of these domains.

Taken together, results support the feasibility of using white noise as an inert procedure that, given the proper environmental context, can serve as a credible sham hypnosis.

Development of a Model for the Conduct
of Randomized Clinical Trials of Hypnotic Intervention

by

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A Dissertation

Approved by the Department of Psychology and Neuroscience

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DEDICATION

To my husband, my love, my hope, and my best friend
Jim Kendrick

To my mom and dad
Desiree and Charles Winkle

To the memory of my grandmother
Ruth Naomi Durkee

CHAPTER ONE

Introduction

The Definition of Hypnosis

Scientists and practitioners have long faced the challenge of establishing a comprehensive definition of hypnosis, an endeavor that has precipitated much debate. Certain theorists have noted that hypnosis involves "a degree of subjective conviction bordering on delusion, and an experienced involuntariness bordering on compulsion," which demonstrates shifts in consciousness influenced by social and contextual variables (Kihlstrom, 2008, p. 21). Others argue that, because data have yet to empirically support the idea that hypnosis is a state of altered consciousness, it is better defined as a process, rather than a physiological state **(**e.g., Spanos, 1991).

Obviously, the establishment of an appropriate definition of hypnosis is important to both its effective clinical use and well-designed research. Kihlstrom (2008) has pointed out that hypnosis is "a process in which one person, designated the hypnotist, offers suggestions to another person, designated the subject, for imaginative experiences entailing alterations in perception, memory and action … [in which] alterations in consciousness take place … in the context of a social interaction" (p. 21). Similarly, Division 30 of the APA recently outlined the procedure: "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" (Green, Barabasz, Barrett, & Montgomery, 2005, p. 263). Further, Division 30 designated two essential components to the procedure of hypnosis: an introduction to the

procedure explaining that the subject will be given suggestions for "imaginative experiences" and an induction in the form of an initial suggestion (Green, Barabasz, Barrett, & Montgomery, 2005). Importantly, Barnier & Nash (2008) point out that it is this initial suggestion, or induction, as well as the invitation of participation that distinguishes suggestions in the hypnotic context from other forms of suggestion. They further note that these requirements do not include specificity regarding the induction procedure or the utilization of the word *hypnosis*.

In addition to the procedure of hypnosis, Barnier and Nash (2008) point out that there is another component that comprises the hypnotic situation: the product of hypnosis, or evidence that a person is actually hypnotized. It is important to emphasize that the administration of hypnosis-as-procedure does not ensure that a subject will achieve a hypnotic state. Barnier and Nash note that two essential elements—aptitude (or individual hypnotizability) and attitude (e.g., Kirsch, 1985; Spanos, 1991)—are required for a person to attain "hypnosis-as-product." Thus, in order to be confident that the product of hypnosis has actually been achieved, the procedure of hypnosis must be properly administered to "able and willing subjects" in a manner that results in both objective (overt responses to suggestion) and subjective (subjective feelings of alterations in sensation and perception) evidence of the attainment of a hypnotic state (Barnier & Nash).

Theoretical Approaches to Hypnosis

Although the purpose of this dissertation is specifically aimed at enhancing methodological design in current hypnosis research and is not meant to be a theoretical analysis, theory is important to sound methodology. Thus, a review of the primary

theories of hypnotic responding—dissociative theories and social cognitive theories—will be presented with particular emphasis given to social cognitive theories because they form the foundation for the proposed methodology of this dissertation.

Dissociative Theories of Hypnotic Response: Early Theorizing

Some of the earliest theorizing of hypnosis, which sought to understand the trance-like state and automaticity seen in hypnotic response, proposed that responding was a function of dissociative processes, or altered states of consciousness. Such dissociative theories share two basic assumptions: that humans possess the innate capability to discern internally and externally provoked events and that, at least among persons of great hypnotic ability, hypnosis interrupts these processes, precipitating dissociation or an altered state of consciousness (Woody & Sadler, 2008).

Theories of dissociation originated with French psychiatrist Pierre Janet, who theorized that hypnotic responding, like hysteria, reflected a process of dissociation during which some mental process(es) become(s) separated from consciousness. He posited that such a dissociative process precipitated separation from both effortful control and perception of the dissociated mental processes. According to Janet (1907), the hypnotic state resulted in subjects' restricted awareness of normally accessible material and openness to suggestion in the area of isolated mental functioning.

Neodissociation Theory. Following Janet's conception of dissociation, Ernest Hilgard (1973) posited "neodissociation" theory to describe the disconnect between monitoring and execution of behavior as the source of subjective involuntariness characteristic of hypnotic responding. Hilgard (1977, 1991) theorized that, during

hypnosis, executive control of cognitive subsystems is briefly suspended and executive function can be greatly influenced by the hypnotist. Further, he noted that "If Dissociation is conceived broadly to imply an interference with or a loss of familiar associative processes, most phenomena of hypnosis could be conceived as dissociative" (1991, p. 84).

Hilgard found empirical support for his neodissociation theory in the nonvolition of subjects' responses to suggestion and a phenomenon he deemed the "hidden observer," which he discovered during a series of experiments on hypnotic-induced pain analgesia or deafness (Hilgard, 1991). Hilgard's experimentation consisted of informing highly hypnotizable persons that they had a hidden part or "hidden observer" that could be accessed by a predetermined prompt from the hypnotist and could experience pain (or other sensation) while the individual experienced an absence of such sensation. For example, following hypnotic suggestion for pain analgesia, highly responsive subjects inserted their hand and forearm into ice water. In one such experiment, subjects –while reporting no overt pain – reported great pain via automatic key pressing, thus giving Hilgard evidence for dissociation between the conscious and unconscious (Hilgard, Morgan, & Macdonald, 1975).

Hilgard (1977, 1994) later posited the coexistence of corresponding streams of consciousness in which a "cloak of amnesia" creates division among coexisting channels of experience and separates executive monitoring from behavioral execution. With this concept and his experiments demonstrating the hidden observer phenomenon, Hilgard devised a theory of hierarchical levels of open, independent "subsystems" connected by feedback loops and an "executive ego," a "central control structure" that serves to

integrate and control subsystems in order to create functionality within the organism. He posited that, through suggestion, the hypnotist directly affects executive function, causing change in these hierarchical workings, which results in perceptual, memory, and motor function alterations (Hilgard, 1991).

Dissociated Control and Dissociated Experience. Kenneth S. Bowers (1990, 1992) divided Hilgard's theory into two parts: dissociated experience and dissociated control. Bower's dissociated control theory describes hypnotic response in terms of shifts in pathways of behavioral control. In this model, suggestion activates subsystems of control and sidesteps administrative control, resulting in low levels of perceived effort during hypnotic response. Thus, behaviors resulting from suggestion are dissociated from executive function in a way that "minimize[s] the influence of executive initiative and effort over hypnotic responding" (Miller & Bowers, 1993), and hypnosis is proposed to change the control, rather than the experience, of the behavior; the person's experience of nonvolition is actually viewed as accurate (Bowers, 1992). Dissociation is thus seen as a way in which "subsystems of control can be directly and automatically activated, instead of being governed by high level executive control" (p. 267).

In contrast to dissociated control, Bowers (1990) used the term "dissociated experience" to describe how hypnosis masks patients' perception of their effortful behavior. He noted that this model of hypnotic responsiveness "implies the operation of an amnesia-like barrier that keeps the experience of effort (and of volition) out of consciousness" (Miller & Bowers, 1993, p. 37). From this perspective, Bowers posited that even high hypnotizables may be unaware of substantial effortful responding. According to this theory, though cognitive effort is high and enactment of suggestion is

voluntary as in waking situations, effort in responding is perceived as minimal; thus, the effect of suggestion is to block one's ability to see his or her volition in responsiveness.

Bowers (1990) originally conceptualized his theories as complementary. However, noting that perceiving dissociation solely as a method of blocking consciousness of effortful responding would greatly limit its potential therapeutic benefit (Bowers, 1992), he later gave more attention to dissociated control theory. Bowers and his colleagues conducted several investigations into effort in hypnotic responsiveness and found empirical support for dissociated control theory. For example, Miller and Bowers (1993) compared hypnotic analgesia and stress inoculation in cold-pressor pain and found that stress inoculation, but not hypnotic analgesia, impaired cognitive abilities as demonstrated on the Nelson Denny Reading Task when used to alleviate pain. Results indicated "that hypnotic analgesia was directly activated by suggestion, rather than mediated by resource-demanding cognitive strategies" (p. 37).

Social Cognitive Theories of Hypnotic Response

While dissociative theories have remained popular amongst practitioners, such theories have not gone without criticism and challenge. According to Lynn, Kirsch, and Hallquist (2008), dissociative theories were initially challenged in 1933 by Clark Hull, who did not dismiss the potential influence of a trance state, but demonstrated—through comparing the effects of suggestion in hypnotic and waking states—only negligible effects from a hypnotic induction. Hull cited suggestibility (both hypnotic and nonhypnotic) as an explanatory factor in behavioral response and marked the beginning of what today are termed "nonstate theories" (Hull, 1933). Some of the most prominent nonstate theories fall into the social cognitive domain, a theoretical approach that

attributes hypnotic response to social, psychological, and cognitive factors and has been praised for demonstrating "the most successful approach to documenting correlates of hypnotizability" (Spiegel, 2008, p. 245). Lynn, Kirsch, and Hallquist (2008) point out that the beginnings of this theoretical approach can also be found in the works of Harvard researcher Robert White, who studied the effects of social variables such as motivation and attitude in hypnotic response (White, 1941). From the social cognitive perspective, hypnosis becomes a creation of the procedure instead of an entity being appraised by such processes (Spanos, 1986).

Role Theory. One of the earliest theories in this domain was Theodore Sarbin's role theory. In 1950, he began work in an effort to describe hypnotic behavior within the larger social-psychological realm of "role-taking." Sarbin was the first theorist to completely reject "state" theories of hypnosis (Lynn, Kirsch, & Hallquist, 2008) and argue that theory should account for the influence of interpersonal factors that are a dominant part of the hypnotic experience, as well as the objective phenomena associated with hypnosis. He postulated that the degree to which an individual involved him- or herself in the hypnotic "role" had the greatest determination upon response to suggestion (Sarbin, 1950). He also proposed that the success of role-taking behavior depended on the ability to attend to environmental contextual cues for reciprocal role information, the degree of congruence between role requirements and personal characteristics, perceived expectations of a particular role, role-taking aptitude, and role demands (Sarbin & Coe, 1972, p. 94). Further, he noted that hypnotic subjects enact their role within the hypnotic environment even if that requires that they deceive themselves—not in a disingenuous manner, but in one likened to that of certain theologies, where belief depends upon the

subconscious "suspension of the law of non-contradiction, the rule that something cannot be both A and not A at the same time," in order to resolve their doubt and simultaneous belief in hypnotic happenings (Sarbin, 1989, p. 413). Thus, role theory does not equate hypnotic experiences with make-believe, but instead explains such occurrences as a result of an individual's unique response to contextual clues, rather than the product of an induction procedure (Sarbin, 1950; Sarbin, & Coe, 1972)

A Scientific Approach. Following the work of Sarbin, Theordore X. Barber (1969) set out to understand hypnosis by conducting a series of experiments investigating factors influencing hypnotic responsiveness (e.g., Barber & Calverley, 1965, 1966). For example, Barber and Glass (1962) showed that behaviors characteristic of hypnotic responding—in particular, passing typical items of suggestion—were achieved by 45% of a nonhypnotized sample instructed that their level of response would be determined by how hard they "imagine" and "try" to produced behavior in a comparable manner to those who underwent a hypnotic induction. In another experiment, Barber and Calverley (1963) set out to test the effects of "task motivated instructions" and determined that such instructions, in which subjects' cooperation with the hypnotist was highly encouraged and they were instructed that their capacity to imagine suggestions was being tested, had essentially the same impact as hypnosis carried out through an induction. Later, Barber and Calverley (1964) demonstrated that subjects' responsiveness was altered according to labeling a procedure "hypnosis" or "control" and by varying labels of suggested items as "easy" or "difficult." Barber's research eventually led him to attribute hypnotic responding to eight variables: "attitudes, expectancies, the wording and tone of suggestions, motivation, the definition of the situation as 'hypnosis,' suggestions for

relaxation, the wording of the inquiry with which the response is assessed, and the behavior of the experimenter" (Lynn, Kirsch, & Hallquist, 2008, p. 117). Recently, Barber (1999) suggested that three aspects of hypnosis—fantasy-proneness, proneness to amnesia, and positive social psychological characteristics—as well as other influential factors including demand characteristics, the role of the hypnotist, and, most importantly, reaction to the many variations of suggestions, were influential in hypnotic responding. Barber's work and his subsequent conclusion that suggestibility is not dependent upon dissociation do not suggest that hypnosis does not precipitate alterations in consciousness, but rather that the altered state may in fact be yet one more effect of hypnosis rather than a cause of other effects (Lynn, Kirsch, & Hallquist, 2008).

Multifactorial Theory. Following the work of Sarbin and Barber, Nicholas Spanos expanded the work in social cognitive theories (in more than 250 studies) and proposed his multifactorial theory, "one of the most influential contemporary theoretical approaches to the understanding of hypnotic behavior" (Lynn, Kirsch, & Hallquist, 2008, p. 118). Like others, he cited social cognitive factors such as environmental influences, expectancy, attitudes, perceptions, ascription of meaning, wording of suggestion, information designed to alter attitudes and interpretations of the hypnotic situation, and strategic, goal-directed responding meant to meet testing demands (Spanos, 1986, 1991) as influential in hypnotic response. For example, by comparing subjects' responses to a posthypnotic cue word in formal (within the experimental context) and informal (outside the experimental context) settings, Spanos and his colleagues demonstrated that the effects of the experimental context, expectancy, and the goal-directed nature of

responding affect hypnotic response when subjects are unaware of experimentation and observation (Spanos, Menary, Brett, Cross, & Ahmed, 1987).

Spanos (1991) conceptualized hypnosis as an "interaction that proceeds through mutually negotiated self-presentations and reciprocal role validation" (p. 326), and he saw such role enactment as being directed by situational norms, unspoken understanding between involved parties and situational implications related to how the endeavor is understood, and what is deemed suitable behavior according to this understanding. Thus, in Spanos' view—like that of Sarbin—hypnosis involves endeavors of "role enactment" (p. 326), not to suggest imitating responses, but rather putting forth effort to generate expected response to suggestion. In this context, hypnosis does not indicate a state or condition of a person's consciousness, but instead relates to "the historically rooted conceptions of hypnotic responding that are held by the participants in the minidrama that is labeled hypnosis" (p. 326) and is—like that of most other responses—determined in many ways from a social interaction. But, what makes hypnosis unusual is the behavioral demands suggested and legitimated by the hypnotic role. Within this understanding, hypnotic responding becomes the product of attentiveness and organization of contextual cues to guide action and interaction that usually progresses with little effort due to common situational understanding—a cultural understanding with well-formed ideas that hypnotized persons respond involuntarily to suggestion (Spanos, 1991). In many ways, one part of "becoming hypnotized" involves acting out goal-directed, culturally driven behaviors while construing such behaviors as involuntary (Spanos, 1982).

In addition to his other work, Spanos correlated goal-directed fantasy, or "imaginings that are congruent with the aims of the suggestion" (Spanos, 1971), with

subjective involuntariness and posited that such fantasizing was one cognitive strategy that could be used to produce feelings of involuntariness (Spanos & Gorassini, 1984**).** In a number of studies, Spanos suggested that, despite attributions, hypnotic subjects retain voluntary control. However, he noted that the hypnotic context is filled with direct and indirect suggestion that subjects' behavior is supposed to be involuntary, which encourages and justifies subjective involuntariness (e.g., Spanos, Cobbs, & Gorassini, 1985; Spanos & Gorassini). Spanos and his colleagues also correlated subjective involuntariness with the wording of suggestions in passive voice versus directives (e.g., Spanos & deGroh, 1983; Spanos & Gorassini). In one such study, which assigned subjects to either actively or passively worded "hypnotic analgesia" or "waking analgesia," pain reduction was equivalent in high hypnotizables in all conditions, but reports of nonvolition were only seen in those groups that received passive instructions (Spanos & Katsanis, 1989). Moreover, Spanos and his colleagues demonstrated variability in hypnotic responsiveness related to the disparity between internal feedback and proposed suggestion. For example, suggestions for an outstretched hand to become heavier (acted upon by gravity) were more likely to be experienced as "involuntary" than suggestions that an outstretched arm and hand would become lighter and begin to rise (Spanos & Gorassini, 1984). Spanos (1991) noted that "suggestions invite subjects to adopt and temporarily treat as veridical an imaginary or counterfactual definition of the situation—namely that their own actions are no longer self-initiated or goal-directed" (p. 327*)*. Moreover, in a series of studies, Spanos demonstrated that, through appropriate training, subjects could alter their hypnotizability ratings, which are generally considered a stable, trait-like influence upon hypnotic responsiveness (see Gorassini & Spanos,

1999). Further, Spanos and his cohorts demonstrated that response to hypnosis as a social situation can be altered with changing demand characteristics, subjects' response to suggestion (e.g., Spanos 1990; Spanos, Flynn, & Gabora, 1989; Spanos & McLean 1986; Spanos, Perlini, et al., 1990), and, as previously mentioned, training (Spanos, 1991).

Response Expectancy Theory. Adding to the social cognitive perspective, Irving Kirsch (1985, 1990) proposed response expectancy theory, which describes how expectancies of nonvolition and cultural influence coupled with environmental and interpersonal cues within the hypnotic situation that directly influence expectancy alter hypnotic experiences and produce subjectively involuntary responses that are confirmed by correlation of physiological verification with subjective reports. According to Kirsch's theory, response expectancies possess a unique characteristic in that they are "self-confirming." This phenomenon provides the theory's foundation: "[e]xpectancies can generate nonvolitional responses" (Kirsch, 1991, p. 439) in which nonvolition is defined solely according to subjective experience, without attempts to explain its origin. According to the theory, "responses that reflect experiential alterations are genuine, regardless of how they were produced" (p. 440), and expectancy that helps create a hypnotic effect is part of the basis of hypnotic responding.

Kirsch (1985, 1991) also noted the importance of response expectancy in the placebo effect. He suggested that hypnosis acts as a nondeceptive placebo (Kirsch, 1999) and posited that, like a placebo, hypnosis induces suggested effects as a result of heightened expectancies (Kirsch, 1990, as cited by Kirsch, 1991, p. 440). Thus, while inductions—which, despite their varied presentations, generally have in common the use of the term *hypnosis* (Kirsch, 1994)—may not be necessary to see results from

suggestion, they can be seen as expectancy manipulations. Interestingly, Bridell et al. (1978) pointed out that, when expectancy is in opposition to the supposed effects of a pharmacological treatment, placebo response occurs in the direction of expectancies (Kirsch, 1985). Further, effects of response expectancies have been demonstrated widely in medical and psychological contexts outside of hypnosis (Kirsch & Lynn, 1998) and have, like placebos, altered perception of pain and tolerance, wakefulness, tension, pulse, and alertness (Kirsch, 1991), thus creating reason to believe that expectancy would produce similar results within the hypnotic context (Kirsch & Council 1989).

In accordance with response expectancy theory, Wilson (1967) demonstrated that altering response expectancy through manipulation of environmental cues subsequently produced higher responsiveness to suggestion. Similarly, Wickless and Kirsch (1989) enhanced experiential expectancy through environmental cues and subsequently produced alterations in expectancy, which affected subjects' corresponding scores on hypnotizability ratings and thus reports of nonvolition.

Kirsch (1991, 1999), however, considers expectancy to be only one of a number of factors—including hypnotic ability—that influence response, as the effects of various personal and situational variables may be partially or totally mediated by expectancy. In one related study, expectancies were determined to influence response to hypnosis when they affected successive expectations, while variation not accounted for by expectancy effects seemed only explainable by a core hypnotic ability (Benham, Woody, Wilson, & Nash, 2006). Kirsch (1990) has pointed out that responses during hypnosis reflect motivation, response sets congruent with personal experience, the effects of suggestions,

procedures used for induction, personality characteristics, and hypnotizability according to the levels of independence between these variables and expectancy.

Response Set Theory. As an expansion of response expectancy theory, Kirsch and Steven Jay Lynn (1997) proposed a response set theory to explain many aspects of human behavior that is particularly applicable within the setting of hypnosis and is based upon the automatic nature of much human action. According to response set theory, all behavior, including that within and outside of the hypnotic context, is considered automatic: activated cortically prior to behavioral initiation (Kirsch & Lynn, 1998). The theory proposes that suggestions both within and outside the hypnotic context produce physiologically verifiable perceptual and subjective changes in experience (experiences of dissociation), and response expectancies (Kirsch, 1985) are seen as being at least partially responsible for such experiences. Within this context, volitional acts occur automatically when sparked by indicators in the hypnotic situation, and suggestions' effects are strengthened due to widely held cultural beliefs concerning hypnosis. In line with expectancy theory, response set theory emphasizes that the automaticity of much behavior is based upon the premise that human experience is constructed according to expectations, previous experience, and unconscious processes. In this vein, response sets—or schemas for appropriate responding across various scenarios (even in hypnosis)—prepare us for automatic activation of actions. Involuntariness is a part of these response sets in that it is anticipated in hypnosis, and subjective automaticity of hypnotic responding is seen as the product of automatic activation of responses primed by cues, as well as the influence of cultural norms upon subjects' response sets (Kirsch & Lynn, 1998, 1999; Lynn, 1997; Lynn & Kirsch, 2006).

Commonalities Among Social Cognitive Theories. From an examination of the social cognitive theories, several commonalities appear. A defining characteristic of these theories of hypnosis is the denial of a dissociation or a trance state as a requirement of hypnotic responding. Further, social cognitive theories generally do not deny that certain cognitive factors or innate abilities may play an important role in hypnotizability and hypnotic response (Benham, Woody, Wilson, & Nash, 2006; Kirsch, 1991). Instead, they posit that such abilities exert their effect in conjunction with situation-specific attitudes, personal interpretations of task demands, and subjects' motivations to align their experiences and behavior in terms of those demands (Braffman & Kirsch, 1999; Kirsch & Lynn, 1998). Moreover, response to suggestion is seen as the aggregate effect of influences from factors such as motivation (Everett, Patterson, Burns, Montgomery, & Heinbach, 1993; Kirsch, 2005; Lynn, 2000), demand characteristics (Spanos & Hewitt, 1980), variation in suggestion (Spanos, Gwynn, & Stam, 1983; Spanos, Radtke, & Bertrand, 1985), situation-specific attitudes (Kirsch 1990; White, 1941), personal interpretations of task demands (Kirsch & Lynn, 1998; Spanos & Hewitt, 1980), subjects' motivations to align their experiences and behavior in terms of those demands (Braffman & Kirsch, 1999), the influence of cultural norms (Kirsch, 1985; Kirsch & Lynn, 1998; Lynn, 1997), and expectancy (Kirsch & Lynn, 1999; Wickless & Kirsch, 1989; Hylands-White & Derbyshire, 2007; Kirsch, Silva, Carone, Johnston, & Simon, 1989).

An Integrated Model

In response to a review by Kirsch and Lynn (1998) of dissociative theories of hypnotic responding, Woody and Sadler (1998) suggested that the field would benefit from integrating a number of theories of hypnosis. They proposed that theories should be

viewed as provisional because of the need to constantly revise them according to the latest research findings. Further, they noted that Bower's (1990, 1992) theories of dissociated experience and dissociated control and social cognitive theories could be interrelated and were not unreasonably inconsistent. Thus, they proposed a model of hypnotic response that integrated Bower's aforementioned dissociation theories with sociocognitive theories of hypnotic responding according to a dual systems model (e.g., Norman & Shallice, 1986, as cited in Woody & Sadler, 1998), in which complementary systems manage various aspects of behavior. According to Woody and Sadler's integrative model, then, hypnotic responding, such as subjective reports of nonvolition, could be viewed as the combined result of social cognitive factors, as well as changes in conscious control of behavior, and alterations in control of behavior by executive functions.

This integrated approach to understanding hypnotic response—like the previously discussed dissociative and social cognitive theories—developed out of a history of hypnosis in which researchers and clinicians sought to understand its nature and evaluate its effects and clinical utility. The following chapter describes this history and the ongoing efforts of researchers and practitioners to design valid methods of properly evaluating hypnosis and its therapeutic value.

The History of Hypnosis Research: Evolution of Methodological Designs

Since its beginnings, fascination with hypnosis has driven researchers and practitioners to explore its utility, evaluate its efficacy in the treatment of numerous physiological and psychological disorders, and seek understanding of how it works.

Although hypnosis' popularity has waxed and waned throughout its history (American Medical Association, 1958), practitioners—recognizing hypnosis' therapeutic effects—have consistently used it to treat numerous disorders even as its mechanisms remained unclear. Still, hundreds of years of research aimed at scientific understanding of hypnosis' clinical utility, its therapeutic value, and how it works have led to an increasing emphasis on empiricism and a move away from research using case studies to larger, controlled trials involving numerous subjects and eventually to the recent use of rigorous, randomized clinical trials.

Early Beginnings: Case Studies, Observation, and Theorizing

Initially, hypnosis was practiced by physicians and surgeons who were interested in its practical, medical uses, and therefore focused their research through the lens of clinical utility. As working clinicians, they attempted to explain the effects of hypnosis through case studies, careful observation, and theorizing based on their firsthand experiences with their patients. Beginning with Anton Mesmer, who is typically attributed credit for the beginnings of modern hypnosis (Sarbin & Coe, 1972), practitioners have attempted to understand hypnotic phenomena and explain its effects and efficacy. During a time when magnetism and electricity were newly discovered marvels of science, Mesmer believed an internal fluid sensitive to gravity influenced organismic functioning, a phenomenon he called "animal magnetism." He made sweeping passes with a magnet over his patients and discovered they often fell into a trance (Hothersall, 2004), which he attributed to "animal magnetism." He concluded that physical cures could be found through establishing internal equilibrium of this fluid by magnetic force (Riskin & Frankel, 1994). Mesmer conducted numerous case studies of

patients with various disorders including cataracts, nasal polyps, and even tumors that he treated successfully with magnetism (Gauld, 1992). In one such case, Mesmer treated an 18-year old congenitally blind concert pianist who recovered her sight through treatment with mesmerism (Forrest, 1974). With his success, Mesmer's popularity—and that of magnetism—grew immensely and prompted King Louis XVI to commission a team of scientists headed by Benjamin Franklin to investigate mesmerism (Hothersall, 2004). The team conducted a series of controlled observations and experiments and determined that "touching [or the subject's response to touch from the magnetizer], imagination, and imitation" were the source of animal magnetism's effects, with imagination being perhaps the most important factor influencing response (Franklin et al., 1784/2002, p. 359). Importantly, while Mesmer's approach to studying magnetism lacked empirical rigor and relied solely on case study, his work nevertheless brought a scientific tone to the field. He posited that, if the results of the practices of exorcists could be replicated without exorcism, then the effects may be attributable to forces other than good or evil (Dixon & Laurence, 1992). Further, it is apparent that the case studies conducted by Mesmer and the work of Ben Franklin's investigatory team may have been the first attempts to explain, respectively, physiological and social/contextual variables as the precipitants of hypnotic phenomenon (Dixon & Laurence).

Despite the commissioners' report and Mesmer's departure from Paris in 1792 (Hothersall, 2004), the practice of mesmerism continued. Like Mesmer, his followers conducted case studies aimed at understanding hypnosis' clinical utility and therapeutic value. Two such followers, Jose Custodio de Faria (1756−1819), a Portuguese priest, and French physician and physicist Alexander Bertrand (1795−1831), believed that individual

patients were the source of effects seen during mesmerism (Dixon & Laurence, 1992) Faria, who treated a variety of disorders using magnetism and was particularly interested in hypnotic analgesia (Laurence & Perry, 1988), depended upon case studies and observations to investigate magnetism's phenomena. For example, Faria observed that he could efficiently treat ailments through suggesting that a drink consumed during a hypnotic state was a medicine with particular effects and side effects. Through his studies, Faria contended that responsiveness to magnetism—and thus its therapeutic utility—was achieved through suggestion, contextual components, and certain cognitive attributes in the areas of imagination, attitudes, expectancy, and attentive abilities (Sharma, 1974). Importantly, Faria's work also led him to call into question the involuntariness of hypnotic response, which he proposed resulted from patients' misattribution of voluntary behaviors (Dixon & Laurence, 1992). However, because Faria's work (like that of Mesmer) was limited by his sole reliance upon case study and observation, little conclusive evidence generalized to hypnosis as a whole could be drawn from his work.

By the end of the 1820s, animal magnetism had become increasing popular throughout most of Europe. In England, practitioners who witnessed hypnosis' analgesic effects continued to study its clinical utility and anesthetic properties. For example, medical innovator, physician, and professor of medicine John Elliotson (1791−1868) performed many surgeries using mesmerism as the sole method for anesthesia (Hothersall, 2004). After reading Elliotson's accounts of mesmeric analgesia and anesthesia, Scottish surgeon James Esdaile (1808−1859) of the British East India Company in Calcutta, India, began to experiment with mesmerism's analgesic effects in

both surgery and in the treatment of pain. Through careful observation in hundreds of case studies using mesmerism, Esdaile discovered that patients successfully survived surgeries and frequently reported no experience of pain (Gravitz, 1988). Esdaile performed thousands of operations—with more than 300 major ones (Thomas, 1955)—using mesmeric analgesia alone with remarkable survival rates for the time. In one such case, he removed a scrotal tumor weighing more than 112 pounds using only mesmeric anesthesia. So successful was Esdaile's use of anesthetic mesmerism in surgery that the British government established a public "experimental hospital" in 1846 in Calcutta solely for his work (Gauld, 1995). However, despite his clinical successes and his efforts to understand mesmerism's efficacy in the treatment of pain, his results were limited and without generalizability due to his sole reliance on case studies and observation

Around the same time that Eisdale was performing surgeries using mesmeric analgesia, Scottish-born physician James Braid (1795−1860) successfully used hypnosis to treat such disorders as tic douloureaux, paralysis, aphasia, constipation, menstrual disorders, and rheumatism (Gauld, 1995). Braid was interested in understanding the underlying processes of hypnosis effects and, like others before him, utilized case studies and observation to form theories about hypnotic responding and explore its therapeutic value. While Braid is perhaps best known for introducing the term *hypnosis* in 1843 and the eye fixation method of induction of trance (Braid, 1853), he also observed patterns of responsiveness in his patients that led him to propose stages of the hypnotic process (Gauld, 1995) and discovered that hypnosis' results could be produced from suggestion, which he proposed should be the primary component of treatment (Osler, 2006). Despite Braid's clinical successes and his advancements in understanding how hypnosis works,

his reliance on case studies and observation—like that of his predecessors—inherently limited the generalizability of his findings.

Despite physicians' increasing interest in its therapeutic benefits in the early and mid 19th century, hypnosis had yet to gain mainstream medical acceptance. French physician Ambroise-Auguste Liébeault (1823–1904) furthered Braid's endorsement of the importance of suggestion (Risken & Frankel, 1994) and successfully treated psychological disorders, neuralgias, ulcers, rheumatism and menstrual cramps with hypnosis (Harris, 1985). Determined to understand hypnotic phenomena, Liébeault offered his patients treatment with hypnosis free of charge but charged them for standard medical care (Laurence & Perry, 1988). Like practitioners before him, he conducted case studies of his patients and carefully observed hypnosis' effects. Though such methods, he theorized that hypnosis was brought about through expectancy and suggestion that focused the patients' attention, and he proposed that such focus led to suspension of patients' executive functions of judgment and critical self-observation. Further, Liébeault's observations of individual differences in patients' responsiveness to suggestion led him to theorize that individual capacity for imagery reflected a patient's level of hypnotizability (Liébeault, 1866, as cited by Laurence & Perry, 1988). Though Liébeault contributed to understanding hypnosis' effects and utility, his work—like that of researchers and clinicians before him—was restricted due to the limited methodology of case studies.

Hypnosis, Neurology, and Early Attempts at Measurement

Like Liébeault, Braid, and other early practitioners, physicians, and researchers, scientists in the latter half of the 19th century continued to utilize hypnosis in the

treatment of various disorders, examine its effects through case studies, and generate theories in order to understand its phenomena. However, the late 1800s brought the first attempts at proposing hypnosis' neurological correlates and systematically measuring its effects. In 1860, Étienne Eugène Azam, a French physician who conducted experiments in hypnotic analgesia, published a case study of one of his patients in which he was the first to describe what he called "double consciousness." Coupled with the recent discovery that the brain's cerebral hemispheres had independent functions, Azam's report on his patient set the stage for hypnosis to be understood in its ability to access various brain processes (Laurence & Perry, 1988), which prior to 1860 was a possibility that had gone unrecognized. Still, Azam's methodology relied on case study, which lacks sound ecological validity and the empirical rigor needed to generalize findings.

Jean-Martin Charcot (1825–1893), a noteworthy neurologist who headed the Salpêtrière Mental Hospital in Paris beginning in 1878, also sought to understand hypnosis and its effects and, like Azam, proposed a physiological understanding of hypnotic response. At the Salpêtrière, Charcot studied hypnosis' effects on hysterical patients. Having observed that categorical responses (catalepsy, lethargy, and somnambulism) that resembled symptoms of hysteria could be elicited through hypnosis, Charcot proposed that hypnosis was neurologically akin to hysteria and thus the hypnotic trance was a pathological state. He carefully observed variances of hysterical patients' physiological responses during hypnosis—as compared with their typical patterns of response—believing that variance in patients' responsiveness would provide a basis for understanding the laws of hypnosis (Laurence & Perry, 1988). Importantly, such methods appear to be an early attempt at using a repeated measures design with subjects

as their own controls. Still, however, Charcot's findings remained limited due to his primary reliance on case studies.

Charcot's approach of using hysteria to understand hypnosis was challenged by neurologist Hippolyte Bernheim, (1837−1919) a professor at the Nancy School who was influenced by Liébeault and Faria. Bernheim posited that, because of hysterical patients' symptoms, Charcot's methods of experimentation resulted in confounded results (Bernheim, 1883, as cited by LeBlanc, 2001). Bernheim and his colleagues utilized hypnosis to treat a variety of disorders, as "the negation of all morbid symptoms was suggested; also the maintenance of the conditions upon which general health depends, i.e. sleep, digestion, etc. (Bramwell, 1903, p. 31, as cited by Sarbin & Coe, 1972). Through case studies and careful observation, he discovered that his patients carried out posthypnotic suggestions without understanding the origin of their behaviors (Bernheim, 1883, as cited by LeBlanc, 2001) and that, through suggestion, he could induce positive and negative hallucinations (in one case, Bernheim suggested to a highly hypnotizable patient that he would see a large dog in each hospital bed, and the patient reported that he found himself in a hospital for dogs; Gauld, 1995). Thus, Bernheim theorized that suggestion was the primary source of hypnosis' effects (Bernheim, 1883, as cited by LeBlanc, 2001). Further, Bernheim's observations that only certain patients easily achieved suggested posthypnotic hallucinations undoubtedly influenced his attempts to understand and emphasize individual suggestibility and his subsequent development of a precursor to modern hypnotizability scales: a measure that outlined nine categories of hypnotizability (Bernheim 1886 as cited in Laurence & Perry, 1988). Bernheim's influence continues to impact contemporary research of hypnotic phenomena, as

understanding appropriate measurement of individuality in hypnotic responding and controlling for error remain important aspects of hypnosis research today.

Toward Empirical Investigation: Hypnosis and Experimentation

Though hypnosis' popularity and research declined toward the end of the 19th century in parts of Europe (Janet, 1925, as cited by Laurence & Perry, 1988), research efforts began to discard case studies in favor of empiricism and experimentation aimed at understanding hypnosis' effects, its clinical utility, and how it works.

For example, French psychiatrist Pierre Janet (1859−1947), who studied hypnosis' utility in the treatment of neuroses, criticized both Charcot and Bernheim for their methodologies, preoccupation with physiological matters, and insufficient psychological knowledge (Janet, 1930). Janet noted Charcot's use of too few subjects and argued that his categorization of hypnotic stages was actually the result of patients being trained (Ellenberger, 1965). Like Charcot, Janet maintained that hysteria and hypnosis resulted from related neurological functioning, but he proposed that such functioning reflected a dissociative process. (Importantly, this proposal of a dissociative process, which was prompted by Janet's primary research goal to understand the automaticity he had observed in his patients' hypnotic responsiveness [Dixon & Laurence, 1992], served as a main instigator of one of the primary debates in contemporary research: the altered state debate of hypnotic responding.) Despite this contribution and Janet's criticism of Charcot's and Bernheim's methods, his own methodology still lacked the rigor seen in later hypnosis trials that would allow for aggregate data and generalizability of results.

Janet's research was of particular interest to psychologist William James (1842–1910). Like others before him, James also examined hypnosis' clinical utility, though his approach was different in that he understood the dissociative nature of the hypnotic trance as similar to states of dissociation present in hysteria and other disorders of consciousness and therefore saw hypnosis as a potential laboratory model to study such disorders. In his psychology lab at Harvard University, James' work at the end of the 19th century reflected increasing empiricism in hypnosis research as he and his students conducted experiments involving careful observation of perceptual function and motor abilities in numerous subjects under hypnosis in an effort to understand hypnotic phenomena and how the hypnotic process seemed to cut off executive functioning from other mental processes (Kihlstrom & McConkey, 1990). For example, James (1890) described how "real sensations may be abolished as well as false ones suggested" (p. 606), suggesting ways in which subjects could cut off consciousness from certain objects or experience positive hallucinations, such as changes in temperature sensation, taste, or smell, during a hypnotic trance.

Though Janet's and James's research reflected empiricism through experimentation, greater numbers of subjects, careful measurements and recording of phenomena, and methodological controls, they still lacked the experimental rigor that would be brought to the field later in the 20th century, and, as a result, hypnosis still lacked acceptance in the medical community. However, their work marks the first efforts at systematic, controlled experimentation designed to evaluate hypnosis' effects and potential utility in the treatment of various disorders.

In the United States, clinical and research efforts in hypnosis were generally slowed because physicians were disdainful about using hypnosis due to a lack of scientific data in support of its clinical application (Thomas, 1955; Young, 1927) and the popularity of Austrian psychiatrist Sigmund Freud's psychoanalysis (Laurence & Perry, 1988). However, many practitioners continued to use hypnosis to treat a variety of physiological and psychological disorders because they observed its therapeutic utility, even if they didn't understand how it worked. During the early part of the 20th century, research in the U.S. began to move away from reliance on case studies and observation by practitioners seeking to understand their observations of hypnosis' effects in individual patients. Instead, this new era was characterized by university-based research that used empirically based, controlled clinical research trials with multiple subjects. Although aimed at theoretical understanding of hypnosis' phenomena, this research would also inform the evaluation of its clinical utility.

At Harvard University in 1923, Paul Campbell Young produced his doctoral thesis on hypnosis: a report on the first systematic empirical research in the field, which consisted of a series of experiments in perception, sensation, and memory (Kihlstrom & McConkey, 1990). Young discerned that proper evaluation of hypnosis had been impeded by research methods that lacked experimental rigor, which he criticized as "non-scientific…without definite control-conditions…, [and] avowedly scientific… with control-conditions in hypnosis, but without a comparable investigation of the same persons in ordinary waking consciousness." He also noted that experimentation lacked standardization, adequate subjects, account for individual differences amongst subjects that could influence responses, and full disclosure of methods of investigation in

published results (Young, 1925, pp. 214–215). Importantly, Young recognized that case studies were inadequate to enable generalizability of experimental results, and in his thesis he followed extensive procedures to ensure well-controlled, systematic methods of experimentation using 22 subjects in a series of 15 different "tests" designed to understand hypnotic phenomena. To account for variance attributable to individual hypnotizability, Young conducted preliminary screenings to determine treatment subjects (high-hypnotizables) and controls (low-hypnotizables), with both groups receiving identical instructions in identical environments during both hypnotic and waking states. He was careful to account for variance attributable to individual hypnotizability, environmental factors, and the experimental situation (Young, 1925). The result was a work of experimental rigor that provided a methodological template that would become increasingly predominant in the years to come.

Similar work was also being conducted by Clark Hull (1884–1952), a psychologist at the University of Wisconsin. Hull's research was primarily aimed at a theoretical understanding of hypnosis and refining methods previously used to understand its clinical utility. Hull's interest in hypnosis' therapeutic value began after a student came to him seeking hypnosis for a phobia. Though Hull had never actually seen someone hypnotized, he had read extensively on the subject and used the techniques he had read about to hypnotize his student (Triplet, 1982). Hull (1952) described this event as the beginning of his experimentation in with hypnotic phenomena. Like Young, Hull was dissatisfied with previous researchers' reliance on case studies and advocated for trials that used adequate numbers of subjects and appropriate controls. He argued that "the present state of hypnotic knowledge [was] a scientific scandal" (Hull, 1929, p. 200)

and set out to design well-controlled, empirical investigations of hypnosis. After studying hypnosis for 8 years at Wisconsin, he published several papers, one of which proposed methods for empirical investigation and data analysis of approximately 100 hypnotic phenomena. For example, to investigate hypnotic analgesia, instead of relying solely upon subject report (which could be influenced by social and situational factors), Hull (1929) suggested comparing physiological measures such as breathing, galvanic skin reaction, metabolic rate, and involuntary movements of facial and other muscles with verbal reports of analgesia. Importantly, Hull understood that proper evaluation of hypnosis' effects and its clinical utility could only be achieved through experimental rigor involving controls and theoretical understanding of hypnosis and how it works, rather than case studies and observations.

During the 1930s and '40s, research methods in hypnosis continued to develop at Harvard, where psychologist Robert White (1904–2001) studied the ways in which hypnotic responsiveness and thus the effects of hypnosis might be influenced by social variables. Like Hull, White understood that proper evaluation of hypnosis' effects required experimentation with sound methodology and an understanding of hypnosis' underlying functions and the factors influencing hypnotic response. To this end, White (1941) investigated the power of motivation within the hypnotic situation and illustrated how various personal attributes such as extraversion, submission, deference, autonomy, and passivity correlate with hypnotic susceptibility and examined their relationship to subjects' behavior within the hypnotic context. In order to test his hypothesis that attitudes contribute to hypnosis' effects, White designed methodologies to understand the effects of variables that could be somewhat elusive. For example, in an effort to examine

the influence of subjects' attitudes upon hypnotic response, he conducted an experiment in which subjects were shown a picture of a hypnosis session that had been added into a Thematic Apperception Test (TAT). The TAT was made to seem unrelated to a later test of hypnotic responsiveness, during which judges predicted subjects' hypnotic performance according to their responses to the picture of the hypnosis situation in the TAT. White demonstrated that subjects' expressed attitudes correlated considerably with their hypnotic performance and therefore concluded that attitudinal variables contribute to hypnotic responsiveness. Through such investigations, White (1941) was the first to underscore nonstate influences of hypnotic phenomena and concluded that "No one can be hypnotized against his desire" (p. 160); thus, hypnotic susceptibility cannot be considered solely the result of aptitude. Although White's experimentation still lacked the sophistication seen in the randomized, controlled clinical trials of today, his carefully designed trials with multiple subjects demonstrated a continued move toward empiricism and experimental rigor and laid the groundwork for further experimentation into situational, attitudinal, and environmental influences upon the effects and clinical utility of hypnosis.

A Systematic Move Toward Empiricism: The Development of Hypnosis Research Laboratories

The increasing empiricism of the early 1900s was followed by increased clinical and research popularity in the mid 20th century. In addition to research advancements, treatment of veterans from the two World Wars who suffered from various issues such as fatigue from combat and shell shock (e.g., Reiter, 1950) heightened hypnosis' popularity (AMA, 1958; Weisberg, 2008) particularly amongst military personnel (Laurence &

Perry, 1988). By the 1950s, hypnosis was being used in dentistry (e.g., Stolzenberg, 1950), mainstream medicine (e.g., Hammel, 1953; Kirkner 1956), and psychological practice (e.g., Ambrose, 1951). The clinical popularity of hypnosis had grown enough that the British Medical Association endorsed its medical use (BMA, 1955) and the *Saturday Evening Post* published a story with the title "How Medical Hypnosis Works" (Silverman &Silverman, 1957).

In 1958 by the American Medical Association (AMA) published a report in favor of using hypnosis in medicine and dentistry, teaching hypnosis in medical and dental institutions, and establishing appropriate training for its application in these environments, which marked an enormous advancement in hypnosis' acceptance in mainstream medicine. Evidence of this growing acceptance was further demonstrated in a later directive that training in hypnosis for medical uses should be conducted like other medical training: in a hospital or other medical setting. Thus, not only was the AMA supporting the medical use of hypnosis, but also it also suggested that it should be taught alongside other medical disciplines (Rosen & Bartemeier, 1961). However, despite the AMA's endorsement, advances in hypnosis research, and its growing social recognition and popularity, it continued to fall short of full approval from the medical community at large, and graduate programs in medicine, dentistry, and psychology continued to disregard it as a valid subject for study and instruction (Weisber, 2008). Nevertheless, hypnosis continued to be studied and utilized in the treatment of numerous disorders, including obesity (e.g., Oakley, 1960), asthma (e.g., White, 1961), pain (e.g., Asin, 1961; Lenox, 1970; Sacerdote, 1970), addictive disorders (e.g., Fox, 1967; Wollman, 1969), sexual dysfunction (e.g., Richardson, 1968), and dermatological disorders (e.g., Tenzel &

Taylor, 1969). Hypnosis' continued clinical use led to a heightened focus on its empirical examination, which resulted in the development of several major academic hypnosis research laboratories in the 1950s and '60s (McConkey, 2008).

In the 1950s, the development of and subsequent work at the Laboratory of Hypnosis Research at Stanford University by Ernest Hilgard and Andre Weitzenhoffer played an instrumental role in transforming research in the field. Importantly, Hilgard and Weitzenhoffer understood that, in order to properly evaluate hypnosis' therapeutic value, there must be a standard measure for its phenomena. Thus, in the Stanford laboratory, experimentation not only focused on understanding hypnosis and working to improve methods of experimentation, but also sought to create a standardized, reliable, and valid measurement of hypnotizability (Hilgard, 1979). This work reflected Hilgard's (1979) observation that "comparability from one laboratory to another with respect to results [of hypnotizability measures] was… obviously dependent upon subject selection," (p. 4) which thus impeded effective evaluation of hypnosis or generalizability of measurements. This work resulted in the development of the gold standard in measuring hypnotizability: the Stanford Hypnotic Susceptibility Scales (SHSS; Hilgard & Weitzenhoffer, 1959). The development of the SHSS was important to hypnosis research not only because it was a reliable and valid standardized measure of hypnotizability, but also because it allowed for the empirical evaluation of the stability of hypnotic responsiveness (e.g., Morgan, Johnson, & Hilgard, 1974) and empirical investigation of variables contributing to individual differences in hypnotizability such as age, sex, and personality (Alexander, Turnbull, & Cyna, 2009; Hilgard, 1979). Further, the advent

of the SHSS finally afforded investigators the opportunity to empirically investigate variability related to individual responsiveness in the clinical use of hypnosis (e.g., Butler et al., 2009). The advent of standardized tests of hypnotic susceptibility in the 1950s marked the beginning of another new era in the experimental investigation of hypnotic phenomena. Scientists employing these tests were finally in a position to empirically evaluate many of the notions that comprised the scholastic legacy of the 18th- and 19th-century hypnotists.

In 1959, Martin Orne (1927–2000) established the Hypnosis Research Project at the Massachusetts Mental Health Center, which was partnered with Harvard Medical School. In 1964, he moved his laboratory, the Unit for Experimental Psychiatry, to the University of Pennsylvania. Similar to the researchers at the Stanford lab, Orne and his colleagues discerned the importance of the appropriate measure of hypnotizability and how such measurement could inform research evaluating hypnosis' therapeutic value; thus, the development of the Harvard Group Scale of Hypnotic Susceptibility (Shor & Orne, 1962).

Orne (1959) theorized that hypnotic response consisted of the subject's understanding of his or her role (influenced by environmental and experimenter-provided cues) in hypnotic responsiveness, the subject's motivation to play his or her role, and the hypnotic trance (the essence of hypnosis). Importantly, Orne posited that variability amongst subjects' understanding of their role and individual factors such as motivation would ultimately lead to variability in hypnosis' clinical utility. Thus, he sought to illuminate and navigate the potential pitfalls in experimentation related to such factors through well-thought-out designs. Orne (1959) noted that "By experimentally controlling

these two elements, role-playing and increased motivation, it is possible to investigate their sufficiency for explaining all aspects of the trance state and the extent to which still other concepts, such as an altered state of consciousness, are required" (p. 277). Faced with the challenge of parsing out such variables, Orne created a model in which "demand characteristics of the experimental situation" (p. 281) could be delineated from the true effects of hypnotic response. In his real-simulator design, which seeks to understand both intrinsic and extrinsic influence upon hypnotic responsiveness, a procedure is used in which low hypnotizables are told to behave like excellent hypnotic subjects to deceive a second experimenter, but neither knows the rationale behind the experiment (Orne, 1959). Further, in order to fully account for influence of situational demands, Orne included subject debriefing and inquiry of each subject regarding his or her subjective experience with an experimenter who was not previously a part of the experiment (e.g., O'Connell, Shor, & Orne, 1970; Orne, 1959; Orne & Evans, 1965). Importantly, Orne's model introduced a sound design that enabled researchers to empirically evaluate hypnosis' effects and clinical utility while accounting for effects produced by the experimental environment, thereby giving a clearer picture of the true products of hypnosis. Orne's real-simulator design model was readily put into practice to evaluate hypnosis' effects (e.g., Hepps & Brady, 1967) and continues to be used to evaluate its therapeutic utility (e.g., Bryant & Mallard, 2002).

Meanwhile, Theodore Sarbin (1911–2005) led research at the University of California at Berkeley that challenged state definitions of hypnosis and introduced the concept of role theory (Sarbin, 1950). Like previous researchers, Sarbin sought to further define hypnosis' effects through methods designed to account for and control potential

sources of variability in hypnotic responsiveness. Understanding that hypnosis is a social situation and concerned with how social factors would ultimately influence response to hypnosis and thus hypnosis' clinical utility, Sarbin (1950) advocated for a social psychological understanding of hypnotic responsiveness. For example, he proposed that, influenced by factors of motivation, the perception of appropriate hypnotic behavior, and personal "role-taking aptitude" (i.e., ability to take on such a role), subjects attempt to enact their hypnotic role appropriately (Sarbin, 1950). From this work, Sarbin provided a framework for understanding hypnotic responding in terms of social constructs (Spanos & Coe, 1992). Importantly, he and his colleagues greatly contributed to theory-driven hypnotic research in the latter part of the 20th century as researchers continued to seek scientific understanding of the utility of hypnosis and the effects of hypnotic phenomena (Dixon & Laurence, 1992).

In addition to the advancements in research laboratories, the mid 20th century also saw a resurgence of clinical interest in hypnosis. Although advancements in pharmacotherapy and genetics led to a subsequent dismissal by the mainstream medical community of "low-tech" treatments such as acupuncture and massage, there was an increased demand for hypnosis as a viable option for medical treatments in the 1950s, which some have explained as a result of its successful use in treating World War II veterans (Weisberg, 2008). Clinicians in the '50s used hypnosis to treat numerous disorders including addictions (e.g., Hershman, 1956; Kirkner, 1956), pain (e.g., Crasilneck et al., 1955; Kirkner), and anesthesia (e.g., Crasilneck, McCranie, & Jenkins, 1956).

Around the same time of the AMA's 1958 report, Theodore X. Barber (1927–2005) established a fourth hypnosis research center at the Medfield State Hospital in Massachusetts. As researchers continued in the quest for scientific understanding of hypnotic phenomena, Barber and his colleagues took the assumption of an altered state of consciousness suggested by other practitioners and subjected it to rigorous experimentation. Importantly, Barber recognized that, to understand and show evidence for hypnosis' therapeutic value, research must demonstrate that its effects were unique to hypnosis and not produced by nonhypnotic variables. Thus, Barber and his colleagues sought to understand potential confounding factors influencing hypnotic response and designed experiments to parse out the effects of such variables.

In an effort to understand whether effects produced during hypnosis could also be reproduced in a normal waking state, much of Barber's theory-driven research in the 1960s and '70s consisted of systematic experiments using "task motivated instructions" in which multiple nonhypnotic controls who were instructed that tasks typically performed during hypnosis could be produced through effort and imagination were compared to multiple treatment subjects who had undergone hypnotic induction (e.g., Barber & Calverley, 1964). In other experiments, subjects were instructed to put themselves into a hypnotic trance, and responses were compared to subjects actually having undergone hypnotic induction (e.g., Barber & Calverley, 1969). Through such experimentation, Barber supported his hypothesis that hypnotic behaviors did not have the prerequisite of altered consciousness. Further, in a continuing effort to understand influences on hypnotic responsiveness that might affect its clinical utility, Barber's center investigated the effects of situational variables, such as the way in which a procedure is

labeled (Barber & Calverley, 1964) or the wording of suggestions (Barber, Walker, & Hahn, 1973). In addition to other methodological designs, Barber employed repeated measures (e.g., Barber & Glass, 1962), which he used to compare the effect of direct suggestion in subjects who underwent "task motivated instructions" to the effects of the same suggestions when subjects received a traditional hypnotic induction.

Though Barber's work in the latter part of the 20th century primarily contributed to the theory-driven research of the time, his early work was particularly important in that it gave researchers a method to evaluate influences of hypnotic responding that had not been previously accounted for, such as effort and imagination. It also allowed for another empirical approach (in addition to Orne's method) to understanding variation due to situational factors. Importantly, such research would prove to be critical to rigorous evaluation of clinical utility, and it demonstrated that evaluating hypnosis' therapeutic utility could only be successful when potential error attributable to nonhypnotic factors was properly controlled.

In Australia, hypnosis research was beginning to take shape in the mid-1950s under the guidance of J. P. Sutcliffe and A. G. Hammer at the University of Sydney. In a continuing quest to understand hypnotic phenomenon and empirically evaluate its clinical utility, Sutcliffe (like Barber, Sarbin, and Orne) further examined factors of the hypnotic experience such as the relationships between hypnotist and subject, the subject's interpretation of the situation, and expectations and strivings of hypnotized persons. Sutcliffe developed a distinction between ways of viewing hypnotic phenomena: "credulous" or "skeptical" (McConkey, 2008, p. 55). The credulous view takes subjects' accounts at face value; "skeptics" question the veracity of hypnotic phenomena and

subjects' reports because subjects are seen as likely to perform as if suggestions are producing real effects when they are not. Sutcliffe determined that empirical methods of the time were not adequate to determine the true nature of hypnotic response, and he proposed an experimental design in which both hypnotizable (somnambulistic) and nonhypnotizable (nonsomambulistic) subjects were assigned to one of six groups consisting of control, acting conditions, and hypnosis conditions, all with and without the presence of experimental stimuli. Using this subject grouping to assess specific hypnotic phenomenon, Sutcliffe devised methods of comparisons between various groups to test both the "skeptical" and "credulous" points of view (e.g., comparing subjects in the acting group to subjects receiving hypnosis to test the "skeptical" hypothesis; Sutcliffe, 1961). Like other researchers working at the time, Sutcliffe recognized that the clinical utility of hypnotic phenomena could not be adequately demonstrated without empirical methods that parsed out what effects were actually attributable to hypnosis and which were not, and he successfully worked toward better methods of empirical investigation of hypnosis (see Sutcliffe, 1960, 1961).

By the early 1970s, the ever-increasing emphasis on empirical methods designed to understand hypnotic response and hypnosis' potential therapeutic utility had progressed to the extent that Sarbin and Coe (1972) were able to identify five experimental designs that had emerged in hypnosis research during the mid-20th century: (1) repeated measures of subjects under different experimental conditions (e.g., Barber & Glass, 1962); (2) real-simulator design (Orne, 1959) using simulators as a quasi-control group (e.g., Orne & Evans, 1965); (3) designs comparing independent treatment groups (e.g., Barber & Calverley, 1964, 1969); (4) designs utilizing base rates of phenomena

occurring within the population (e.g., Sarbin & Andersen, 1963); and (5) an interaction design (e.g., Rosenhan & London, 1963) in which hypnotizables and nonhypnotizables were researched under hypnotic and nonhypnotic conditions in order to examine the interaction between variables influencing hypnotic response.

Following hypnosis' rise in popularity in the mid 20th century and the emergence of the use of hypnosis for the recovering memories in the 1970s and 1980s, an American Medical Association panel (AMA, 1985) determined that memory recovered under hypnosis may be less reliable than waking memory, a finding that slowed hypnosis' use and popularity in mainstream medicine (Upshaw, 2006). Despite this report, however, hypnosis continued to be evaluated and used in the treatment of various disorders such as pain (e.g., Noyes, 1981; Orne, 1981), digestive disorders (e.g., Whorwell, 1987), anxiety (e.g., Morse, 1981), sleep disorders (e.g., Kohen, Mahowald, & Rosen, 1992), and numerous other psychological and physiological conditions. Moreover, though the 1985 AMA report slowed research, technological developments in neuroimagery such as the Positron Emission Tomography (PET) and Functional Magnetic Resonance Imaging (fMRI) gave researchers and clinicians tangible, visual evidence of the alterations in brain function resulting from various hypnotic suggestions that could be used in research and clinical practice (e.g., Wik, Fischer, Bragée, Finer, & Fredrikson, 1999; Rainville, Duncan, Price, Carrier, & Bushnell, 1997). A 1996 National Institutes of Health (NIH) report included a statement endorsing hypnosis in the use of chronic pain (NIH, 1996), and the establishment of the NIH's Alternative Medicine Office in 1993 (renamed the National Center for Complementary and Alternative Medicine [NCCAM] in 1998) further encouraged hypnosis research through the funding of well-designed, controlled,

empirical studies (NIH, 2009). These developments undoubtedly contributed to heightened popularity and greater interest in evaluating hypnosis' therapeutic utility in the last 20 years and influenced yet another major shift in research: the shift toward evaluating hypnosis' effects and clinical utility through the use of randomized clinical trials.

Hypnosis' Clinical Utility: Designs and Methodological Complications

Current Uses and Designs

Hypnosis is used in the treatment of a wide variety of psychological and medical disorders. Hypnosis has been utilized in the treatment of psychological disorders such as anxiety, depression (Bryant, 2008), addiction, and alexythmia (Gay, Hanin, & Luminet, 2008), as well as sleep, sexual, and eating disorders (Waxman, 1980). Further, it has been used to treat migraine headaches (e.g. Olness, MacDonald, & Uden, 1987) and other forms of significant pain (Patterson et al., 1992; Zachariae & Bjerring; Olness, MacDonald, & Uden, 1987), and to minimize procedural discomfort and time, pre- and postoperative complications, and time needed for postoperative inpatient care related to surgical operations (Elkins, White, Patel, Marcus, & Perfect, 2006; Faymonville, et al., 1997; Lang et al., 2000; Stewart, 2005). Further, hypnosis has been used in the treatment of dermatological disorders (Spanos, Stenstrom, & Johnson, 1988; Spanos, Williams, & Gwynn, 1990), gastroenterological disorders (Galovski & Blanchard, 1998; Prior, Colgan, & Whorwell, 1990), and vasomotor events (Elkins et al., 2008). Moreover, hypnosis has been utilized to reduce negative effects of cancer treatments (Elkins, Marcus, Stearns, & Rajab, 2007; Richardson, Smith, McCall, Richardson, Pilkington, &

Kirsch, 2007) and moderate stress' effects on immunity (Keicolt-Glaser, Marucha, Atkinson, & Glaser, 2001). However, despite its widespread use, hypnosis has yet to fully attain mainstream acceptance because research to validate its efficacy has been limited due to the lack of a sham hypnosis (placebo) for comparison. As a result, current researchers face significant methodological limitations in empirically validating hypnosis' effects.

In accordance with the recommendations of an APA (1995) task force on empirically validated treatments, Chambless and Hollon (1998) proposed guidelines for establishing treatment efficacy. According to these guidelines, a minimum of one study must demonstrate that the treatment under examination exceeds the efficacy of a placebo group or an alternative treatment or matches that of a treatment already recognized for its efficacy in order for a treatment to be considered a "possibly efficacious." Two studies must demonstrate the treatment's efficacy independently in separate research settings and no empirically sound studies should demonstrate results to the contrary in order for the treatment to be considered "efficacious." Further, the treatment under investigation must show superiority in a minimum of two independent research trials and settings to another recognized treatment or placebo (either pill or psychological) if it is to be considered "efficacious and specific" (p. 8).

In an effort to validate hypnosis' clinical utility and establish hypnosis as a possibly efficacious treatment for various medical and psychological disorders, researchers have sought to evaluate hypnosis through randomized clinical trials (Chambless & Hollon, 1998). However, researchers have faced serious methodological constraints due to variation in control procedures and shared components between

hypnosis and controls (Neumann, 2005; Patterson & Jensen, 2003). In randomized clinical trials such as those cited above, controls vary and may include attention or no-treatment, other mind-body therapies, psychological interventions, pill placebo (e.g., Everett, Patterson, Burns, Montgomery, & Heinbach, 1993), or psychological placebo (e.g., Spanos, Stenstrom, & Johnston, 1988). Thus, even though randomized clinical trials have been designed to evaluate the usefulness of hypnosis, current methodological constructs impede such evaluation. Instead of a consistent placebo control, researchers are forced to use limited methodologies that cloud a clear picture of hypnosis' effects or efficacy.

Wait-list or No-Treatment Control

One common methodology used in clinical trials of hypnosis compares hypnosis to wait-list or no-treatment control. For example, Kiecolt-Glaser et al. (2001) assessed the results of hypnosis intervention on immunological dysfunction associated with acute stress. Medical students undergoing exam stress were randomized to receive hypnosis or no treatment. Hypnosis was delivered to those randomized to treatment in small groups of 2 to 6 and consisted of an induction, suggestions for deepening, and imagery for relaxation and self-efficacy related to school work. Treatment participants were also encouraged to practice self-hypnosis frequently. Results demonstrated that frequency of participation in hypnosis group sessions was associated with participants maintaining significantly greater percentages of immune-associated T-lymphocytes $CD3^+$ ($\beta = .579$, $p < .02$, $R^2 = .36$) and $CD4^+$ ($\beta = .60$, $p < .01$, $R^2 = .34$) during periods of acute stress compared to those participants in no-treatment control. Further, participants in the hypnosis group were determined to have decreased immune dysfunction related to stress.

Similarly, to study hypnosis' effects on hypertension, Gay (2007) compared the effects of hypnosis consisting of induction and suggestions for imagery related to pleasant memories, relaxation, and general well-being and encouragement for frequent self-hypnosis to no-treatment control. Outcomes demonstrated significant reductions in systolic, F (1,28) =15.9, p <.001, and diastolic pressure, F (1,28) = 10.22, p < .003, as well as significant reductions in anxiety, F (1,28) =85.83, p < .001, in participants who received hypnosis treatment compared to controls.

Elkins et al. (2008) studied the effects of hypnosis on hot flashes in breast cancer survivors. Participants were randomized to 5 weeks of hypnosis intervention, consisting of hypnotic suggestion, suggestions for and imagery related to relaxation, "imagery for coolness, deepening hypnosis, and dissociation from hot flashes, positive suggestions and imagery for the future, self-hypnosis," and alerting (p. 5023), or to wait-list control. Significant (68%) improvements in hot flash scores (p < .001), secondary interference with daily activities, F(2,43) = 19.804, p < .001, η_p^2 = 0.479, mood, F (2,44) = 6.083, p < .005, η_p^2 = 0.217, and sleep, F (1,48) = 45.757, p < .001, η_p^2 = 0.488, were seen in hypnosis treatment participants as compared with controls. Elkins notes that this study demonstrated greater reduction in hot flashes than what is generally considered placebo effect (less than 40% reduction). Although the results of these studies initially appear to validate hypnosis' efficacy, the lack of a sham hypnosis (placebo) makes it difficult, if not impossible, to adequately assess placebo effects related to hypnosis in each trial. Even comparing the effects of a hypnotic intervention to what is generally considered a placebo effect makes interpretation difficult because there has yet to be established a hypnotic placebo that could produce a clear picture of placebo effects associated with

hypnosis. Thus, understanding the effects of hypnotic interventions is complicated. To validate hypnosis efficacy, it is important that placebo effects associated with hypnosis procedures not be overlooked, as it has been suggested that hypnosis could potentially serve as a nondeceptive placebo for clinical trials due to the expectancy effects produced by hypnotic intervention (Kirsch, 1994). Further, due to the lack of a pill or psychological placebo or empirically validated treatment for comparison, this methodology does not meet proposed standards for establishing hypnosis as a possibly efficacious treatment (APA, 1995; Chambless & Hollon, 1998). To fully understand hypnosis' effects, a sham (placebo) hypnosis is needed for comparison.

Standard Care Control

Another frequently utilized methodological design in hypnosis trials compares the effects of hypnosis to those of standard care. Vlieger et al. (2007) compared the effects of six 50-minute sessions of "gut-directed" hypnosis in children with functional abdominal pain or irritable bowel syndrome to standard medical care. Hypnotherapy consisted of relaxation and suggestions for gastrointestinal and pain control. In comparison, standard care consisted of education, increased dietary fiber, advice on diet, and pain medication or proton pump inhibitors, as well as six 30-minute sessions of supportive therapy in which the previous weeks' symptoms, potential dietary or emotional triggers, and stress-inducing events were discussed. Significantly greater reductions in pain intensity ($p < .002$) and frequency ($p < .001$) were demonstrated in the hypnosis group compared to standard care.

Similarly, Liossi and White (2001) assessed the effects of hypnosis combined with standard medical care to standard care alone on the quality of life of 50 terminal

cancer patients. Hypnosis consisted of four 30-minute sessions comprised of an induction with suggestions for ego strengthening, management of symptoms, posthypnotic suggestions for continued comfort and benefit during the week following treatment, and—according to request—suggestions for other symptom management. Standard care procedures consisted of standard medical and psychological support. Psychological support was comprised of supportive therapy that included four 30-minute sessions of therapy focused on existential issues, grief and loss, and cognitive restructuring according to issues of import to patients, while standard medical support was composed of pallative pharmacotherapy for symptoms, including pain. Results indicated that those patients randomized to receive hypnosis intervention in addition to standard care endorsed significantly decreased physical stress, F (1, 47) = 12.74; $p <$ 0.01, as measured by the Rotterdam Symptom Checklist (RSCL), a self-report measure of quality of life in cancer patients, as well as significantly decreased anxiety, F (1, 47) = 113; $p < 0.01$, and depression, F (1, 47) = 54.2; $p < 0.01$, as measured by the Hospital Anxiety and Depression Scale (HADS) compared to controls.

Similarly, in a study that used related methodology, Stradling, Roberts, Wilson, and Lovelock (1998) randomized 60 patients with obesity and chronic obstructive sleep apnea to receive one of two hypnotic interventions or standard dietary advice. In each hypnotherapy group, participants received two individual sessions that provided encouragement to use a self-hypnosis tape (with the different forms of hypnotherapy). The first hypnotherapy treatment group received a tape that consisted of inducing a hypnotic state, ego strengthening, and stress reduction, while the second hypnosis treatment group also received ego strengthening with attempts to facilitate attitude

change toward food. All patients—including controls—received dietary advice from a state-registered dietician. Percent changes in weight of each patient over an 18-month period were recorded at approximately 3-month intervals, and those percentages were averaged to determine an overall percentage of loss. Results showed that hypnotherapeutic intervention combined with stress reduction resulted in a significantly greater percentage of weight loss ($p < .003$) compared to the other two groups, with weight loss maintained up to 18 months.

As with the previous studies, evaluation of hypnosis' efficacy in these studies is compromised by the lack of a sham hypnosis because potential placebo effects are unaccounted for. Furthermore, the results are complicated by the potential for variance among standardized medical procedures, which makes it difficult for researchers to make an aggregate statement regarding hypnosis' effects, even those effects compared to standard care. Moreover, without a pill or psychological placebo or other empirically supported therapy to use for comparisons, such designs continue to fall short of proposed guidelines for empirically supported treatments (APA, 1995; Chambless & Hollon, 1998).

Structured Attention or Supportive Counseling Controls

Structured attention or supportive counseling comprises yet another method of control commonly used in hypnosis trials. For example, to assess the effects of hypnosis on presurgical distress, Schnur et al. (2008) randomized 90 patients scheduled for excisional breast biopsy to either 15 minutes of attention control (consisting of nondirective, but empathetic listening without any direction in relaxation, imagery, or conversation) or hypnosis (consisting of education and answering patient questions

regarding hypnosis, administration of a script for hypnotic induction, imagery, deepening strategies, and suggestions specific to surgery for reductions in nausea, distress, and pain, and education regarding how patients could reenter the hypnotic state on their own at will) prior to surgery. Results demonstrated significant reduction in emotional upset prior to surgery ($p < 0.0001$, $d = 0.85$), anxiety ($p < 0.0001$, $d = 0.85$), depressed mood ($p < 0.02$, $d = 0.67$), and significantly higher VAS relaxation scores ($p < 0.001$, $d = 0.76$) in the hypnosis group as compared to controls.

Similarly, Martin, Schauble, Surekha, and Whit Curry (2001) examined hypnosis' effects on labor processes and birth outcomes in adolescents by randomizing 42 pregnant adolescents to supportive counseling control or hypnosis treatment. The hypnosis treatment group received preparation for childbirth, including information regarding labor and delivery, during self-hypnosis. Controls were able to discuss their issues of concern and have social support and interpersonal interaction in the form of supportive counseling. Compared to controls, subjects who received hypnosis experienced significantly decreased complications during labor ($p = .047$), fewer required surgical interventions ($p < .001$), their length of hospital stay was reduced ($p = .008$), and requirement for anesthesia, postpartum medication, or admission of infants into NICU decreased (although not significantly).

As in previous methodologies, this design does not allow for the parceling out of placebo effects or meet proposed guidelines for establishing an empirically supported treatment (APA, 1995; Chambless & Hollon, 1998). Further, like aforementioned methodologies, because delivery of structured attention and supportive counseling may vary from study to study, it is difficult to aggregate or even adequately interpret results

across studies. Thus, such research designs continue to fall short of those with placebos that account for placebo effects and allow for comprehensive analysis of and cumulative understanding of data provided by clinical trials.

Pharmacological Placebo Control

Yet another common methodological approach for evaluation of hypnosis trials is one in which hypnosis is compared to medicine or placebo pill. In a crossover study, Olness, MacDonald, and Uden (1987) compared the effects of self-hypnosis on juvenile classic migraines with propranolol and pill placebo in 28 children aged 6 to 12. Following 4 weeks of baseline assessment, children were randomly assigned to receive 10 weeks of placebo or propranolol followed by a 1-week washout and 12 weeks of either placebo or propranolol, which was then followed by another week washout and finally training in self-hypnosis (which included instruction in and practicing of progressive relaxation, imagery, and pain control techniques). Children were asked to practice self-hypnosis twice daily. Results demonstrated that self-hypnosis produced significant reduction in headache frequency ($p = .045$), but not intensity, which was not seen in the placebo or propanolol treatment groups.

In another similarly designed study, Spanos, Williams, and Gwynn (1990) compared the effects of hypnosis to medical treatment and placebo in the treatment of warts. Hypnosis, which consisted of induction, suggestions for wart regression, imagery of warts diminishing, and, following alerting, instructions to practice imagery for wart regression once daily, was compared to salicylic acid (presented as a new innovative wart treatment called "Dermacyl"), topical medical placebo (also called Dermacyl), and no-treatment control in the treatment of warts. At 6-week follow-up, patients randomized to

receive hypnotic intervention demonstrated significantly more wart loss, $X^2(1) = 8.71$, $p < 0.01$, than patients in the other groups.

Although studies such as these—comparing the effects of hypnosis with pharmacological placebo—meet criteria for establishing a treatment as "probably efficacious" (Chambless & Hollon, 1998), such designs remain limited by the lack of a sham hypnosis. While the presence of a pill placebo accounts for pharmacological placebo effects, it is still impossible to clearly determine placebo effects associated with hypnosis intervention, and interpretation of results in such designs fails to clearly delineate hypnosis' effects.

Combining Hypnosis With Other Psychological Treatments

Another common methodological practice involves combining hypnosis with other psychological treatments. Alladin and Alibhai (2007) compared cognitive behavioral therapy (CBT) supplemented with hypnosis to CBT in the treatment of 84 persons diagnosed with depression who were also being treated with antidepressants. To minimize medication effects, researchers attempted to make sure subjects maintained initial medication levels throughout the trial. Subjects randomly assigned to treatment by cognitive hypnotherapy received 16 weeks of outpatient treatment in the form of manualized CBT that was augmented by a "hypnotic induction, ego strengthening, expansion of awareness, positive mood induction (developing antidepressive pathways), posthypnotic suggestions, and self-hypnosis" (p. 150). Participants randomized to CBT received 16 outpatient treatments of CBT identical to the manualized treatment received by those in the cognitive hypnotherapy group. Results indicated significantly greater decreases in scores on the Beck Depression, $t(82) = -2.66$, $p = 0.009$, and Anxiety

Inventories, $t(82) = -3.22$, $p = 0.002$, as well as the Beck Hopelessness Scale, $t(82) = -3.35$, $p = 0.001$, in those who received cognitive hypnotherapy compared to CBT.

In a similarly designed study, Schnur, David, Kangas, Green, Bovbjerg, and Montgomery (2009) randomized 40 women in radiation therapy for breast cancer to treatment with a combination of CBT and hypnosis (CBTH) or standard care to determine the effects of the combined treatment upon negative affect in this patient population. Combined treatment of CBTH consisted of an initial 15-minute hypnosis session during which any misconceptions about hypnosis were addressed and participants received a hypnotic relaxation induction adapted for use with breast cancer patients that included guided imagery, suggestions for deepening, "symptom-focused suggestions for decreasing negative affect, increased positive affect, increased comfort with the radiotherapy room/setting, and reduced radiotherapy-side effects" (p. 448). Finally, participants were told a word they could utilize as a cue to enter the hypnotic state at any desired time. Following the hypnosis session, participants were given a CD player and a CD of the intervention that they could utilize at home. The CBT component of the therapy consisted of an initial 30-minute session of psychoeducation related to negative cognition and instruction in cognitive restructuring and behavioral coping strategies. They were also given a CBT workbook designed for breast cancer patients undergoing radiation, were instructed in how to create a thought record, and were given homework assignments that they turned into the interventionist during twice-weekly homework checks. Standard care participants, in contrast, had no interaction with the interventionist and only filled out questionnaires at regular intervals. Results indicated significantly less negative affect ($p < 0.03$), greater positive affect ($p < 0.03$), greater intensities of positive

affect, $F(1, 38) = 7.09$, $p = 0.0113$, $d = 0.71$, and less intensity of negative affect, $F(1, 38) = 10.30$, $p = 0.0027$, $d = 0.90$, in participants receiving CBTH compared to standard care controls.

At first glance such designs appear sound, and some (i.e., Alladin & Alibhai, 2007) meet recommended guidelines for empirically supported therapies (APA, 1995; Chambless & Hollon, 1998). However, these designs contain several problems. Because combined therapies involve aspects of behavioral and cognitive interventions in addition to suggestion, it becomes a challenge to separate the effects of hypnosis from the interventions with which it is joined, thus making it virtually impossible to attribute treatment gains to the effects of the hypnotic intervention (Green & Lynn, 2000). Further, while studies that compare hypnosis to other, established psychological treatments meet Chambless and Hollon's guidelines for a "possibly efficacious treatment," the lack of adequate model of sham hypnosis creates a situation in which is it unfeasible to account for potential placebo effects associated with hypnosis, and thus the effects of hypnosis remain unclear.

Controls With Shared Treatment Components

Perhaps most commonly, randomized clinical trials used to assess hypnosis' effects utilize a methodological design that compares hypnosis to other mind body therapies or treatments with components that are common to hypnosis. For example, Jensen et al. (2009) compared the effects of hypnosis and biofeedback in 37 adults with spinal-cord injuries and chronic pain. Participants were randomized to 10 sessions of hypnosis or training in pain management through EMG biofeedback relaxation. Participants randomized to the hypnosis group were initially (during the first two

sessions) administered a hypnotic induction with suggestions specifically for "(a) decreased pain, (b) deep relaxation, (c) hypnotic anesthesia, (d) decreased unpleasantness, and (e) sensory substitution" (p. 245), with each suggestion being given following its own induction procedure and followed by its own alerting procedure. After the final suggestion, participants received a posthypnotic suggestion for continued analgesic effects and for self-hypnosis. The remaining sessions consisted of suggestions to which the participants seemed most responsive with the addition of suggestion for decreased suffering, and the third and fourth sessions of hypnosis were recorded for the participant to practice self-hypnosis. The participants randomized to biofeedback—after being connected to the appropriate equipment—received continual feedback from software via repeating tone. The clinician administering biofeedback used social reinforcement toward lower tones indicating success at relaxation measured via physiological indicators. To create the greatest similarity between the groups, biofeedback participants also received a CD or audiotape following their third session. This CD was created by the clinician and contained a progressive relaxation exercise similar to that administered within the hypnosis sessions, but without direct analgesia suggestions. Participants in both groups were encouraged to practice with their recordings daily. Results indicated that participants in both groups demonstrated similar reductions in pain intensity with no significant difference shown between treatments. However, statistical analyses did indicate a significant average daily pain decrease, $t(17) = 3.18$, $p < 0.01$, as well as a significant increase in perceived pain control in hypnosis patients that was not reported in biofeedback participants. The treatments' shared active

relaxation component should be noted, however, as relaxation was directed and reinforced in both the hypnosis and biofeedback groups.

In another study comparing hypnosis to control with shared components, Faymonville et al. (1997) compared the effects of hypnosis and stress reduction on perioperative discomfort in 60 patients who underwent plastic surgery. Patients were randomized to receive hypnosis or emotional support during elective plastic surgery. Hypnosis was never called "hypnosis," but instead described to patients as a state of focus on positive life experiences that distracts their attention during surgery. Emotional support (which served as the control) was described as ongoing verbal reassurance and support that utilized information regarding the procedure and conversation for distraction. Within this study, participants randomized to receive hypnosis underwent a hypnotic induction via eye fixation, directions for muscle relaxation, and "permissive and indirect suggestions," with exact wording varying according to perceived patient needs. However, no direct analgesia suggestions were given. Patients randomized to the emotional support group control received instruction in deep breathing and "positive emotion induction to focus the patient on recreating a pleasant memory and to induce a positive emotional state" (362). In addition, cognitive coping in the form of imagining change in sensation, as well as deliberative patient attempts at cognitive changes to reduce pain were also utilized in the control. During the operation, all patients were administered alfentanil and midazolam according to need conveyed by psychological or vital sign indicators. Results demonstrated significantly reduced postoperative nausea and vomiting ($p < 0.001$), significantly reduced pain and discomfort ($p < 0.001$), significantly greater patient satisfaction ($p < 0.004$), and significantly lessened need for

alfentanil and midazolam ($p < 0.001$) in patients receiving hypnosis than in the patients receiving emotional support. Notably, however, the hypnosis and control procedures possessed shared components of guidance to utilize deep breating, remembering a pleasant memory to induce a positive mood and emotional state, and cognitive self-induced coping processes (such as imagining change in sensation) that might reduce pain.

In a similarly conducted study, Patterson et al. (1992) compared the effects of hypnosis and attention control on debridement pain in 30 burn patients. Patients were randomized to receive hypnosis, attention labeled "hypnosis," and no-treatment control. Within the attention group, subjects were told at the end of the session that it might be helpful for them to "close [their] eyes, count to 20, and imagine [themselves] in a relaxing place prior to dressing change." At the end of the attention procedure, participants were able to practice this procedure and were told the nurse would prompt them to begin "hypnosis" before their next dressing change by giving them a touch on their shoulder. In the hypnosis group, patients were administered a modified version of Barber's Rapid Induction Analgesia—reworked to be appropriate to burn pain—with a posthypnotic suggestion that the touch from their nurse would serve as a cue for them to experience cool numbness in the burned area. Results demonstrated that only persons who received hypnosis experienced significantly decreased pain, $t(27) = 4.48$, $p = 0.0001$, compared to baseline pain control achieved with only opioid medication.

The following year, Everett et al. (1993) used identical baseline, hypnosis, and attention control procedures to compare the effects of treating burn debridement pain with: (1) hypnosis combined with lorazepam; (2) hypnosis combined with placebo lorazepam; (3) lorazepam combined with the aforementioned attention control; or (4)

attention control combined with placebo lorazepam. In contrast with the 1992 study, results indicated that, although patients reported pain reduction, no significant difference was attributable to treatment group assignment, a finding researchers attributed potentially to differences in baseline pain scores. However, such interpretations may be confounded. Complications due to the shared component among treatment and control groups; that is, instructing the patient in guided imagery, make such interpretations difficult to accept at face value as results are clearly affected by methodological constraints.

In another similar methodological design, ter Kuile et al., (1994) compared the effects of cognitive self-hypnosis, autogenic training, and wait-list control in the treatment of recurrent headaches in 146 subjects. Participants randomized to receive cognitive self-hypnosis training were presented with exercises in "relaxation, imaginative inattention; pain displacement and transformation; … hypnotic analgesia" (p. 333), as well as training in cognitive restructuring for maladaptive thoughts thought to mediate headache occurrence. Autogenic training consisted of suggestions for relaxation, sensory changes, and respiratory and cardiovascular ease and normalcy. Results (measured by headache index scores, psychological distress indicated by SCL-90, and medication usage) indicated significantly reduced symptoms in both the treatment groups (autogenic training and cognitive self-hypnosis) that were not seen in wait-list control. No significant differences between results in the two treatment groups were found. The problem with this study is the shared component of suggestion. It is generally accepted that hypnosis' effects appear to be largely influenced by suggestion, which also

represents the key component of autogenic training; thus, findings related to hypnosis efficacy in this design are at best limited.

In yet another example of clinical trials comparing hypnosis with treatments containing shared components, Marc et al. (2008) designed a randomized clinical trial to assess the effect of hypnosis on pain during first-trimester abortion. Three-hundred and fifty women scheduled to undergo surgical abortion were randomized to receive a standardized hypnotic intervention for analgesia with direct suggestions for pain reduction and comfort 20 minutes prior to and throughout the surgery or "standard care." The women randomized to standard care did not receive attention from medical staff prior to the abortion procedure. During the procedure, however, the family planning nurse delivered standard care, consisting of "usual attention and support to the patient, talking and listening, giving positive reinforcement, reassurance and instructions for relaxation (abdominal and pelvic area), and deep breathing" (Marc et al., p. 469.e3). Thus, although outcome measures indicated a significantly greater reduction in the need for intravenous sedation analgesia than controls ($p < 0.0001$), treatment and control interventions both involved active directives for relaxation and deep breathing, thus making interpretation of results and parsing out what is and what is not related to hypnosis complicated and difficult.

Similarly, Lang et al. (2000) compared intraoperative standard care, structured attention, and self-hypnotic relaxation in reducing discomfort and undesirable effects of vascular or renal procedures performed percutaneously. Results indicated significantly decreased procedural times ($p = 0.016$) with hypnosis intervention compared to standard care and demonstrated a lack of linear pain increase as a function of procedural time in

the hypnosis group in both standard care and structured attention groups. Importantly, however, the hypnosis treatment varied from structured attention in only three ways: inclusion of progressive muscle relaxation, self-generated imagery, and an induction that consisted of instructions for patients to "roll their eyes upwards, close their eyes, breathe deeply, and concentrate on a sensation of floating" (p. 1467). The procedures were otherwise identical and included encouraging patients to focus on perceptual sensations in the presence of pain and reading a standardized hypnotic script to patients within both groups.

The problem with studies comparing hypnosis to other mind-body therapies or therapies with shared components is the difficulty in parsing out hypnosis' effects from those of other psychological treatments such as those involving multifaceted suggestions for imagery, feelings of comfort and security, or relaxation (Lynn, 2000). Not surprisingly, then, when hypnosis is compared to no-treatment controls or standard care, results often indicate hypnosis' superiority in treatment. However, when compared to treatments that share components with hypnosis, such a finding is – not surprisingly – less common (Patterson & Jensen, 2003).

Problems With Current Designs

Clearly, without an effective hypnosis placebo, interpretation of clinical hypnosis research—even in randomized clinical trials—remains unclear. Though studies frequently determine that hypnosis produces significant results, inconsistencies among controls make it difficult to compare the results of studies or make aggregate statements regarding the specifics of hypnosis' efficacy, while shared components between hypnosis and control procedures challenge interpretation of hypnosis' effects. Further, the lack of

a feasible placebo for comparison in clinical trials makes it impossible to account for placebo effects created by the hypnosis procedure, which have been cited as a major confound in empirical trials evaluating hypnosis (e.g. Carvalho, Mazzoni, Kirsch, Meo, & Santandrea, 2008). Moreover, a clearly identified and feasible sham hypnosis is necessary for research to be commensurate with guidelines established for the purpose of delineating empirically supported treatments (APA, 1995; Chambless & Hollon, 1998).

Though hypnosis is widely utilized in medicine and psychology and has been useful in numerous clinical trials, variance and confounding factors within methodological designs complicate proper evaluation of its effects. Clearly, the lack of a sham hypnosis to use as a placebo impedes sound methodological procedures that would further hypnosis' use in medicine and psychology. If, instead of using a wide variety of controls or controls with shared components with treatments, researchers had access to a sham hypnosis, placebo effects could be isolated, comparisons amongst studies could be made, the efficacy of hypnosis could be established according to appropriate standards, and data could be aggregated in order to effectively evaluate hypnosis' utility. The creation of a feasible model of sham hypnosis would thus fill a current methodological gap in the literature; allow for greater unification of methodological procedures; reduce confounding factors amongst controls, thereby allowing for clearer delineation of hypnosis' effects; and enable hypnosis research to achieve the "gold standard" in empirical investigation: the randomized, placebo-controlled trial. Given the need to advance hypnosis' research in the fields of psychology and medicine, as well as the need for an established standard for controls in empirical evaluation, a credible placebo for hypnosis is needed to move the field forward.

Importantly, what comprises a placebo is somewhat elusive, as definitions for the term *placebo* abound (Stewart-Williams & Podd, 2004). Thus, in order to achieve a sham or placebo for hypnosis, the characteristics of such a placebo should first be defined. In accordance with expectancy theory, placebos have been defined as "substances administered in the guise of active drugs but that do not in fact have the pharmacological properties attributed to them" (Kirsch, 1985, p. 1189) and as "physically inert substances and medical procedures that are identical in appearance to an active pharmacological or (less commonly) other medical treatment being investigated" (Kirsch, 2002, par.5). Congruent with Kirsch's 1985 definition, Stewart-Williams & Podd (2004) point out that, given the effects of placebos—which at times can be significant—it is important to clarify the term "inert," as lacking "inherent," active components to create a particular effect. Although expectancy theory does not posit expectancy as the sole source of placebo effects, it does propose that other influential factors in the placebo mechanism exert their influence by way of expectancy alteration, influenced by contextual variables such as information provided about the placebo, as well as the appearance and route of placebo administration (Kirsch 1985, 1994). Thus, placebos alter expectancies, and expectancies create "placebo" effects. From this perspective, placebos (whether in the form of a pill or procedure) can be seen as expectancy manipulations (i.e., Kirsch, 1985; Stewart-Williams & Podd, 2004).

Accordingly, a placebo (a feasible sham hypnosis) should have the following characteristics: (1) it would have to be believable; (2) it would have to be a physically "inert" procedure; and, (3) related to believability, it would have to have an outward show "identical" –or similar enough to be believable – in appearance to the treatment to

produce expectancy effects (Kirsch, 2002). Given these characteristics, we have identified that white noise presented within the context of hypnosis may meet these criteria and potentially be utilized as an effective sham hypnosis.

CHAPTER TWO

Materials and Methods

Objective

The objective of this dissertation was to evaluate the feasibility of white noise presented in the context of hypnosis as a model of sham hypnosis that can be used as a placebo in randomized, controlled hypnosis trials. The choice of white noise was made because no demonstrable empirical evidence exists that white noise possesses hypnotic components or creates effects equivalent to those demonstrated by administration of hypnotic suggestions.

Specific Aims

This dissertation has three specific aims:

Aim 1: To evaluate whether white noise can be considered an "inert" procedure.

Aim 2: To evaluate the credibility of a model of sham hypnosis that uses white noise as a potential form of "hypnosis" when presented within the hypnotic context.

Aim 3: To explore the relationships between participant characteristics and specific outcome measures.

Participants

Participants were 75 undergraduate volunteers drawn from Baylor University (25 participants completed each arm of the study). In addition, 10 subjects were run initially for the purpose of refining the procedures prior to randomization and study initiation.

Based upon experience from the initial 10 participants, the sham hypnosis procedure was refined to achieve potential feasibility of the sham hypnosis.

Some participants were offered course credit at the discretion of their professor for participating in the study. Flyers were posted to advertise the study with requests for volunteers for the development of "experimental hypnosis procedures." The department's website for recruiting research participants (SONA systems) was also utilized to recruit volunteers, and potential volunteers were able to read about and enroll in the study using the website. A minimal reading level was required to ensure participants' ability to complete study measures, and participants were required to be at least 18 years of age. Further, individuals who had prior experience with clinical hypnosis were excluded from the study. Prior to recruitment of participants or initiation of the study, approval for the study was attained by the Baylor University Institutional Review Board (IRB).

Measures

Attitudes Toward Hypnosis. The Attitudes Toward Hypnosis Scale (Spanons, Brett, Menary, & Cross, 1987) was used to measure three factors of participants' personal attitudes toward hypnosis: (a) positive beliefs concerning hypnosis; (b) the lack of fear of hypnosis; and (c) beliefs related to the mental stability of hypnotized persons. Participants self-reported their personal attitudes toward hypnosis using the 14-item scale, which has been demonstrated to have satisfactory reliability and validity.

Hypnotizability. The Elkins Hypnotizability Scale (Elkins, 2003) was used to measure hypnotizability. A research assistant who had been trained in hypnosis procedures administered the scale individually. Participants received a score of 1 through

12 that indicated their level of hypnotizability. The scale has been found to possess adequate validity and reliability and takes approximately 30 minutes to complete.

Absorption. When presented in the same context as hypnosis or a hypnotizability measure, absorption demonstrates a small, positive correlation with hypnotizability (due to the moderator effects created by expectancy), but it does not demonstrate this same correlation when evaluated in a context separate from hypnotizability (Lynn, Kirsch, & Hallquist, 2008). Therefore, the Tellegen Absorption Scale (TAS) was used to explore the manner in which participants' group assignments may moderate the correlation demonstrated between hypnotizability and absorption. The measure is comprised of 34 true/false questions and has demonstrated good internal validity and test-retest reliability, as well as an internal reliability of $\alpha = 0.88$ (Tellegen & Atkinson, 1974).

Procedural Rating. Because this study was a feasibility study, and no measures have been developed to evaluate the characteristics of a sham hypnosis, the writer and her mentor developed a set of questions designed to evaluate the sham. In each of the groups, participants were asked the following questions after the administration of their procedure: (1) "Did your therapist interact with you in a professional manner?"; (2) "Was the environment consistent with a hypnosis session?"; (3) "Were you provided with a hypnosis session?"; (4) "Was your experience pleasant?"; (5) "Was your experience relaxing?"; (6) "Did you benefit from today's session?"; (7)"If yes, in what way(s) did you benefit?"; and (8) "If no, why not?" In addition, subjects were asked to rate on a 0 to 5 Likert scale the degree to which they agreed with the following statements: (1) "The therapist acted in a professional manner"; (2) "The environment was conducive to a hypnotic experience"; (3) "I was provided with a quality hypnosis session"; (4) "My

experience was pleasant"; (5)"My experience was relaxing"; and (6) "I benefitted from today's session." The scale was anchored with the following anchors: (1) strongly disagree; (2) disagree; (3) neither agree nor disagree; (4) agree; (5) strongly agree.

Shifts in Benefit Expectancy. To evaluate shifts in participants' expectancy that hypnosis can help people relax, participants were also asked to rate the question "Based upon your experience, to what degree do you believe hypnosis can help people relax?" using a visual analogue scale (VAS) entitled "Benefit Expectancy" both before and after their session.

Shifts in Relaxation. To evaluate participants' shifts in relaxation, they were asked "Right now, how relaxed do you feel?" using a VAS entitled "Relaxation Index" anchored with "Not at all relaxed" and "As relaxed as I could possibly feel" before and after their session.

Acceptability of Procedures. The Treatment Acceptability Questionnaire (Hunsley, 1992) was used as an indirect measure of the believability of the sham procedure. The questionnaire is a six-question semantic differential scale designed to evaluate the acceptability of psychotherapeutic interventions. Importantly, the scale inquires about a person's perception of the therapist as "trustworthy," thus providing an indirect evaluation of the believability of procedures—in particular, the sham procedure. The questionnaire demonstrates good internal consistency, Chronbach's α ranges from 0.74 to 0.81, and test retest reliability, $r = 0.78$.

Setting

In accordance with the work of Wickless and Kirsch (1989) and Kirsch, Wickless, and Moffitt (1999), the environment of the study was manipulated in such a way as to create "experiential expectancy" (Wickless & Kirsch) with environmental cues. The study was conducted in the Baylor Mind Body Medicine Laboratory, a professional working laboratory in a comfortable setting similar to a medical office. Participants were greeted by graduate or undergraduate research assistants or an administrative professional and were allowed to wait in a comfortable and professional waiting area until their session. Participants were led to the research room by a research assistant or the primary researcher, and those randomized to the sham or hypnosis groups entered through a door upon which hung a professional sign that read "Session in Progress." Adapted from Wickless and Kirsch, the sham and hypnosis procedures were conducted in a quiet, dimly lit office, and participants were seated in a comfortable recliner. The researcher's credentials conveying expertise in hypnosis were hung on the wall, and bookshelves in the room were lined with clearly marked books on hypnosis. The researcher and any research assistants dressed in business casual clothing and wore professional lab coats embroidered with "Baylor Mind Body Medicine Laboratory." Persons randomized to the white noise condition received their procedure in a room that was free from hypnotic context.

Procedure

Participants were randomized to one of three groups: (1) White Noise (WN); (2) Hypnosis in the Context of Hypnosis (H+C); or (3) White Noise in the Context of Hypnosis (WN+C). A researcher or research assistant presented participants with basic

information about the study and provided informed consent. After completing the informed consent form, all participants were asked to complete a demographic questionnaire, the Attitudes Toward Hypnosis Scale, and the "Benefit Expectancy" and "Relaxation Index" visual analogue scales (VAS). Participants randomized to the hypnosis and sham conditions were then given some initial, brief introductory material about hypnosis to read.

Following administration of White Noise, Hypnosis in the Context of Hypnosis, or the sham, participants were administered the Procedural Rating Form by a separate researcher. Additionally, participants were again asked to complete the VAS "Benefit Expectancy" and "Relaxation Index" scales. They were also asked to complete the Treatment Acceptability Questionnaire and the Tellegen Absorption Scale.

Participants were then administered the Elkins Hypnotizability Scale. All participants were offered debriefing and, if necessary, provided with a referral and contact information for professional mental health consultation.

Group 1: White Noise (WN). Twenty-five subjects were administered approximately 20 minutes of white noise without any hypnotic context.

Group 2: Hypnosis in the Context of Hypnosis (H +C). Twenty-five subjects were administered hypnosis in the context of hypnosis as described above.

Participants received the following introduction after the initial instructions: "Thank you for participating in our hypnosis study. Because we want to make sure everyone receives an identical, standardized hypnosis session, your hypnosis session has been prerecorded and will be administered via an audio CD. However, during your

session, I will be sitting in the chair in the corner of the room to ensure that your procedure is completely standardized and there are no technical problems that might interrupt your session (the therapist indicates the corner of the room where a chair has been set in a place that is generally out of the direct view of the participant). You have been selected to participate in an experimental hypnotic relaxation procedure. Recent technological advances such as fMRIs have allowed researchers to see that hypnosis produces unique patterns of activation in certain areas of the brain. We are very excited about preliminary data from the development of this hypnosis procedure, and we have found that we can produce patterns of brain activation congruent to those seen in current research. Hypnosis is a procedure that involves focusing your attention and allowing your mind and body to relax. Your unconscious mind can receive hypnosis directly through this process. We are very much interested in your hypnotic experience. During your session, pay attention to your experiences so that you can report them to the research assistant at the end of your trial. If you are ready, I will start your hypnosis CD so that your session may begin."

Following this introduction by the research assistant, participants in the hypnotic treatment condition were played a CD with an initial statement followed by a standard induction and suggestions for relaxation. The introduction on the hypnosis CD was as follows: "This is a recording that you may use to experience hypnosis for relaxation. Hypnosis is a process of focusing your attention and allowing your mind and body to relax. Through this process, your unconscious mind can receive the effects of hypnosis. Because of the effects of hypnosis, it is important that, when you use this recording, you remain comfortably seated, setting other things temporarily aside so that you may fully

experience the effects of hypnosis. You should not listen to music or engage in driving or other activities during hypnosis, and you should only use this recording when you can allow yourself to become completely absorbed in hypnosis and the hypnotic experience. Different people experience different things. Whatever you experience will be right for you, as you allow whatever happens to happen, and pay attention to your hypnotic experience so that you may report your experiences to the researcher at the end of your session. In a few moments, this introduction will end, you will hear a pause, and your hypnosis session will begin. You may now close your eyes and allow yourself to experience hypnosis." This statement was followed by a recorded standard induction and suggestions for relaxation. The entire session lasted approximately 20 minutes. After the administration of hypnosis and alerting, the researcher asked the subjects to describe their experience of hypnosis.

Group 3: Placebo Condition: White Noise in the Context of Hypnosis (WN +C). Twenty-five subjects were administered approximately 20 minutes of white noise in the same context as the hypnosis group. They were also given the same instructions and introductory information as the hypnosis group, with the following exceptions: (1) participants were told that the experimental hypnotic relaxation procedure utilized white noise; and (2) they were told that the effects of the "hypnosis" were produced by subtly altering the frequencies in white noise.

Hypotheses

Aim 1: To evaluate whether white noise can be considered an "inert" procedure.

H 1.1 Participants' responses will indicate that they did not benefit from administration of white noise (WN).

Aim 2: To evaluate the credibility of a model of sham hypnosis that uses white noise as a potential form of "hypnosis" when presented within the hypnotic context.

H 2.1 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise without hypnotic context (WN) in dichotomous ratings of the therapist's professionalism.

H 2.2 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise without hypnotic context (WN) in Likert scale ratings of the therapist's professionalism.

H 2.3 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise without hypnotic context (WN) in dichotomous ratings of the hypnotic environment.

H 2.4 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise without hypnotic context (WN) in Likert scale ratings of the hypnotic environment.

H 2.5 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in positive reports that they have received a hypnosis session.

H 2.6 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in Likert scale ratings that they have received a quality hypnosis session.

H 2.7 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in dichotomous ratings of pleasantness.

H 2.8 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in Likert scale ratings of pleasantness.

H 2.9 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from

those who receive white noise (WN) in rating the experience as relaxing in a dichotomous format.

H 2.10 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in rating the experience as relaxing in Likert scale format.

H 2.11 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in positive reports of benefit from their session.

H 2.12 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in Likert scale ratings of benefit from their session.

H 2.13 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in shifts in expected benefit of hypnosis from pre- and post-session ratings.

H 2.14 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in shifts in feelings of relaxation from pre- and post-session ratings.

H 2.15 It is expected that there is an interaction between absorption and group membership and the correlation of absorption with hypnotizability. Participants assigned to the sham (H+C) and hypnosis (WN+C) groups, but not those assigned to white noise (WN), will demonstrate positive correlations between scores on the Tellegen Absorption Scale and the Elkins' Hypnotizability Scale.

H 2.16 Subjects who receive sham hypnosis (WN+C) and those who receive a hypnotic induction (H+C) will demonstrate significant differences from those who receive white noise (WN) in scores on The Treatment Acceptability Questionnaire.

Aim 3: To explore the relationships between participant characteristics and specific outcome measures.

H 3.1 Participants' attitudes toward hypnosis will positively correlate with ratings of perceived benefit in those participants assigned to the sham (WN+C) and hypnosis (H+C) conditions.

H 3.2 Participants' hypnotizability scores will positively correlate with ratings of perceived benefit in those participants assigned to the sham (WN+C) and hypnosis (H+C) conditions.

CHAPTER THREE

Results

Demographic Variables: Descriptive Statistics

Data from the main sample were evaluated for outliers though the use of box plots. It was determined that observations of 4 of the participants deviated 2.5 or more standard deviations from the mean of one or more variables of interest. Data from these cases were deleted and 4 additional subjects were run for a final sample of 75 participants.

Table 1.
Demographic factors of study participants.
All values are expressed as a percentage of the specified population.

Variable	*N*	Percent
Gender		
Female	62	83
Male	13	17
Race		
Asian	7	9
African American	7	9
Hispanic	9	12
Middle Eastern	1	1
Caucasian	48	64
Classification		
Freshman	39	52
Sophomore	14	19
Junior	16	21
Senior	6	8

The final sample was comprised of 75 undergraduate volunteers. Table 1 provides the frequencies and percentages associated with gender, race, and grade

classification. Of the sample, 83% were female (n = 62) and 13% were male (n = 13); 64% of participants were Caucasian, 12% were Hispanic, 9% were African American, 9% were Asian, and 1% was Middle Eastern. Of the sample, 52% were college freshmen, 19% were sophomores, 21% were juniors, and 8% were seniors. Analysis of demographic variables did not indicate significant differences between groups in the areas of gender, $\chi^2(4) = 3.503$, $p = .477$, $\phi_C = .153$, race, $\chi^2(8) = 4.611$, $p = .798$, $\phi_C = .175$, or year in school $\chi^2(6) = 6.875$, $p = .333$, $\phi_C = .214$.

Evaluation of White Noise as an Inert Procedure: Perception of Benefit

The relationship between group assignment and participant's perception of benefit was evaluated through dichotomous and Likert-scale ratings. Group assignment, the independent variable, was determined by randomization into one of three groups: hypnosis (H+C), sham hypnosis or the placebo condition (WN+C), or white noise in the absence of hypnotic context (WN). The dependent variable was subjects' perception of benefit from the procedure they received. It was expected that subjects who received a hypnotic induction (H+C) and those randomized to the sham condition (WN+C) would demonstrate significant differences from those who received white noise without hypnotic context (WN) in dichotomous and Likert-scale ratings of perceived benefit from the condition to which they were randomized. Participants' dichotomous ratings of perception of benefit indicated that those randomized to the hypnosis condition (100%) or placebo condition (92%) were significantly more likely to rate the procedure as beneficial than those randomized to white noise in the absence of hypnotic context (16%), $\chi^2(2) = 50.54$, $p < .001$, $\phi_C = .821$.

Likert ratings of participants' perception of benefit also indicated that subjects assigned to the hypnosis or sham groups rated the procedures as significantly more beneficial than those randomized to white noise without hypnotic context, $F(2, 72) = 66.34$, $p < .001$, $\eta_p^2 = 0.648$. To evaluate pair-wise differences among means, follow-up tests were conducted. Levene's Test of Equality of Error Variances indicated equal variances between means could not be assumed; thus, the Games-Howell procedure was utilized for pair-wise comparisons. As anticipated, results indicated a significant difference between the means of the hypnosis group and the white noise group, $p < .001$, as well as the sham and white noise group, $p < .001$. However, no significant difference was found between means of the hypnosis and sham groups, $p = .165$.

Because original data were nonnormally distributed, with skewness of -.746 ($SE = 0.277$), a natural logarithm transformation was completed. Transformation substantially corrected the skewness and transformed data, with skewness of .163 ($SE = .277$), were reanalyzed using a one-way analysis of variance. Again, participants randomized to either the sham or hypnosis groups found the procedure they received to be significantly more beneficial than those randomized to the white noise control, $F(2, 72) = 53.89$, $p < .001$, $\eta_p^2 = 0.600$. The Games-Howell procedure was again utilized to evaluate pair-wise differences among means as Levene's Test of Equality of Error Variances demonstrated equal variances among means could not be assumed. Analysis of the transformed data also indicated those participants assigned to the hypnosis, $p < .001$, and sham groups, $p < .001$, found their procedure to be significantly more beneficial than those assigned to the white noise control. Again, no significant difference was found between the hypnosis and sham groups, $p = .240$.

Table 2.
Results of ANOVA analyses of Likert scale procedural ratings

	Professional Therapist	Environment	Quality Hypnosis	Pleasant	Relaxing	Beneficial
F	17.65	203.63	207.35	63.82	59.48	66.34
P	< .001	< .001	< .001	< .001	< .001	< .001
η_p^2	0.329	0.850	0.852	0.639	.623	0.648
Pairwise Comparisons						
p H & WN	< .001	< .001	<.001	< .001	< .001	< .001
p (WN+C) & WN	.001	< .001	<.001	< .001	< .001	< .001
p H & (WN+C)	.668 (NS)	.712 (NS)	.775 (NS)	.416 (NS)	.343 (NS)	.165 (NS)

Table 3.
Means and Standard Deviations of Likert scale procedural ratings

	Professional Therapist	Environment	Quality Hypnosis	Pleasant	Relaxing	Beneficial
Hypnosis						
Mean	4.92	4.60	4.68	4.76	4.80	4.60
Standard Deviation	0.277	0.500	0.476	0.436	0.408	0.500
Sham						
Mean	4.84	4.48	4.56	4.56	4.60	4.24
Standard Deviation	0.374	0.510	0.651	0.651	0.577	0.831
White Noise						
Mean	4.04	1.88	1.52	2.48	2.52	2.08
Standard Deviation	0.889	0.600	0.714	1.122	1.229	1.077

Ratings of Therapist Professionalism

Dichotomous and Likert-scale ratings were utilized in order to evaluate the relationship between group assignment and participants' ratings of the therapist's professionalism. Group assignment via randomization into the hypnosis, sham, or white noise in the absence of hypnotic context group served as the independent variable. The dependent variable was rating of therapist's professionalism. It was expected that subjects who received the sham hypnosis and those who received a hypnotic induction would demonstrate significant differences from those who received white noise without hypnotic context in both dichotomous and Likert-scale ratings of therapist's professionalism. When dichotomous ratings were utilized to rate therapist's professionalism, 100% of participants randomized to hypnosis and the sham conditions and 92% of participants randomized to white noise group stated that the therapist acted in a professional manner. No significant difference was found between groups, $\chi^2(2) = 4.110$, $p = .128$, $\phi_C = .234$.

However, when Likert-scale ratings were used to examine the relationship between group assignment and ratings of therapist professionalism, the one-way analysis of variance was significant, $F(2, 72) = 17.65$, $p < .001$, $\eta_p^2 = 0.329$. Follow-up tests were conducted to evaluate pair-wise differences among the group means of Likert-scale ratings. Variances among means ranged from 0.07 to 0.79, and analysis using Levene's Test of Equality of Error Variances suggested unequal variances among means. The Games-Howell procedure was utilized for pair-wise comparisons. As anticipated, results indicated a significant difference between group means of ratings of therapist's professionalism in the hypnosis (H+C) group and the white noise (WN) group, $p < .001$,

as well as in the sham (WN+C) group and the white noise (WN) group, $p = .001$. However, no significant difference was found between means of the hypnosis and sham groups, $p = .668$. To reduce negative skewness of -1.719 ($SE = .277$) in the original data, a natural logarithm transformation was conducted. However, transformation only reduced skewness to 1.251 ($SE = .277$). Therefore, no additional analyses were performed.

Evaluation of Environment

Dichotomous and Likert ratings were utilized in order to evaluate the relationship between group assignment and participants' ratings of the environment as consistent with a hypnosis session. The independent variable was group assignment to the hypnosis, sham, or white noise condition. Environmental evaluation served as the dependent variable. The researcher hypothesized that subjects randomized to the hypnosis (H+C) or the sham hypnosis (WN+C) conditions would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in their evaluation of the environment as consistent with a hypnosis session.

Analysis of subjects' dichotomous ratings of the environment indicated that participants randomized to the sham (100%) or hypnosis (100%) groups were significantly more likely than those randomized to the white noise condition (4%) to rate the environment as consistent with a hypnosis session, $\chi^2(2) = 70.59$, $p < .001$, $\phi_C = .970$. A one-way analysis of variance was conducted in order to evaluate the relationship between group assignment and participants' Likert-scale ratings of the environment as congruent with expectations for a hypnosis session. The ANOVA was significant, $F(2, 72) = 203.63$, $p < .001$, $\eta_p^2 = 0.850$. Pair-wise differences among means were evaluated

through the conduct of follow-up tests. Because Levene's Test of Equality of Error Variances indicated equal variances between means could be assumed, Tukey's HSD test was utilized for pair-wise comparisons. As anticipated, results indicated a significant difference between the means of the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, as well as between the sham (WN+C) and the white noise (WN) group, $p < .001$. However, there was not a significant difference between means of the hypnosis and sham groups, $p = .712$.

Receipt of Hypnosis

It was hypothesized that participants randomized to the hypnosis and sham conditions would demonstrate significant differences from those randomized to the white noise control in their perception that they had received hypnosis. In order to evaluate the relationship between group assignment and subjects' report that they had received hypnosis, dichotomous and Likert-scale ratings were utilized. Group assignment to hypnosis, sham, or white noise in the absence of hypnotic context served as the independent variable. Subjects' perception that they had received a hypnosis session served as the independent variable. Dichotomous ratings of subjects' perception that they had received a hypnosis session indicated that participants randomized to the hypnosis (100%) and sham (100%) groups reported that they had received hypnosis significantly more than those randomized to white noise (0%), $\chi^2(2) = 75.00$, $p < .001$, $\phi_C = 1.00$

When the relationship between group assignment and participants' reporting that they had received a "quality" hypnosis session were evaluated using Likert-scale ratings, the ANOVA was also significant, $F(2, 72) = 207.35$, $p < .001$, $\eta_p^2 = 0.852$. Differences among group means of Likert-scale ratings evaluating participants' perception that they

had received a quality hypnosis session were evaluated through pair-wise comparisons. Variances among group means ranged from 0.22 to 0.51, and Levene's Test of Equality of Error Variances indicated equal variances between means could be assumed. Thus, Tukey's HSD test was utilized for pair-wise comparisons. As anticipated, results indicated a significant difference between the means of those participants randomized to the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, as well as those randomized to the sham (WN+C) and the white noise (WN) group, $p < .001$. However, there was no significant difference between group means of participants randomized to hypnosis or to the sham, $p = .775$.

Evaluation of Pleasantness

To examine the relationship between group assignment and subjects' ratings of the procedure they received as pleasant, dichotomous and Likert-scale ratings were utilized. Group assignment again served as the independent variable and consisted of three categories: hypnosis (H+C), sham (WN+C), or white noise (WN) in the absence of hypnotic context. Subjects' rating of the procedure they received as pleasant served as the dependent variable. It was anticipated that subjects randomized to the hypnosis (H+C) or the sham hypnosis (WN+C) conditions would demonstrate significant differences from those randomized to white noise in the absence of hypnotic context (WN) in their evaluation of the procedure they experienced as pleasant.

Dichotomous ratings of subjects' pleasantness ratings indicated that those participants who received hypnosis (100%) and those who received the sham (100%) were significantly more likely to rate the procedure as pleasant than those who received white noise (29.2%), $\chi^2(2) = 45.98$, $p < .001$, $\phi_C = .788$. When Likert-scale ratings were

utilized to evaluate the relationship between group assignment and participants' pleasantness ratings by a one-way analysis of variance, results were also significant $F(2, 72) = 63.82$, $p < .001$, $\eta_p^2 = 0.639$. Pair-wise comparisons were conducted through follow-up tests to evaluate difference among group means. Group mean variances ranged from 0.17 to 1.41, and Levene's Test of Equality of Error Variances indicated equal variances between means could not be assumed. Thus, the Games-Howell procedure was utilized for pair-wise comparisons. Consistent with expectations, results indicated a significant difference between the means of those participants randomized to the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, as well as those randomized to the sham (WN+C) and the white noise (WN) group, $p < .001$. Also consistent with expectations, there was no significant difference in group means of pleasantness ratings between those participants randomized to hypnosis and those randomized to the sham conditions, $p = .416$.

Because original data had a skewness of -1.054 ($SE = .277$), a natural logarithm transformation was conducted and transformed data, with a skewness of .474 ($SE = .277$) were reanalyzed. Results were consistent with those of the original data, and the ANOVA was again significant, $F(2, 72) = 65.97$, $p < .001$, $\eta_p^2 = 0.647$. Follow-up tests were again utilized to examine differences among group means. Because Levene's Test of Equality of Error Variances indicated equal variances between means could be assumed, Tukey's HSD test was utilized for post-hoc analysis. Results again indicated significant differences between means of ratings of participants randomized to the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, as well as those randomized to the sham (WN+C) and the white noise (WN) group, $p < .001$. Again, no

significant difference was found between the means of participants randomized to the hypnosis and sham groups, p=.477

Ratings of Relaxation

Dichotomous and Likert-scale ratings were also used to evaluate the relationship between group assignment and subjects' perception of the procedure to which they were assigned as relaxing. Group assignment served as the independent variable and consisted of three categories: hypnosis (H+C), sham (WN+C), or white noise (WN) in the absence of hypnotic context. Subjects' perception of the procedure they received as relaxing served as the dependent variable. It was anticipated that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in rating their experience as relaxing. Subjects' dichotomous ratings of their experience as relaxing indicated that those who received hypnosis (100%) or the sham (100%) were significantly more likely to rate the procedure as relaxing than were those randomized to white noise (34.8%), $\chi^2(2) = 41.04$, $p < .001$, $\phi_C = .750$.

Results of one-way analysis of variance of participants' Likert scale ratings of the procedure they received as relaxing were also significant, $F(2, 72) = 59.48$, $p < .001$, $\eta_p^2 = 0.623$. Follow-up tests using pair-wise comparisons among means were used to evaluate group Likert-scale relaxation ratings. Variances of group means ranged from 0.17 to 1.51, and Levene's Test of Equality of Error Variances suggested equal variances between means could not be assumed. The Games-Howell test was therefore utilized for pair-wise comparisons. Consistent with anticipated outcomes, results showed significant differences between group means of both the hypnosis (H+C) group and the white noise

(WN) group, $p < .001$, as well as the sham (WN+C) and the white noise (WN) group, $p < .001$. Further, no significant difference was seen between group means of relaxation ratings in the hypnosis and sham conditions, $p = .343$.

Shifts in Expected Benefit

The researcher hypothesized that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in pre- and postsession shifts in expected benefit of hypnosis. Group assignment again served as the independent variable and shifts in benefit expectancy of hypnosis served as the dependent variable.

An omnibus F test indicated significant differences between groups, $F(2,72) = 12.69$, $p < .001$, $\eta_p^2 = 0.623$. To examine pair-wise differences among group means, follow-up tests were utilized. Group mean variances ranged from 247.12 to 479.17, and Levene's Test of Equality of Error Variances indicated equal variances among means could not be assumed. Therefore, the Games-Howell procedure was utilized for pair-wise comparisons. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, and between the sham (WN+C) and white noise (WN) group, $p = .001$. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, $p = .840$.

Shifts in Relaxation Ratings

In order to evaluate the relationship between group assignment and subjects' changes in ratings of relaxation before and after the session, a one-way analysis of

variance was conducted. Randomization group served as the independent variable and consisted of three categories: hypnosis (H+C), sham (WN+C), or white noise in the absence of hypnotic context (WN). Subjects' shift in VAS relaxation ratings pre- and postsession served as the dependent variable. It was expected that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in shifts of VAS ratings of relaxation.

An omnibus F test indicated significant differences between groups, $F(2,72) = 7.09$, $p = .002$, $\eta_p^2 = 0.165$. Pair-wise differences among group means were examined through post-hoc analysis. Levene's Test of Equality of Error Variances indicated equal variances among means could be assumed. Therefore, Tukey's HSD test was utilized for pair-wise comparisons. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, $p = .005$, and between the sham (WN+C) and white noise (WN) group, $p = .004$. Also consistent with expectation, no significant difference was found between the hypnosis and sham groups, $p = .997$.

Correlations Between Hypnotizability and Absorption

Correlation coefficients were calculated among scores on the Tellegen Absorption Scale and the Elkins Hypnotizability Scale in each of the randomization groups. It was expected that participants assigned to the sham (WN+C) and hypnosis (H+C) groups, but not those assigned to white noise (WN), would demonstrate positive correlations between scores on the Tellegen Absorption Scale and the Elkins' Hypnotizability Scale.

As anticipated, results demonstrated a positive, significant correlation between absorption and hypnotizability in the hypnosis group (H+C), r = .495, p = .023. A significant correlation was not seen in the sham group (WN+C), r = .351, p = .100 or in the white noise group (WN), r = .17, p = .595.

Evaluation of Acceptability of Procedures

It was anticipated that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in scores on the Treatment Acceptability Questionnaire. The questionnaire consists of six questions that evaluate various aspects of the degree to which persons find a proposed treatment to be acceptable. The outcomes of analysis of both total treatment acceptability scores and individual questions comprising the questionnaire will be addressed here. In each of these analyses, group assignment served as the independent variable and the outcome measure served as the dependent variable.

It was anticipated that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to receive white noise in the absence of hypnotic context (WN) in their perception of the procedure they received as acceptable. An omnibus F test indicated significant differences between groups, $F(2,72) = 63.42$, $p < .001$, $\eta_p^2 = 0.638$. Group mean variances ranged from .576 to 1.9993, and Levene's Test of Equality of Error Variances indicated equal variances among means could not be assumed. Therefore, the Games-Howell test was utilized for post hoc pair-wise comparisons of group means. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white

noise (WN) group, $p < .001$, and between the sham (WN+C) and white noise (WN) group, $p < .001$. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, $p = .573$.

It was also hypothesized that subjects randomized to receive hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to the white noise control (WN) in their perception of the procedure they received as ethical. The omnibus F was significant, $F(2,72) = 25.197$, $p < .001$, $\eta_p^2 = 0.412$. To examine pair-wise differences among group means, the Games-Howell test was utilized for pair-wise comparisons, as group mean variances ranged from .323 to 2.193, and Levene's Test of Equality of Error Variances indicated that equal variances among means could not be assumed. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, and between the sham (WN+C) and white noise (WN) group, $p < .001$. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, $p = .889$.

Because original data were non-normally distributed, with skewness of -1.14 ($SE = 0.277$), a natural logarithm transformation was completed. Transformation substantially corrected the skewness and transformed data, with skewness of -.128 ($SE = 0.277$) were re-analyzed. Again, the ANOVA was significant, $F(2,72) = 19.684$, $p < .001$, $\eta_p^2 = 0.353$. Levene's test of equality of Error Variances again demonstrated that equal variances among group means could not be assumed. Thus, the Games-Howell procedure was used for pair-wise comparisons of transformed data, and outcomes demonstrated significant differences between the hypnosis, $p < .001$, and sham groups, p

< .001, when compared to the white noise group. However, these differences were not seen between the hypnosis and sham group, $p = .912$.

A one-way analysis of variance was also utilized to examine the relationship between group assignment and participants' perception of the procedure they received as an effective procedure to help people relax. The researcher hypothesized that subjects randomized to the hypnosis (H+C) or sham conditions (WN+C) would demonstrate significant differences from those randomized to the white noise in condition in ratings of the procedures as effective. The omnibus F was significant, $F(2,72) = 69.25$, $p < .001$, $\eta_p^2 = 0.658$. Levene's Test of Equality of Error Variances indicated equal variances among group means could be assumed. The Tukey HSD test was therefore utilized for pair-wise comparisons. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, and between the sham (WN+C) and white noise (WN) groups, $p < .001$. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, $p = .709$

Participants' perception that the procedure they received might have negative side effects was also evaluated by one-way analysis of variance. It was anticipated that subjects randomized to hypnosis (H+C) or sham hypnosis (WN+C) would demonstrate significant differences from those randomized to white noise control (WN) in their perception that the procedure they were administered might have negative side effects. Inconsistent with expectations, the omnibus F was not significant, $F(2,71) = 1.021$, $p = .365$, $\eta_p^2 = 0.028$.

A one-way analysis of variance was also utilized to examine the relationship between group assignment and participants' perception of the researcher as knowledgeable. The omnibus F was significant, F (2,72) = 27.81, p < .001, $\eta_p^2 = 0.436$. For purposes of post-hoc comparisons of group means, Levene's Test of Equality of Error Variances indicated that equal variances among group means could not be assumed. The Games-Howell procedure was thus utilized for pair-wise comparisons. Consistent with anticipated outcomes, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, p < .001, and between the sham (WN+C) and white noise (WN) group, p < .001. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, p = 1.00.

To correct the skewness of 1.051 (*SE*=.279) found in the original data and address the error it potentially produced, a natural logarithmic transformation of the data was conducted and transformed data, skewness of 0.319 (*SE*=.279) were analyzed. Again, the omnibus F was significant, F(2,72) = 38.07, p < .001, $\eta_p^2 = 0.514$. To evaluate post-hoc pair-wise comparisons, the Games-Howell procedure was again utilized as Levene's Test of Equality of Error Variances indicated that equal variances among group means could not be assumed. Results were again consistent with anticipated outcomes. Both participants randomized to the hypnosis condition, p < .001, and those randomized to the sham, p < .001, demonstrated significant differences from those randomized to the white noise condition in ratings of researcher knowledge. Also consistent with hypothesized outcomes, no significant difference was found between the hypnosis and sham groups, p = .990.

To evaluate participants' perception of the researcher who administered their procedure as trustworthy, a one-way analysis of variance was utilized. Results were significant, F (2,72) = 17.79, p < .001, η_p^2 = 0.331. The Games-Howell procedure was utilized for post-hoc pair-wise comparisons because Levene's Test of Equality of Error Variances indicated that equal variances among group means could not be assumed. Results showed a significant difference between the hypnosis (H+C) group and the white noise (WN) group, p < .001, and between the sham (WN+C) and white noise (WN) group, p = .001. Also consistent with expectations, no significant difference was found between the hypnosis and sham groups, p = .721. A natural logarithmic transformation of the data was conducted to correct the skewness of -1.622 (*SE*= .277) of the original data and address potential error it might produce. It should be noted that, although transformed data still possessed significant skewness of 1.073 (*SE*=.277), the transformation reduced the skewness by almost half. Transformed data were therefore analyzed. Again, the omnibus F was significant, F (2,72) = 18.986, p < .001, η_p^2 = 0.345. Because Levene's Test of Equality of Error Variances again indicated that equal variances among group means could not be assumed, the Games-Howell procedure was utilized for post-hoc pair-wise comparisons. Results indicated that participants randomized to the hypnosis condition, p < .001, as well as those randomized to the sham, p < .001, demonstrated significant differences from those randomized to the white noise condition in ratings of researcher trustworthiness. No significant difference was found between the hypnosis and sham groups, p = .809.

The relationship between participants' Total Treatment Acceptability ratings and group assignment was also conducted via one-way analysis of variance. The researcher

hypothesized that subjects randomized to the hypnosis (H+C) or sham conditions (WN+C) would demonstrate significant differences from those randomized to the white noise (WN) in their overall ratings of the procedures they received as an acceptable procedure to help people relax. The omnibus test was significant, F (2,72) = 78.59, p < .001, $\eta_p^2 = 0.589$. Levene's Test of Equality of Error Variances indicated that equal variances among group means could not be assumed, so the Games-Howell procedure was utilized for post-hoc follow-up tests. Consistent with expectations, results indicated a significant difference between the hypnosis (H+C) group and the white noise (WN) group, $p < .001$, as well as between the sham (WN+C) and white noise (WN) group, $p = .001$. Also congruent with anticipated outcomes, no significant difference was found between the hypnosis and sham groups, $p = .823$. Because original data were non-normally distributed, with skewness of -0.771 (SE = .279), a square root transformation was completed and data were reanalyzed. The ANOVA was again significant, F (2,72) = 71.98, $p < .001$, $\eta_p^2 = 0.670$. Levene's Test of Equality of Error Variances demonstrated that equal variances among group means of transformed data could be assumed. Thus, Tukey's HSD test was employed for post-hoc comparisons among group means. Results again demonstrated significant differences between participants randomized to the hypnosis condition and white noise condition, $p < .001$, and those randomized to the sham and white noise condition, $p < .001$, in total Treatment Acceptability Scale scores. Again, no significant difference was demonstrated between the hypnosis and sham groups, $p = .886$.

Table 4.
Results of ANOVA analyses of Treatment Acceptability Questionnaire

	Acceptable	Ethical	Effective	Negative Side Effects	Knowledgeable	Trustworthy	Total
F	63.42	25.197	69.25	1.021	27.81	17.79	78.59
p	<.001	<.001	<.001	.365 (NS)	<.001	<.001	<.001
η_p^2	0.638	0.412	.658	.028	0.436	.331	0.589
Pairwise Comparisons							
p H & WN	<.001	<.001	<.001		<.001	<.001	<.001
p WN+C & WN	.001	<.001	<.001		<.001	<.001	.001
p H & WN+C	.573 (NS)	.889 (NS)	.709 (NS)		1.00 (NS)	.721 (NS)	.823 (NS)

Table 5.
Means and standard deviations of Treatment Acceptability Questionnaire

	Acceptable	Ethical	Effective	Negative Side Effects	Knowledgeable	Trustworthy	Total
Hypnosis							
Mean	6.08	6.56	5.96	2.04	6.80	6.84	34.17
Standard Deviation	0.759	0.651	0.841	1.083	0.408	0.374	2.334
Sham							
Mean	5.80	6.64	5.72	2.04	6.80	6.72	33.72
Standard Deviation	1.155	0.569	1.100	1.457	0.500	0.678	2.894
White Noise							
Mean	2.80	4.88	2.76	2.52	5.08	5.56	23.60
Standard Deviation	1.414	1.481	1.234	1.503	1.498	1.227	4.444

Correlation of Attitudes Toward Hypnosis and Perceived Benefit From Procedures

It was hypothesized that participants' attitudes toward hypnosis would positively correlate with ratings of perceived benefit in those participants assigned to the sham (WN+C) and hypnosis (H+C) conditions. Results did not demonstrate a significant correlation between participant's attitudes toward hypnosis and perceived benefit from procedures in participants assigned to the hypnosis group, r = .040, *p* =.829 or in participants assigned to the sham group, r = .319, *p* =.120.

Table 6.
Correlations between attitudes toward hypnosis and perceived benefit from procedures

	Hypnosis	Sham
r	.040	.319
P	.829	.120

Correlation of Attitudes Toward Hypnosis and Hypnotizability

The researcher anticipated that participants' hypnotizability scores would positively correlate with ratings of perceived benefit in those participants assigned to the sham (WN+C) and hypnosis (H+C) conditions. Contrary to expectations, outcomes did not demonstrate a significant, positive correlation between participant's attitudes toward hypnosis and hypnotizability in those assigned to the hypnosis group, r = .192, *p* =.357, on in those assigned to the sham group, r = .365, *p* =.073. Again, however, neither of these correlations was statistically significant.

Table 7.
Correlations between attitudes toward hypnosis and hypnotizability

	Hypnosis	Sham
r	.192	.365
P	.357	.073

CHAPTER FOUR

Discussion and Conclusions

As noted in the Introduction, research on the efficacy of hypnosis has been limited due to the lack of a sham hypnosis (placebo) for comparison to use as a control in randomized clinical trials (Neumann, 2005; Patterson & Jensen, 2003). Instead, researchers have had to use a variety of controls, including attention or no-treatment, other mind-body therapies, psychological interventions, pill placebo (e.g., Everett, Patterson, Burns, Montgomery, & Heinbach, 1993), or psychological placebo (e.g., Spanos, Stenstrom, & Johnston, 1988). Such inconsistency greatly limits researchers' methodology and makes it difficult to compare study results or make aggregate statements regarding hypnosis' efficacy. Further, a clearly identified and feasible sham hypnosis is necessary for research to be consistent with recent guidelines defining empirically supported treatments (APA, 1995; Chambless & Hollon, 1998). Current clinical research reflects the need to empirically evaluate hypnosis' efficacy according to these recommendations.

Thus, the objective of this dissertation was to evaluate the feasibility of using white noise presented in the context of hypnosis as a placebo in randomized controlled trials. The study consisted of three primary aims: 1) to evaluate whether white noise can be considered an "inert" procedure; 2) to evaluate the credibility of a model of sham hypnosis that uses white noise as a potential form of "hypnosis" when presented within the hypnotic context; and 3) to explore the relationships between participant characteristics and specific outcome measures.

To evaluate the utility of the sham hypnosis, 75 undergraduate students were randomized to one of three groups: hypnosis, sham (white noise presented in the context of hypnosis), or control (white noise presented in the absence of hypnotic context). Measures of interest involved participants' ratings of: 1) therapist's professionalism; 2) the consistency of the environment with hypnosis; 3) subjects' perception that they received hypnosis; 4) subjects' evaluation of the procedure as pleasant, relaxing, and beneficial; 5) participants' perceived acceptability of the procedure they received; and 6) shifts in relaxation resulting from each procedure.

In each of these areas, subjects who received the sham hypnosis and those who received a hypnotic induction demonstrated significant differences from those assigned to the white noise control. However, there were no significant differences between participants' ratings of the sham and hypnosis procedure in any of these domains. Thus, these results support the feasibility of using white noise as an inert procedure that, given the proper environmental context, can serve as a credible sham hypnosis.

Another measure of interest involved shifts in pre- and postsession ratings of expected benefit from hypnosis. In this case, each participant was asked to rate his or her expectation that hypnosis could help people relax on a visual analog scale. Importantly, because pre- and postsession ratings of hypnosis were measured in all three groups, interpretation of this data could be misleading. The study would be improved by measuring pre- and postsession ratings of expected benefit of white noise within the white noise group and comparing these ratings to shifts in expected benefit in hypnosis in the hypnosis and sham groups.

With regard to potential relationships between participant characteristics and specific outcome measures, study results did not suggest a relationship between participants' attitudes toward hypnosis and 1) participants' perception of the sham or hypnosis as beneficial or 2) hypnotizability of the participants assigned to the hypnosis condition. When the relationship between hypnotizability and absorption was examined, however, results demonstrated a positive, significant relationship between hypnotizability and absorption within participants in the hypnosis group. However, while a positive correlation between hypnotizability and absorption was also seen in both the sham and white noise groups, neither of these correlations was significant. Thus, the hypothesis that a significant, positive relationship between hypnotizability and absorption would be seen in the sham group was not confirmed. This finding is interesting as it is consistent with previous findings that hypnotizability and absorption are correlated when absorption is measured following a hypnotic induction; thus, the finding further supports the nonhypnotic nature of the noise.

Limitations of the Study

In interpreting the findings of this research, several limitations that may have influenced study outcomes should be acknowledged. One of the primary limitations of the study is that the sample consisted entirely of undergraduate college students at a private university. Thus, generalizability of results to a greater population demographic cannot be assumed.

Another limitation of this study involves the measurement of participants' responses to the condition to which they were assigned. Because this was a feasibility study and measures to evaluate the credibility of a sham hypnosis have yet to be

established, the researcher and her mentor created some of the measures used to evaluate the sham procedure. Thus, feedback from procedures was evaluated—at least in part—by measures for which the validity and reliability have yet to be established. Further, because measures consisted of self-report questionnaires, results are dependent upon accurate self-report by participants.

Additionally, because participants were self-selected to participate in an experiment designed to evaluate "experimental hypnosis procedures," it is possible that participants' generally favorable response to both the sham and the hypnosis conditions were influenced by their perception of the purpose of the experiment or that their responses reflected a cooperative subject effect. In relation to the possibility of this cooperative subject effect, it may be the case that there is a relationship between participants' status as undergraduate students and a tendency to respond in ways consistent with their perception of experimenters' expectations. It is also possible that responses from participants who were randomized to the white noise condition—who also self-selected to participate in an experiment designed to evaluate an experimental hypnosis procedure—were influenced by a feeling of resentment that they were assigned to a condition inconsistent with their expectations when they signed up for the study. Further, in all conditions, subjects were observed, which may have affected their responses to their assigned procedure.

Evaluation of the white noise control as inert was to involve administering white noise in the absence of any hypnotic context. The hypnotic context involves many factors that influence placebo effects, such as therapist or researcher warmth and friendliness, environmental comfort, contextual cues in the environment, good clinical

management, and demonstrated interest in the participant / patient by the clinician. Research suggests that all these factors influence participants' responses to administered placebo. This is not a problem in pharmacological placebo as researchers know the actual placebo pill to be inert. However, to evaluate the inertness of a placebo procedure in the absence of influential factors produces a new set of challenges. That is, the nature of research inevitably is confounded by social norms, participants' expectations of the environment and their experience, and the nature of relationships between researchers and subjects. It follows that, when researchers attempt to remove environmental and relational factors (such as therapist warmth) known to influence placebo effects, subjects' responses to the inert substance in the absence of a therapeutic or hypnotic environment may be negatively influenced by their preconceived notions of their potential research experience.

A further complication to methodology of the white noise condition is the extraordinary difficulty in creating a neutral environment as a part of this study. Because of subject expectations, societal norms, and the fact that participants randomized to the white noise condition volunteered for a hypnosis study at the Mind Body Medicine Research Laboratory, the question arises: Is it possible to create a truly neutral environment and remove all factors known to influence placebo effects without participants' automatically perceiving the noise as negative?

Additionally, because the white noise administered in the sham was recorded and participants were invited to change the CD volume to a level that was comfortable, it is possible that the participants altered the volume in the sham condition to a level that increased their comfort. Further, this study evaluated the feasibility of the sham only for

relaxation; thus, results cannot necessarily be generalized to other conditions, such as for persons seeking hypnotherapy for pain, vasomotor events, or procedural discomfort.

Directions for Future Research

As has been emphasized, this research was a feasibility study. It follows that future directions for research include methodological refinement of procedures. For example, the white noise procedure could be administered to persons in an environment free from any hypnotic or placebo-augmenting context and in a situation wherein participants do not expect to receive hypnosis as a part of participating in the study, thereby controlling for potential negativity resulting from disappointment in group assignment. Additionally, future research could examine the manner in which procedures might need to be refined so that the placebo could be tested in comparison to hypnosis for purposes other than to help people relax.

Further, as a part of this feasibility study, the hypnosis and sham procedures were administered via CD in order to simplify the administration of standardized procedures. Future work is needed to compare the sham to a live hypnosis induction and to sort out the nuances of the sham procedure as well as how to account for the variable of the therapist in utilizing the sham in comparison to a live hypnosis session. This would be particularly important for hypnosis for medically related conditions, as most of these procedures are administered via live induction. It is also suggested that future research replicate this work with populations other than college undergraduates so that the findings can be evaluated for their generalizability to other populations. Finally, it will be important for this work to be replicated with clinical conditions. For this research to

be extended beyond a feasibility study, the work should be replicated in trials with numerous clinical conditions.

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