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**A meta-analysis of the effects of meditation and hypnosis on
measures of anxiety**

Edwards, David Lynn, Ph.D.

Texas A&M University, 1990

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300 N. Zeeb Rd.
Ann Arbor, MI 48106

**A META-ANALYSIS OF THE EFFECTS OF MEDITATION
AND HYPNOSIS ON MEASURES OF ANXIETY**

**A Dissertation
by
DAVID L. EDWARDS**

**Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY**

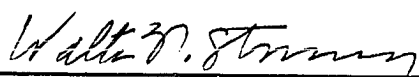
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Major Subject: Counseling Psychology


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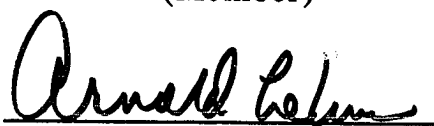
A Dissertation
by
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ABSTRACT

A Meta-Analysis of the Effects of Meditation and Hypnosis
on Measures of Anxiety. (December 1990)

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This meta-analysis was conducted to determine the effects of meditation and hypnosis techniques on psychometric measures of anxiety. The chief measure employed in the evaluated research was the State-Trait Anxiety Inventory (Spielberger, 1970; 1983).

An extensive literature search identified several hundred related studies. A combination of the desired search terms narrowed this to 109 highly related studies. The final analyzed group included 21 hypnosis studies and 54 meditation studies. Effect sizes were then calculated for each included study, employing a pooled estimate of the population standard deviation (Hedges and Olkin, 1985). Where appropriate, statistical comparisons of effect sizes were undertaken.

Both techniques were effective in reducing measures of state anxiety (Hypnosis = $-.858$; Meditation = $-.745$). However, for measures of trait anxiety, meditation was more effective (Meditation = $-.686$; Hypnosis = $-.347$). This difference was statistically significant.

Data concerning the impact of practice time indicated that practice length influenced hypnosis effect sizes. A moderate amount of practice (three to six weeks) was associated with larger effect sizes. No significant differences were found for meditation studies. This study also indicated that journal source articles produced significantly larger hypnosis effect sizes. Meditation effect sizes did not significantly differ on the basis publication source.

Data from this project found non-significant differences in effect sizes for the different hypnosis techniques. For meditation studies, Transcendental Meditation (TM) was somewhat more effective than other techniques. However, the only statistically significant difference was between TM and Relaxation Response trait anxiety effect sizes. Finally, results also suggested that the level of subject-instructor contact did not significantly influence hypnosis state anxiety effect sizes. Hypnosis trait anxiety effect sizes did, however, significantly differ in favor of moderate levels of contact. Effect sizes did not significantly differ on the basis of contact level for meditation studies.

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CHAPTER I

INTRODUCTION

In the last several years, the mental health profession has witnessed major changes in how psychological services are marketed and provided. With psychology's move into Health Maintenance Organizations (HMO's), and other forms of corporate care-providing, there has been a move toward limiting care costs, and the inclusion of a variety of techniques aimed at preventative mental health care (Jacobs & Goodman, 1989). These emerging trends, and the recent heightened awareness of the role of stress or anxiety in both mental, and physical illness (some estimates suggest stress reactivity is implicated in up to 70% of all illness), has resulted in self-regulation techniques gaining prominence as therapeutic adjuncts in clinical settings (Carrington & Ephron, 1975; Kenny & Delmonte, 1986) and as stress management techniques (Woolfolk & Lehrer, 1984).

Self-regulation methods have been used in the treatment of substance abuse, alcoholism (Delmonte, 1985), in weight reduction programs (Rowley, 1986), as a method for reducing stress or anxiety (Brooks & Scarano, 1985), and for self-development or personal growth (Delmonte, 1984;

This proposal follows the style of the Journal of Counseling Psychology.

Fritz & Mierzwa, 1983). The self-regulation techniques which have been most consistently supported in the empirical research assessing anxiety reduction include: Autogenic therapy, biofeedback, cognitive behavioral techniques, hypnosis, meditation, and progressive relaxation (Crasilneck & Hall, 1985; Dillbeck, 1977; Woolfolk & Lehrer, 1984).

To date, there have been several hundred studies investigating self-regulation techniques in connection with numerous client concerns (Ferguson, 1981; Schwartz & Shapiro, 1978). The aim of this study, is to narrow the focus to measures of anxiety and to attempt to assess the effectiveness of two types of self-regulation methods (hypnosis and meditation) in reducing anxiety. Even within this restricted area of research, there are hundreds of empirical studies which have investigated the effectiveness of hypnosis, and meditation (Delmonte, 1987; Ferguson, 1981; Humphreys, 1984; Woolfolk & Lehrer, 1984).

A great deal of information has been accumulated regarding the reduction of anxiety through the application of hypnosis and meditation techniques. However, this useful information is dispersed throughout a vast number of diverse publications. Few psychologists have the time to consult, or are able to access all of these publications. Due to this situation, most professionals are exposed to a small number of studies on this topic, which are published in the most accessible journals.

Unfortunately, many of the most recent studies or reviews have produced inconsistent and often contradictory outcomes (Benson & Friedman, 1985; Holmes, 1984). As a result, the true nature of this body of research remains somewhat unclear.

The question, then, is how to best contribute to the existing body of knowledge regarding the effectiveness of meditation and hypnosis techniques in reducing psychometrically measured anxiety. One method available would involve conducting an additional empirical investigation, in the form of a controlled experiment. A second possible approach would be to analyze a large amount of research data, from available studies, into a quantitative statement about the effectiveness of meditation and hypnosis techniques in reducing psychometrically measured anxiety. Supporting this approach, are Glass, McGaw, and Smith (1981) who have called upon psychologists to employ meta-analytic research techniques to clarify the implications of large groups of existing research studies.

The following discussion will briefly summarize the status of research in the area of meditation and hypnosis related to the reduction of anxiety. It will also suggest, based on the nature of the existing research, that a meta-analysis will produce a useful addition to the body of knowledge regarding meditation, hypnosis, and anxiety reduction.

Anxiety

Until recent years, anxiety and its role in mental illness, was central to much of the thinking in psychoanalysis and psychology. However, over the last several years there have been attempts to redefine, and narrow the meaning of anxiety. In current usage (American Psychiatric Association, 1987), anxiety is thought to refer to: Apprehension, tension, or uneasiness resulting from the anticipation of a dangerous situation (either external or internal in source). In addition, anxiety has also been defined as being limited to apprehension regarding an unknown source of fear or danger. Indicators of anxiety include: Motor tension, autonomic hyperactivity, apprehensive expectation, vigilance, and scanning.

Anxiety may be focused on objects, activities, situations, or may be free-floating. The primary psychiatric diagnostic categories involving anxiety include: Adjustment Disorder with Anxious Mood, Generalized Anxiety Disorder, Panic Disorders, Phobias, Obsessive Compulsive Disorder, and Post-traumatic Stress Disorder (APA, 1987). Anxiety is also implicated as a major contributing, or associated factor, in many other mental disorders (APA, 1987).

Other conceptualizations of anxiety have suggested that it may include both mental and somatic elements (Delmonte, 1985; Schwartz, Davidson, & Goleman, 1978). The implication then, is that anxiety is represented both in the body and in the

mind of the individual. Based on this concept, Davidson and Schwartz (1976) suggested anxiety may be divided into two types (cognitive or somatic anxiety). In addition, they also suggested that different types of techniques vary in effectiveness, based on whether the technique is focused on somatic or cognitive anxiety (Davidson & Schwartz, 1976).

In opposition to this concept is the work of Benson (1975), who suggested anxiety is a unitary process which may be treated with a variety of techniques. Benson concluded many techniques produce a "relaxation response" which is sufficient to treat anxiety or stress reactivity in general. At this time, the debate in the research literature between the "multi-process" model and the "unitary" model of anxiety appears unresolved (Delmonte, 1984, 1985).

Anxiety may be examined from several perspectives: Physical markers (EMG, blood pressure, skin resistance, or body temperature), behavioral observations, and psychometric measures (Woolfolk & Lehrer, 1984). This analysis will focus on psychometric measures of anxiety.

Meditation

Meditation has in recent years gained popularity as an adjunct to psychotherapy (Carrington & Ephron, 1975; Deikman, 1982; Krynicki, 1980; Shapiro & Giber, 1978; Smith, 1975), and as a technique for self-regulation (Abrams & Siegal,

1978; Smith, 1986) or stress management (Delmonte & Kenny, 1987; Shapiro & Walsh, 1984). The early research in the area of meditation (prior to 1973), was often undertaken by advocates or practitioners of various meditation techniques, and in many cases lacked the scientific rigor desired in empirical investigations (Carrington, 1978; Ferguson & Gowan, 1976; Schwartz & Shapiro, 1978). This first group of studies found almost universal positive effects for meditation in connection with anxiety reduction or stress management, in treating phobias, pain, asthma, and in positively influencing measures of personality (Brooks & Scarano, 1985; Davidson, Goleman & Schwartz, 1976; Quality Assurance Project, 1985; Rios, 1979; and Shapiro, 1978, 1982).

Work conducted since that time has tended to produce more equivocal findings. This second wave of meditation research has also tended to employ superior research designs (random assignment of subjects, use of control groups, demand control, double blind designs, etc.) (Delmonte, 1981, 1984, & 1985; Fling, Thomas, & Gallaher, 1981; Heide, Wadlington & Lundy, 1980). Currently, the status of meditation as an effective anxiety reducing treatment is less clear due to the mixed outcomes in the recent literature (Delmonte, 1987; Galanter & Buckley, 1978; Rivers & Spanos, 1981). Many recent studies have continued to suggest the value of meditation in the treatment of anxiety, hypertension, and for personal

development; however, other studies have found less support for these techniques (Busby & De Koninck, 1980; Kenny & Delmonte, 1986; Throll, 1981; Zilka, 1987).

Typical literature reviews have come to different conclusions and in some cases have been selective in terms of studies included for review. Some reviews have concluded meditation was associated with reductions in anxiety and psychopathology, and was effective in the treatment of hypertension and phobias. In contrast, one review found meditation to be ineffective in reducing somatic markers of stress, while another review came to essentially the opposite conclusion (Delmonte, 1985; Dillbeck & Orme-Johnson, 1987; Holmes 1984; Murray, 1982; Shapiro & Giber, 1977; Smith, 1975)

Two dissertations have involved meta-analytic examinations of meditation. Ferguson (1981), compared meditation techniques for all psychological self-report outcome measures, and Kuchera (1986) looked at the effectiveness of meditation techniques in reducing blood pressure. In both cases, meditation was suggested to be effective. More recently, Eppley, Abrams, & Shear (1989) conducted a meta-analysis of the effect of meditation, progressive relaxation and biofeedback on measures of trait anxiety. Studies included in this analysis, were obtained from research conducted prior to 1983. They concluded that meditation and biofeedback were

effective in reducing measures of trait anxiety. Meditation, specifically Transcendental Meditation (TM), was found to be most effective.

An additional meta-analysis concerning meditation appears justified on several counts. First, different outcome measures were analyzed in previous meta-analyses of meditation (Ferguson, 1981; Kuchera, 1986). Second, a large amount of research has not been analyzed by aggregating methods following the last related study. As previously noted, this study examined research conducted prior to 1983. Finally, this most recent project examined only measures of trait anxiety (Eppley, Abrams, & Shear, 1989). This study included research conducted up through the year of 1990 and examined measures of both state and trait anxiety.

Hypnosis

Hypnosis in various forms, has been practiced for thousands of years. Over this long period of time, the popularity and use of hypnosis has varied dramatically. At times hypnosis has been proclaimed as a cure for all that troubles mankind, and often within a few years has been dismissed as quackery (Crasilneck & Hall, 1985). Theories and explanations concerning hypnosis, have also changed greatly with the passage of time.

Even at the present time, there is a great deal of disagreement concerning an acceptable definition of hypnosis or theory to explain the hypothesized influence of the technique (Edmonston, 1986; Rowley, 1986). Despite this lack of concurrence, most investigators agree that hypnosis involves producing a highly relaxed state, which allows subjects to narrow their field of perceptual awareness and to become more accepting of suggestions for positive changes (Kihlstrom, 1985).

Hypnosis has been investigated in connection with pain control, weight reduction, in the treatment of substance abuse and alcoholism, in forensic and health psychology, and in anxiety reduction (Golden, Dowd, & Friedberg, 1987; Kihlstrom, 1985; Klajner, Hartman, & Sobell, 1984; Krenz & Edwards, 1982; Kroger, 1977; Reiser, 1980; Rowley, 1986; Wester & Smith, 1984). However, until recent years, hypnosis has been less investigated (in comparison with meditation techniques) in terms of psychometrically measured anxiety reduction. This seems to be due to the tendency for previous investigations to focus on differences in hypnotizability and on the production of analgesia (Crasilneck & Hall, 1985; Sigman & Phillips, 1985). In addition, hypnosis related research has tended to employ clinical reports of symptom relief or to describe hypnosis as an aid in exploring and identifying clinically important material (Kihlstrom, 1985; Spiegel, Fleiss, Bridger & Aronson, 1975).

Due to this emphasis, hypnosis has been used much less in controlled studies involving anxiety related dependent measures. As a result, there exists a smaller body of literature investigating hypnosis as a treatment for reducing psychometrically measured anxiety. However, a review of the existing literature indicated an emerging interest in this area. An additional discovery of this review, was the lack of a meta-analysis involving the examination of hypnosis in the treatment of psychological disorders. Since hypnosis has long been considered an effective treatment for anxiety and other psychological disorders, it seems appropriate that it's hypothesized effects be investigated by a meta-analysis.

Additional support for a meta-analysis involving hypnosis and meditation is suggested by Shapiro (Shapiro & Walsh, 1984), an influential writer in the field of stress reduction research. He has suggested that research involving self-regulating techniques include at least two different treatments, in order that there be some way to evaluate the relative effectiveness of techniques in comparison to both a control group, and an alternative treatment method.

Further justification is suggested by the need to identify effective methods of stress management and methods for reducing anxiety. The large body of research literature regarding hypnosis and meditation, and the wide use of these techniques, indicates the need for additional attempts to

objectively examine their effectiveness in anxiety reduction. Additionally, these techniques are utilized by many therapists who require more empirical support on which to base their treatment decisions. Due to the mixed outcomes found in the existing literature, the disagreement or subjective nature of traditional reviews, and the lack of an aggregated evaluation involving hypnosis, a meta-analysis on this topic would appear to provide a needed addition to the body of knowledge concerning meditation, hypnosis and anxiety reduction.

One additional support is suggested from the area of health psychology, where psychologists are attempting to apply various behavioral methods in applied clinical and medical settings. Research concerning the role of anxiety in psychiatric and medical conditions indicates that it is a major factor involved in the etiology of many disorders and is implicated as a major associated concern in many disorders (Carruthers, 1981).

Anxiety is often seen in patients who are diagnosed with bipolar disorder, major depression, dysthymia, post-traumatic stress disorder, and schizophrenia. Due to this, patients are often prescribed anxiolytic drugs, in addition to other medications (neuroleptics, anti-depressants, or lithium). Unfortunately, anxiolytic drugs have negative side effects which complicate an already complex somatic treatment situation. These factors further suggest the need for

psychologists to provide non-drug alternatives for the treatment of anxiety (Carruthers, 1981).

With this in mind, a meta-analytic study of this type seems to offer an additional service by attempting to clarify the picture regarding the suggested effectiveness of the techniques under consideration. In addition, this study attempts to examine both the short and long term (state vs trait) effectiveness of meditation and hypnosis techniques. By doing so, it is thought that some indications of the value of the techniques will be gained concerning their relative effectiveness in assisting both acute and chronic aspects of anxiety.

Objectives and Research Questions

This research attempted to examine the following questions by employing meta-analytic research techniques.

1. Determine if hypnosis and meditation will be shown to be effective in reducing psychometrically measured anxiety when the primary data from a large group of studies is aggregated in a meta-analysis.
2. Determine which of the two types of techniques (hypnosis or meditation) will produce the larger effect size in terms of anxiety reduction.
3. Determine if the role of practice time is significantly associated with reductions of measured anxiety.

4. Determine if there are significant differences in treatment effect sizes on the basis of source of publication (journal publications vs dissertations or other sources).

5. In the event that sufficient sub-types of techniques are available, determine if significant differences exist in terms of computed effect sizes for the examined technique sub-types.

6. Determine if level of contact between subject and experimenter or treatment instructor is associated with significant differences in computed effect sizes.

The primary focus involved attempting to locate studies which involved the use of the State-Trait Anxiety Inventory (Spielberger, 1983) as a dependent measure, in combination with hypnosis or meditation techniques as experimental treatments. In order to broaden the group of studies available for analysis, other similar and highly related measures of anxiety were included (IPAT Anxiety Scale, Multiple Affect Adjective Check List-Revised, Profile of Mood States, SCL-90-R, and the Taylor Manifest Anxiety Scale).

Research methodology included: computing the magnitude of the over all treatment effects for hypnosis and meditation in the reduction of psychometrically measured state and trait anxiety. In addition, the effect sizes of the two types of treatment methods were compared, the role of study characteristics (length of treatment time, source of study, and type of treatment instruction) were examined to determine if

these factors influence obtained effect sizes. Finally, treatment sub-type effect sizes (e.g., Benson's Relaxation Response, Centered Prayer, Rational Stage Directed Hypnosis, or Transcendental Meditation) were examined (where adequate numbers of these sub-types were available) to determine if any specific techniques appear to be significantly more effective.

Definition of Terms

Meditation

For the purpose of this study, meditation was defined to include any treatment called "meditation", or techniques similar to the described types of meditation (e.g., mental repetition of a word(s), or the concentration of mental focus on bodily functions or phenomena) that have the goal of developing non-analytic mental activities, and attempt to avoid discursive cognitive processes. The treatments were passive, did not include physical activity (e.g., aerobic exercise, dancing, jogging, etc.), were a learned process, and capable of being used individually (Delmonte, 1985; 1987; Ferguson, 1981; Goleman, 1977; Kuchera, 1986; Pelletier, 1978; Wood, 1980). Examples of these techniques include: Benson's Relaxation Response, Carrington's Clinically Standardized Meditation, Contemplative or Centered Prayer, Transcendental Meditation, and other techniques employing a mantra or cognitive focus.

Non-meditative techniques

Non-meditation techniques which require the subjects to actively generate thoughts, to use positive statements, to imagine various scenes, to use "self-talk" cognitive strategies, require the use of mechanical devices, or treatment conditions aimed toward a particular physiological response (heart rate, hand temperature, or muscle activity) will not be included in the meditation category. Examples of these techniques are: biofeedback, self-hypnosis, hypnotherapy, auto-hypnosis, guided imagery, autogenic therapy, or cognitive-behavioral therapies.

Hypnosis

For the purpose of this study, hypnosis was defined as including techniques which were aimed at creating a client-agreed upon altered state of consciousness, or awareness, which allowed subjects to follow suggestions to intensify their attention, receptiveness, and responsiveness to an idea or set of ideas. This was typically accomplished through the use of suggestion, imagery, and by assisting the client in becoming more relaxed (Crasilneck & Hall, 1985; Golden, Dowd, & Friedberg, 1987; Kihlstrom, 1985).

In order to expand the analysis, studies were included which employed techniques traditionally designated as hypnosis, as-well-as related techniques which were referred to

by other terms. All of these techniques shared the use of methods which aim to produce relaxation, focused attention, and attempt to increase the patient's receptivity to suggestions for positive change. Due to the distorted notions which have often been attached to hypnosis, dating from the time of Mesmer, many practitioners have recently begun to label hypnotic techniques by other less controversial designations.

Studies were included which were designated as: Auto-hypnosis, autogenic relaxation, guided imagery, hypnosis, hypnotherapy, self-hypnosis, and some relaxation therapies (which employed methods aimed toward attaining the previously mentioned goals). Studies which involved the use of audiotaped suggestions, the training of subjects in auto-suggestion techniques, or employed the more traditional hypnotist-client interactions were evaluated.

Two of the affiliated techniques, included within the group of hypnosis techniques to be evaluated, were autogenic methods and guided imagery. Autogenic techniques are essentially a self-directed form of self regulation developed as a variation on hypnosis in Germany at the turn of the century (Woolfolk & Lehrer, 1984). This technique involves inducing a hypnotic state through the use of self-suggestions to imagine feelings of warmth, heaviness, calmness, and alternatively coolness in various parts of the body. In addition, some

suggestions are often included which aim the patient toward self-exploration or self-knowledge.

Schultz and Luthe (1959), who are primarily responsible for continuing work on autogenic techniques, described the focus on self-administration of the treatment as an attempt to avoid resistance toward the therapist. The tendency to fight or resist the treatment was seen as a major problem in some types of traditional hypnosis. Like other forms of hypnosis, autogenic techniques induce relaxation, decrease anxiety, reduce excessive stimulation to the brain and body, and produce a focusing of attention which allows the patient to become more accepting of self-suggestions for therapeutic gain.

Guided imagery, is described as employing the senses and cognitions of the patient to produce relaxation and healing (of both a psychological and physical nature). Typically, these methods involve the use of suggestions for relaxation, which are followed by instructions to experience a number of images (which may involve various senses) within the context of a guided fantasy. The fantasy may take various forms, aimed toward inducing positive change in the patient. The guided imagery may involve re-experiencing events, or involve metaphorical images which are thought to interact more with the unconscious aspects of the patient's mind. Guided imagery, like other forms of hypnotic methods, involves patient relaxation, a focusing of attention, and attempts to increase the

patient's openness to suggestion for positive change (Achterberg, 1985; Woolfolk & Lehrer, 1984).

Anxiety

Anxiety, for the purposes of this study was defined to mean the specific affective state which is a reaction to a perceived state of threat to well being, either actual or imagined. It is characterized as including an affective experience of discomfort, feelings of tension, apprehension, and uneasiness. Anxiety was defined as including both a transitory (state anxiety) and a relatively stable aspect (trait anxiety). State Anxiety is a temporary reaction to perceived threat, while Trait Anxiety is described as a "disposition toward manifesting characteristics of state anxiety in a wide range of stimulus situations whenever an individual feels threatened." This construct will be measured primarily by the State-Trait Anxiety Inventory (STAI) A-State and A-Trait scales, and other highly related instruments (Spielberger, 1983).

This focus allowed the analysis to examine the assessed effectiveness of the techniques in reducing both acute and chronic psychometrically measured anxiety. This distinction seems important due to the suggested need to examine treatment techniques in terms of their effectiveness in treating both situational and characteristic aspects of psychological

disorders. As a result, effect sizes were calculated for both state and trait anxiety in connection the examined treatments.

Meta-Analysis

Meta-analytic techniques were used to examine the effectiveness of meditation and hypnosis in the reduction of anxiety. Meta-analysis was defined as a statistical method of aggregating the findings from numerous empirical investigations through the process of pooling "effect sizes". The effect sizes from the individual studies are combined to allow a comparison of the aggregate results, against a non-treatment control aggregate (Glass, McGaw & Smith, 1981).

The effect size is similar to a Z score, in that it is also a unit-less metric which may be interpreted in terms of percentile ranks. An effect size of +1.0, for example, indicates the treatment group is one standard deviation higher than the control condition in terms of average outcomes. This tends to be viewed as indicating that the effect size is similar to ranking at the 84th percentile point of the control group's results (Glass et al., 1981).

Assumptions

1. It was assumed that research studies derived from the literature search accurately reflects the over-all status of research conducted in the area of reducing anxiety through the treatments of hypnosis and meditation.

2. It was assumed that the results found in the individual studies were reflective and representative of patients seeking reductions in anxiety.

3. It was assumed that the authors of obtained studies provided the appropriate data needed to calculate the effect sizes for this analysis.

4. The accuracy of statistical analysis was restricted to the accuracy of the data derived from the individually evaluated research findings.

5. Statistically it was assumed that differences in variances (found in the individual studies), were not systematically biased in any one direction.

6. It was assumed that the data, obtained from studies included in the meta-analysis, were computed accurately into effect sizes.

7. It was further assumed that the search of the existing research literature was extensive and that a good faith effort was made to obtain all identified research studies for evaluation.

8. Some research studies, due to inadequate reporting of data, were excluded from this analysis.

9. This study included appropriate research studies, available at the Texas A&M University Library or through inter-library loan procedures (which were acquired at either no cost to author or for under \$5.00 per item).

10. This analysis included studies published in the English language.

11. The dependent measures which were examined included self-reported psychometric measures of anxiety.

CHAPTER II

REVIEW OF LITERATURE

Several empirically viable conceptualizations are available for examining the effects of self-regulation techniques upon anxiety. Some investigators, like Selye (1976), have approached the subject from a primarily physiological viewpoint. Others (Lazarus & Folkman, 1984) have emphasized the cognitive factors involved in mediating stress reactivity and anxiety. Since this examination is focused on the psychometric manifestations of anxiety, I will approach the topic in a more cognitive manner by discussing theories concerning the basis for the hypothesized positive effects of meditation and hypnosis. In addition, a review of the relevant literature concerning meditation and hypnosis in connection with anxiety reduction will be provided. Finally, in order to be as comprehensive as possible, a discussion of research related to the physiological correlates of these techniques will be included.

Meditation

During the last several decades (1960-1990), meditation has become part of both the popular culture and has also been integrated into a large body of research literature related to anxiety reduction, stress-management, self-development, health psychology, as an adjunct to psychotherapy and other

applied fields (Boerstler, 1986; Delmonte, 1986, 1987; Delmontel & Kenny, 1985; Fritz & Mierzwa, 1983; and Galandter & Buckley, 1978). Although meditation has been practiced as part of spiritual and religious systems for thousands of years, it was not formally taught in the United States until the 1920's, when the first Indian yogi to reside in the United States for an extended period of time, Paramahansa Yogananda (1946) came to this country in order to teach meditation. His system, known as Kriya Yoga, advocated the initial use of a mantra concentrative device, and a technique for more advanced participants involving breathing (pranayama) exercises.

Since that time, many others have advocated the use of meditation as a path toward spiritual awareness. However it was not until the 1960's, with the appearance in the United States of Transcendental Meditation (TM), that meditation began to be promoted as a technique which would provide a wide variety of positive psychological effects. In the thirty years following TM's appearance in this, and in other industrialized nations, millions have been exposed to TM, and many thousands have tried TM or other meditative techniques (Goleman, 1977).

The presence of such an accessible form of meditation seems to have also produced a great deal of research interest, primarily in the social sciences and medicine. This interest

translated into hundreds of published investigations of meditation. Partially as a result of these scientific investigations, so called "non-cultic" variations of meditation were developed in an effort to remove the spiritual connotations and to standardize the technique for research settings. The two most prominent examples are: Benson's (1975) "Relaxation Response", and Carrington's (1978) "Clinically Standardized Meditation". These techniques might be viewed as the psychologist's and physician's attempt to extract the therapeutic "active" ingredient of meditation, reputed to produce desirable psychological or physiological outcomes.

Reviews have described meditation techniques as falling into three primary systems (Goleman, 1977). The first method requires practitioners to focus on the whole of the perceptual field and is often referred to as "mindful meditation". The second system requires the individual to focus attention on specific objects (e.g., an assigned word or mantra, a body function such as breathing, or the contemplation of some object) and is referred to as "concentrative meditation". The third method, which may be thought of as a combination of the first two, requires participants to shift between the previously mentioned objects of attention. This last method has been called "integrated meditation" (Shapiro, 1985). Examples of integrated meditation include: Transcendental Meditation, Zen,

and the derivative method, Carrington's "Clinically Standardized Meditation" (Goleman, 1977).

Despite the suggestion of three distinct types of techniques, the different methods seem to have common elements. Most meditative techniques involve a continuous mental focus or stimuli, suggest participants practice in a quiet place, relax their bodies, and attempt to attain a passive mental set (Goleman, 1977). In order to better come to terms with the techniques of meditation and their applications in mental health, a discussion of the theoretical explanations of meditation's effects will follow.

Theoretical Explanations of Meditation

Theoretical explanations for the effects of meditation have proliferated greatly during the last thirty years. Although it would be impossible to examine every theoretical system, an effort will be made to deal with the major formulations concerning meditation, in their order of historical appearance.

Deikman (1963, 1982; Shapiro & Walsh, 1984) was one of the first western social scientists to develop a theoretical explanation for the effects of meditation. He applied the concept of "deautomatization" to partially explain the influence of meditative processes. The practice of meditation, according to this view, produced a self-induced alteration of attention, which is an undoing of typical perceptual and cognitive

processes. Deikman suggested that meditators, by consciously changing their thought processes and refocusing on a constant stimuli, reverse the usual flow of thought. He described the usual flow of mental processes, as moving from information obtained from sources external to the person (percepts), to thinking processes which involve considering and analyzing percepts. Deikman paradoxically hypothesized, that restriction of awareness and a reversal of thinking processes, produced an expansion of perception. He also thought that meditation caused a move toward a more receptive type of consciousness.

Deikman (1963, 1982) further suggested, that meditation resulted in an attitude which allowed the individual to set aside concerns about the future, or the need to focus on problem solving. He described consciousness as falling into two distinct modes: an "action" mode and a "receptive" mode. The action mode, is typically dominant and involves interacting with and manipulating the environment. In this mode, the striate muscle system is physiologically dominant, muscle tension is increased, and beta brain waves are most likely to be observed. The action mode focuses on objects and employs logical operations.

In place of these typical mental activities, the meditator becomes more concerned with receptive reality. Base line muscle tension is decreased, and EEG results typically find either alpha or theta brain waves. The mental states associated

with receptive consciousness are: diffuse attention, reduced logical and formal mental operations, and emerging intuitive/creative abilities. Deikman thought receptive consciousness changed the way individuals evaluate time and themselves. He believed individuals became aware of previously unexamined aspects of themselves and refocused attention on positive aspects of immediate experience (Deikman, 1963, 1982).

However, Deikman saw the real importance of receptive awareness in enhancing what he called the "observing" self. Deikman distinguished between the **thinking self** (the idea of who and what one is), the **emotional self** (feelings of sadness, happiness, anxiety, and various desires), the **functional self** (what we do, the capacity to affect the world), and the **observing self**. This last concept referred to what Deikman called the "transparent center". The transparent center is primarily awareness, and pre-exists the other selves. It was further suggested that the observing self cannot be objectified, since it is awareness itself, rather than a symbolic representation of an object, emotion, or a capacity for environmental influence.

Based on this formulation, Deikman suggested that "ordinary" consciousness included an aspect of the transcendent. By transcendent, he meant an aspect which is separate, and receptive, rather than being tied to the

individual's emotions, abilities for manipulating the environment, or to the self as an object (Deikman, 1963, 1982). The observing self, according to Deikman (1963, 1982), was basically featureless, since it consists of awareness of external objects and events.

Meditation, by allowing the deautomatization process to unfold, aided in the uncovering this central self. This uncovered form of consciousness is almost totally receptive. Deikman described this awareness as a part of the individual which is simply allowed to develop or emerge. He suggested that meditative techniques, in allowing this process to come about, are useful as adjuncts to psychotherapy.

Deikman (1982) also described meditation as allowing the person to obtain a sense of "distance" or separateness from symptoms such as anxiety, or depressed mood. The process of becoming aware of the distinction between thoughts or symptoms and the observing self was considered by Deikman to be therapeutic, since it allowed the person to experience a calm, accepting, receptive aspect of their own consciousness which was distinct from symptoms. As a result, a person is able to re-define disturbing thoughts as separate cognitive aspects with which the observing self is able to cope.

A somewhat related theoretical approach is offered by Ornstein (Naranjo & Ornstein, 1971), who described meditation as primarily involving the conscious deployment of attention.

Ornstein cautioned western scientists to remember that meditation is typically part of a belief system and set of prescribed behaviors which involve attempting to develop a detached view about the world and daily routines. In Ornstein's view, there are two major types of meditation techniques: those employing restriction of awareness; and techniques which attempt to expand awareness.

Ornstein's (Naranjo & Ornstein, 1971) research in the area of human consciousness led him to suggest that meditation, through the process of recycling the same "subroutine" through the nervous system, produced the equivalent of no stimulation. He described meditation as producing constant exposure to an unchanging stimulus, which in turn caused the nervous system to tune it out. As a result, the nervous system excludes external stimuli for a short time. Ornstein concluded that the end result was a re-focusing on and new evaluation of the immediately present environment. Paradoxically, he thought this restriction of mental processes allowed more environmental stimuli to gain access to awareness following the practice of meditation.

According to Ornstein (Naranjo & Ornstein, 1971), meditation produces a subjective state which allows the world to be viewed as new, unique, and extraordinarily interesting. In addition, a more receptive approach to the world around the person is often experienced. This receptive mode of

consciousness, tends to eliminate much of the categorizing or judgmental aspect of mental processes.

Ornstein described ordinary awareness as selective, narrowing, and involved in constructing internal models of external data. He suggested that meditation is a way of taking a mental "vacation" from the habitual processes of consciousness. Ornstein additionally speculated that this allowed the individual to return to everyday life with a new perspective, not dependent upon pre-determined internal representations and categorizations of external events or objects. Finally, Ornstein suggested that the relaxation produced by meditation, may result from the emergence of this more receptive and deautomated mode of awareness (Naranjo & Ornstein, 1971).

During this same decade, Goleman (1971, 1977) concluded that meditation might be explained in terms of desensitization. He saw meditation as producing relaxation and a co-occurring hierarchy of mental events, experiences, or memories. Using Wolpe's notion that relaxation might be therapeutically paired with threatening mental events, Goleman suggested that meditation allowed an acceptable introduction of distressing thoughts and mental events into awareness.

During meditation, according to this view, the person is able to relax. Then as mental events occur (both positive and negative) the person is able to reciprocally inhibit anxiety

associated with negative mental events. The outcome is a pairing of relaxation, with often previously unacceptable mental events. Goleman thought this allowed negative images or thoughts to be integrated into the person's conscious processes, and to be eventually accepted by the individual (Goleman, 1971, 1977).

Banquet (1973) suggested that the distinct functions associated with the two hemispheres of the brain, become more equalized during meditation. The verbal, logical aspects of the mind (left hemisphere) which tend to be pre-eminent in most people, are lessened as a result of meditative practices. According to this theory, the functions associated with the non-dominant hemisphere, are accentuated to the point where they are largely equally engaged during meditation. Banquet saw this as the likely explanation for the positive effects of meditation.

According to this view, meditation allows some of the negative, restrictive, intra-punitive mental structures (accentuated in modern culture) to be set aside. Banquet thought, as a result of this process, that meditation allowed a temporary respite from self-deprecating mental events. Banquet also suggested that meditation might allow the person to move away from excessive self-demands (such as an inflexible drive to achieve unattainable goals or to live up to certain rigid moral or behavioral standards). As a result, a

person becomes less critical of themselves following meditation. The less verbally dominated mode of consciousness, which Banquet thought meditation produced, was also thought to be generalized beyond the practice of meditation (Banquet, 1973).

Benson (1975), the developer of a derivative non-spiritual form of meditation called the "relaxation response", described meditation as producing a psychological and physiological state of being which he considered to be the opposite of the fight or flight response. He suggested that the fight or flight response was adaptive in the mankind's distant past, since it increased an individual's chance of survival. As a result, this response was represented in future generations since individuals with these traits tended to survive and to reproduce.

However, Benson (1975) saw the fight or flight response as largely inappropriate in our modern society. He described this response as producing increased blood pressure, respiration rates, increased flow of blood to muscles, and an increased rate of heart beat. Unfortunately, this response is not typically appropriate to the type of situations which require behavioral and psychological adjustments for modern humans. Benson suggested that the chronic inappropriate elicitation of the fight or flight response, may lead to heart attack, stroke, and other stress related diseases.

Benson's (1975) evaluation of the physiological correlates of stress related disease led him to conclude that the real value of meditation was eliciting the relaxation response. This response involves a a reduction of sympathetic nervous system activity. Physiological markers of this response, according to Benson, include: decreased heart rate, respiration rate, oxygen consumption, and increases in alpha waves as measured on EEG. He described the effect of meditation as resulting from four elements: a passive mental attitude, diminished muscle tension, a repetitive mental stimulus, and a quiet place in which to practice the technique.

Benson (1975) saw the repetitive mental stimulus (mantra) as allowing the practitioner to attain (and to maintain) a receptive or passive mental state. In this mental state, the person is thought to be able to remain free from ruminative concerns or problems, is able to reduce physiological markers of stress reactivity, and to experience a comforting form of deep mental and physical relaxation. Benson suggested there are many ways to achieve the relaxation response (autogenic therapy, hypnosis, progressive relaxation, Transcendental Meditation, yoga, or Zen), however he offered his method as a system free of religious or spiritual overtones. He concluded that the relaxation response method might be more appropriate for practice by modern stress prone individuals.

Tart (1975), looked at meditation from a systems theory perspective. He grouped meditation, along with other methods (autogenic therapy, biofeedback, hypnosis, progressive relaxation, yoga), as ways of inducing "altered" states of consciousness. Tart described meditation as a way of breaking out of "ordinary" consciousness. This came about as a result of restricting the cognitive focus to limited external data or stimuli. Tart concluded that meditation's requirement for inner focusing allowed persons to experience repressed thoughts, to more calmly consider them, and thereby integrate them into consciousness.

In Tart's (1975) conceptualization of altered states of consciousness, he made a distinction between "ordinary" consciousness, which is constructive, and "altered" consciousness. Altered consciousness, while different for each individual, is best described as that form of consciousness which is distinctly different from the individual's base-line mental state. He suggested that human consciousness be viewed as a dynamic and constantly changing process which ranged between ordinary states of consciousness and various other conscious states. He described base-line consciousness as "consensus" reality. This is the mental state involved in the routine activities or behaviors of daily life.

Tart (1975) wrote that ASC's should be evaluated from the perspective of the individual. According to Tart, individual

differences in how consciousness is structured, are key to assessing the discrete states of consciousness for a given individual. He saw consciousness as being arranged into a pattern or system. Additionally he proposed that the system of individual discrete consciousness, maintained an overall pattern of functioning in spite of changes in the individual's environment.

As a clarification of the differences between consensus and altered states of consciousness, Tart (1975) suggested a consideration of a dream state, during which one is able to "fly", and a base-line state, during which one is very sure that the only way they will fly is by purchasing an air line ticket. Tart included the following mental states as examples of altered consciousness: dreaming, the hypnotic state, states induced by psychoactive drugs, states resulting from strong emotions (intense joy, rage, panic, depression, or sorrow), and states induced by meditative practices.

Meditation, according to this view, is among the available methods for inducing an ASC. Additionally, Tart (1975) described meditation as an active state, in that it is consciously undertaken. He further described meditation as a patterning method, which allows an ASC to be sustained beyond what is usually brought about by spontaneous life events.

Carrington (1978) also speculated that meditation's effects were related to partial sensory deprivation which

seemed to be produced by meditation. In addition, she suggested that meditation served as a sort of governing device. According to Carrington, all forms of meditation reduce the external stimulus received by the meditator. This reduction is brought about by a conscious attention shift toward a repetitious cognitive stimulus. Meditative techniques, according to this explanation, function as a self-initiated sensory screening device. This reduces external stimuli to a level far below what is typically experienced in human activity. Carrington, agreed with Ornstein and others, in seeing meditation's use of a continuous focus on stimuli (which have no cognitive meaning and are unchanging) as producing a shift in typical thinking patterns.

Carrington (1978) speculated that sensation seeking and sensation avoiding people may differ in their reactions to meditation or other forms of attentional restriction. According to this hypothesis, sensation seekers are more likely to react unfavorably to meditation, while sensation avoiders are more likely to benefit from these techniques. However, Carrington also suggested that the highly stimulating nature of the modern world may predispose both types of individuals to seek periodic sensory avoidance.

Carrington (1978) thought meditation might serve as a stimulus control device which was used to restore some stimulation balance to people's lives. She saw meditation as

helping the individual achieve a balance by providing an acceptable type of sensory deprivation. Carrington, supported her contention, with a review of research on sensory deprivation. This work indicated that total sensory deprivation was unpleasant for the majority of research subjects. Yet, some subjects reported positive reactions to total sensory deprivation. Partial sensory deprivation was reported to be acceptable to many more research subjects. According to her theory, meditation may function as an acceptable type of deprivation. However, meditation produces only partial deprivation, since it offers a stimulus (mantra, or other type of focus). Yet, it results in the exclusion of much of the sensory material found in everyday experience.

Carrington's (1978) formulation also described meditation as a way for the individual to become aware of physiological and cognitive aspects of themselves which were previously ignored or were unconscious. She speculated that meditation specifically caused the individual to become more aware of bodily phenomena such as heart beat, respiration, and other inner events.

As a result, meditation allowed the person to gain additional positive results due to the comforting effect of some types of rhythmic phenomena. Carrington (1978) cited clinical data concerning the role of rhythm in soothing and comforting children, and pointed to experimental research related to the

positive influence of various types of rhythm (recorded heart beats, music of a similar rate, etc.). According to this speculation, some of the relaxation derived from meditative practice may be due the focus on body rhythms.

Finally, Carrington (1978) agreed with others who have suggested that meditation produces an altered cognitive mode, distinctly different from the typical verbally dominated cognitive style. Carrington thought that meditation may result in a more synchronized form of consciousness which allows a blending of both verbal and non-verbal mental functions. According to this view, an integration of analytical and intuitive qualities is brought about. In turn, Carrington speculated that this produces a state of consciousness distinct from consensus consciousness. Carrington also saw meditation as producing a shift away from ego functions toward a more receptive and reflective mental state.

Meditation was considered from a somewhat different perspective by the anthropologist and historian, William I. Thompson (1981). He suggested that the effect of meditation might be due to an ancient, innate understanding of how the human mind functions. Calling on the work of MacLean (1973), Thompson speculated that meditation may produce a mental state which allowed individuals to experience an integration or a possible synthesis, of what MacLean called the "three brains" of man (Thompson, 1981).

The brain structures MacLean described included: the spinal cord, the limbic ring, and the neocortex. Thompson (1981), in applying MacLean's concepts, described the spinal cord as reptilian, and primarily involved in instinctive reflexes. He also suggested that this part of the brain functions at a subconscious level. The limbic system, was suggested to control emotion and other strong mental states, such as passion and anger. Finally, the neocortex was described as controlling rational thought, and essential motor and verbal functions.

Thompson (1981) suggested that the practice of meditation resulted in a mental state which allowed the integration of the distinct parts of the brain. This would lead, according to him, to a synthesis and a new type of consciousness. Thompson further suggested that this may be an evolutionary process which will alter human consciousness. Thompson described this altered, synthesis of brain functions, as producing an integration of the intuitive and rational consciousness. The end result would be a more adaptable organism, able to integrate both unconscious and conscious aspects of the mind. Thompson concluded that this possible development might reduce the negative aspects (war, violence, and greed) of human behavior by allowing a mastery of aggression, and an integration of ego drives within a synthesized "higher" self.

Odanjnyk (1988) presented a theoretical discussion of meditation from a Jungian perspective. He described meditation as improving concentration, and saw this as one of the central benefits of meditation practice. Connected with improved concentration, was the ability to suppress or dismiss stimuli which would ordinarily compete for the person's attention. Odanjnyk suggested this allowed the "ego-complex" to gain control over attention and as a result freed psychic energy which was then placed at the disposal of the ego-complex. In principle, increased concentration, resulted in more energy becoming available for inner psychic processes.

Odanjnyk (1988) agreed with Deikman's notion of deautomatization, saying that meditation reversed or interfered with the patterning process which the "psyche" uses in an attempt to deal with repeated stimuli. Meditation is described as releasing the psychic energy used in the automatization process. The result is an enhanced form of consciousness, in which all stimuli are seen as new and are dealt with as unique. As a result, a person's reaction to stimuli is intensified. Odanjnyk concluded that deautomatization produced a release of additional psychic energy, due to the elimination of most objects of attention. The ego-complex and other conscious functions, which tend to fix themselves upon objects, are then without their natural objects of attention.

As a result of this psychic process, meditation allows the mind to let go of ego-complex elements. In this state, the ego complex remains a point of consciousness, however it loses its sense of separateness and merges with the perceptual sense of emptiness. During meditation, the distinction between subject and object is thought to disappear (Odanjnyk, 1988).

In Jungian theory, the ego-complex is normally the center of consciousness and identity. However during meditation, Odanjnyk (1988) suggested that ego complex activity is suspended. The center of consciousness is then shifted to a merged complex that involves the ego-complex and other complexes associated with images, ideas, or emotions. The ego complex, exists in this submerged state, as a link to the meditator's previous self concept and also as a connection to new events the person may experience.

Odanjnyk (1988) suggested, that from a Jungian perspective, meditation resulted in a re-directing of psychic energy for the purpose of bringing into consciousness psychic elements which typically elude human perception. Meditation is described as reversing the flow of psychic energy from the inside toward the outside, and refocuses it on inner mental processes.

Jung suggested that meditation may lead to the underlying structures of the psyche (found in the collective unconsciousness) known as the archetypes, as a result of

employing the personal complexes in this manner. Odanjnyk thought that meditation might facilitate the ultimate Jungian goal of attaining individuation. In this state, the Self emerges from the alchemical processes involved in integrating disowned aspects of the personality, as a balanced entity. Odanjnyk (1988) saw meditation as having the potential to quicken this process, by assisting the person in contacting and understanding the collective unconscious and archetypal images.

Langer (1989) described consciousness as falling into two distinct modes, "mindlessness" and "mindfulness". According to this view, most individuals are engaged in daily activities while functioning in a mental state which involves processing environmental stimuli in an automatic and largely unchanging manner. This type of mental process occurs, due to an internal construction of the external environment, which categorizes all incoming information in an automatic way. This cognitive mode, forces everything into pre-existing mental definitions which are reacted to in prescribed ways. Mindlessness is seen as producing rather inflexible behavior which is controlled by mental rules, not likely to be altered even in the face of unique situations. The result is a rather unconscious processing of incoming information, which while it has a legitimate function in human life, also has the potential to prevent appropriate mental flexibility.

Langer, described mindfulness as a mental style which allows the person to be more involved in re-assessing data from the environment. The individual functions on a less automatic or unconscious cognitive level, dealing with the environment in a far more flexible and effective manner. Langer's work suggested that meditation is one of the most effective ways of encouraging mindfulness (Langer, 1989).

Meditation is described as producing a mental state which allows the person to become free of analytically dominated mental processes. This is thought to allow processing of external stimuli in a more flexible and conscious manner. As a result, the external world is viewed, free of pre-determined mental constructs and may be reacted to in a more adaptable way. In addition, the practice of meditation is suggested to produce a deep state of mental and physical relaxation which allows a sort of down loading of mental strain experienced in the process of daily living. This opportunity to mentally clean out negative life events, is also described as central to the positive influences of meditation (Alexander, Langer, Newman, Chandler & Davies, 1989; Langer, 1989).

Summary of Meditation

The previous discussion has attempted to draw together the key theoretical explanations for the hypothesized positive effects of meditation upon anxiety and aspects of personality.

Deikman (1963, 1982) and others have described meditation as producing a "deautomatization" of ordinary experience which allows the individual to break out of usual cognitive patterns. In the case of individuals experiencing severe anxiety or other psychological difficulties, this was thought to allow them the chance to discontinue ineffective and habitual ways of dealing with their experience (Carrington, 1978; Naranjo & Ornstein, 1971; Tart, 1975). Deikman (1963, 1982) also speculated that meditation allowed the person to see psychological symptoms as separate from their "self" and to be more effective in dealing with problems.

Other writers described meditation as producing an acceptable form of sensory deprivation, which led to relaxation and other psychological benefits (Carrington, 1978; Langer, 1989; Naranjo & Ornstein, 1971; Odanjnyk, 1988). Along a somewhat different line of exploration, Goleman (1971, 1977) concluded that meditation was possibly effective due to negative or unpleasant thoughts being paired with the relaxation produced by meditation. He felt that meditation allowed these unacceptable thoughts to be more easily accepted by the person. Banquet (1973), in a somewhat related theory, concluded that meditation reduced the dominance of verbal mental processes by causing a more equal distribution of both left and right hemisphere brain functions during

meditation. As a result, meditation produces a mental state which allows intra-punitive thoughts to diminish.

Benson (1975) suggested that meditation resulted in the reversal of the fight-flight response which he described as being associated with anxiety and stress related physical disorders. He further conceptualized meditation as effective due to the relaxation which it produced. Most other writers in this field agree with the notion that relaxation is at least partially responsible for the hypothesized positive effects of meditative techniques (Deikman, 1963, 1982; Goleman, 1971, 1977; Naranjo & Ornstein, 1971).

Finally, other authors suggested that meditation may lead to a synthesis of mental functions and may be helpful in assisting patients toward psychotherapeutic goals. Thompson (1981) described meditation as a method for coordinating the various major brain segments. He concluded that this would produce a new form of consciousness which was more free of aggressive and ego driven elements. Odjanyk (1988) also described meditation as a method for more quickly attaining "individuation", the primary goal of Jungian psychotherapy.

Meditation and Anxiety Reduction Research

A complete narrative review of the meditation anxiety reduction research falls beyond the scope of this study, since I am attempting to provide a quantitative evaluation (a meta-

analysis) of the effects of meditation techniques in reducing psychometrically measured anxiety. However, in an effort to provide information concerning the status of meditation as an anxiety reducing technique, a overview of narrative reviews, and some of the most recent empirical research will be summarized.

Smith (1975), reviewed literature related to meditation as a form of, or adjunct to psychotherapy. His review concluded that volunteers who participated in meditation treatments showed over-all significant decreases in psychopathology and specifically in levels of anxiety. He also determined that randomly assigned subjects who were involved in meditation treatments demonstrated significantly better results than those assigned to alternative or control conditions, on a variety of psychological measures including level of anxiety (State-Trait Anxiety Inventory, Taylor Manifest Anxiety Scale, and IPAT Anxiety Scale), psychological well-being, and self-actualization (Personal Orientation Inventory, Northridge Depression, Neuroticism, and Self-Actualization Scale).

Despite these results, Smith sounded a cautionary note, due to the weaknesses he found in the meditation literature. His primary concerns included: the use of solicited testimonial data provided by committed meditators, the lack of control comparisons in many studies, concerns about non-equivalence of comparison groups, the lack of matched level of expectation

for treatments, the use of weak psychometric instruments (often self-constructed by researchers), the failure of many studies to employ double-blinding, and the possibility that unaccounted for variables (simple relaxation, or the required meditation sitting posture) were responsible for therapeutic effects found in meditation studies. Smith, despite the fact that meditation was shown to be effective in a majority of the studies he evaluated, concluded that it was not possible to conclusively state that meditation was therapeutic (Smith, 1975).

Shapiro and Giber (1978) also examined the research literature relate to the psychotherapeutic effects of meditation. They took issue with Smith on two points: his lack of a definition for meditation, and his comparison of results for several different dependent measures found in the literature. In their review, they attempted to correct these limitations by carefully attending to independent variables, methods of data collection, dependent measures used, and control procedures.

Their review found indications that meditation was a promising strategy for preventing and decreasing the use of addictive substances, for reducing blood pressure, and in the treatment of fears, phobias, and stress-related dependent variables. Positive results were indicated in the areas of treating generalized anxiety, pain, fears related to heart attack, and bronchial asthma. Specifically noted were several studies

which supported the therapeutic effect of meditation in reducing anxiety (Shapiro & Giber, 1978).

Shapiro and Giber (1978) also attempted to address the issue of mediating mechanisms which might possibly account for meditation's therapeutic effects. The authors concluded that meditation does produce a state of deep relaxation, and seemed to be associated with reduced heart rate, decreased oxygen consumption, blood pressure, and skin resistance. They also found evidence for increased alpha brain waves as a result of meditation. They questioned, whether meditation was responsible for these changes, suggesting the possibility that measured changes were possibly the manifestations of a hypometabolic state of relaxation. In other words, psychological and physiological changes might be attributed simply to sitting, to expectation of positive results, or specifically to meditation. Smith and Giber concluded their review with some comments regarding weaknesses found in meditation research. They summarized these weaknesses by suggesting the need to consider research design prior to research, rather than as an after thought following a study.

Ferguson (1981) conducted a meta-analysis of 51 meditation studies (obtained from a literature search which included studies available up through the year 1979) which involved a variety of psychometric self-report measures. He determined an effect size of .56 for meditation in influencing

various dependent measures. Ferguson also found that certain types of meditation were superior in terms of measured effect sizes, when compared with other techniques. Transcendental Meditation (TM) was reported to produce a .69 effect size, while all other methods had effect sizes of less than .50.

In his more recent review, Shapiro (1982) suggested that meditation appeared to be equal, yet not superior, to several other types of self-regulating techniques in the reduction of anxiety. He concluded this situation prevailed in the areas of: anxiety reduction, the treatment of substance abuse, insomnia, and hypertension. He also mention for the first time in a review, the possibility of adverse effects experienced as a result of meditation (one study which reported an increase in negative feelings for meditators). This review also suggested meditation was not an appropriate treatment for some psychological conditions (avoidant personalities, chronically depressed patients with decreased levels of energy, and for individual's with a very external locus of control).

Delmonte (1984), reviewed a large group of studies related to the effects of meditation practice on psychometric scores measuring various psychological constructs (self-esteem, depression, psychosomatic symptoms, self-actualization, locus of control, and introversion-extraversion). His review concluded there was no strong evidence that meditation significantly affected measures of self-esteem. In addition,

while finding some evidence for meditation's effectiveness in reducing measures of depression, Delmonte declined to categorically state that meditation was an effective treatment for depression. Delmonte concluded that research in this particular area was too meager, and existing results too equivocal related to reductions in measured depression.

Delmonte's (1984) review in the area of psychosomatic symptomatology suggested little support for the contention that meditation reduced these symptoms. However, he did suggest the need for more research in order clarify this determination. With regard to measures of self-actualization, Delmonte found changes in the direction of psychological health were associated with the practice of meditation. Finally, he determined that there was no association between meditation and changes in locus of control, or in measures of introversion-extraversion. He suggested these measures might have more utility as possible predictors of therapeutic outcome.

Delmonte's later narrative review (1985), looked at the literature related to meditation and anxiety reduction, and evaluated over 50 empirical investigations. This review suggested that the regular practice of meditation was associated with significant reductions in psychometrically measured anxiety. Delmonte also described findings from several studies he had personally conducted which suggested pre-treatment levels of anxiety were effective predictors of a

person's response to meditation. According to Delmonte, individual's with the highest levels of anxiety at pre-testing, were most likely to drop out of treatment. Prospective subjects with more moderate levels of anxiety were less likely to drop out of treatment and more likely to experience reductions in anxiety.

Delmonte's review also concluded that meditation was about equal with other types of interventions in reducing anxiety. He apparently determined this on the basis of examining levels of statistical significance (vote counting), rather than by evaluating the nature of treatment effect sizes. He also suggested that measures of hypnotizability, and the subject's level of expectation for positive change were positively associated with benefits derived from meditation treatments. Delmonte ended his review by suggesting the need for additional research in the area of state anxiety, due to the dominant focus on trait aspects of anxiety found in the literature (Delmonte, 1985).

Eppley, Abrams & Shear (1989) conducted a meta-analysis of research related to the effects of progressive relaxation, EMG Biofeedback, meditation techniques, and non-meditation relaxation techniques on measures of trait anxiety. Their literature search extended up through the year of 1982. The study evaluated 40 progressive relaxation studies, 70 meditation studies, and 17 EMG biofeedback studies.

Their analysis reported an over-all effect size for TM of .70, an effect size of .28 for all other meditation techniques, .38 for progressive relaxation, .30 for EMG biofeedback, and .39 for all other non-meditation relaxation methods. This meta-analysis found that TM's effect size was statistically significantly larger than progressive relaxation, the mixed relaxation techniques, and the other meditation techniques (Eppley et al., 1989).

Another interesting result suggested that all effect sizes were significantly correlated with follow-up hours of contact beyond initial treatment, and with duration of treatment. No relationship was found between demand characteristics, and therapist variables were not related to effect size outcomes. Eppley et al. (1989) also found that there were no significant differences in terms of results found on different dependent measures (different self-report anxiety instruments), and the differences in effect sizes were not significant for different levels of study design quality or level of internal validity. However, there was a significant relationship between level of attrition and effect size for TM and mixed relaxation techniques (Eppley et al., 1989).

With regard to the possible influence of publication source on effect size, Eppley et al. (1989) found no significant differences for any of the techniques when source of publication was compared. They also were able to conclude,

based on their analysis, that higher expectations for positive outcome was not associated with larger effect sizes. They further determined that the role of attention is not significantly associated with calculated effect sizes, and that the desire to learn meditation is not significantly associated with treatment outcome. Eppley et al. (1989) concluded their article by saying that TM appears to produce larger effect sizes than other meditation or relaxation techniques, and that these results cannot be accounted for by expectation of benefit or on the basis of placebo effect.

Summary of Anxiety Reduction Research

Initial reviews related to the effects of meditation concluded that the technique was associated with decreases in anxiety and measured psychopathology. Meditation was also shown to be effective in the treatment of substance abusers, in reducing high blood pressure, in treating phobias, and asthma (Shapiro & Giber, 1978; Smith, 1975). However, later reviews, while still finding meditation to be effective in reducing anxiety, concluded that meditation was not superior to other types of self-regulating techniques (Shapiro, 1982). Other reviews also have highlighted the poor empirical designs of early meditation research (Delmonte, 1984; Shapiro & Giber, 1978).

Meta-analytic methods have examined the effects of meditation in reducing high blood pressure, trait anxiety, and numerous psychometric measures of personality. Ferguson (1981) found a .56 effect size for meditative techniques in relation to a variety of personality measures. Kuchera's (1986) meta-analysis of the effect of meditation on blood pressure found a .93 effect size, which indicated that meditation techniques were very effective in reducing high blood pressure. Finally, the Eppley et al. (1989) meta-analysis found meditation and progressive relaxation to be effective treatments for trait anxiety.

Physiological Correlates of Meditation

In the area of physiological correlates of meditation, a controversy has developed between those claiming specific effects as the result of meditative practice and those who suggest that little difference exists between the physiology of meditators and people simply at rest or engaged in other relaxation techniques (Holmes, 1984; Smith, 1986).

Holmes (1984), reviewed 20 studies and concluded that meditation had about the same physiological effects as simply sitting with eyes closed. He found no significant differences in heart rate, electrodermal activity, respiration rate, skin temperature, oxygen consumption, EMG activity, or blood flow. He also concluded that meditators were not significantly

different from control subjects in terms of their somatic arousal in threatening situations. He further suggested that on the basis of this review, meditation could not be justified as a therapeutic approach for individuals who experience high somatic arousal in the face of threatening situations.

Delmonte (1984) in a similar review, which examined over 80 studies, came to somewhat different conclusions. He determined that meditation and other relaxation techniques produced about the same respiration levels and heart rate. However, according to Delmonte, meditation is associated with significant reductions in blood pressure. His review also concluded that the data concerning electrodermal indices was too contradictory, and should not be used to support the special effects of any technique. Delmonte, on the other hand concluded that meditation was significantly superior in terms of reduced somatic arousal in face of threatening situations.

In a second review (1984) Delmonte also addressed the issue of electrocortical activity associated with meditation practice. He concluded that the state effects of meditative techniques seemed to be decreased electrocortical arousal, and more easily demonstrated alpha and theta brain wave activity. Delmonte also speculated that meditation may begin with left hemisphere activity, which then progresses into brain functions more often associated with the right hemisphere. He also described a phenomena, found in more advanced meditators,

which suggested that both hemispheres' activities were suspended.

Several authors responded to Holmes' (1984) article. Suler (1985) commented that Holmes' conclusions were primarily based on criticisms of the research design found in meditation studies. He suggested that few studies are ever flawless, and that Holmes' dismissal of the existing data (largely on the basis of a critique of the quality of the meditation research) was inappropriate. West (1985) commented that Holmes, in his critique of meditation research, may have over looked the possibility that initial differences in experimental subjects actually worked to the disadvantage of meditation treatments (Holmes having concluded that the initial differences were responsible for the differences in favor of meditation). He cited studies which suggested that people who decide to meditate are more likely to be neurotic, anxious, and to have higher levels of somatic arousal. West concluded that the issue was unresolved due to the need for additional studies employing random assignment to treatments, controls of expectancy of effect, and initial group differences.

Shapiro (1985) responded to Holmes' work by restating his own review of the same literature related to the effects of meditation. His review concluded that meditation was associated with a generalized reduction in several physiological systems which resulted in a relaxed state. His analysis further

suggested that meditation was not a unique physiological state, in that it is not completely different from other relaxation techniques in terms of physiological correlates. He concluded that meditation was, indeed associated with statistically significant changes as compared with control groups. Shapiro commented that Holmes appeared to be about as biased in opposition to meditation, as were the initial claims biased in favor of meditation. He detailed numerous examples of how Holmes discounted any research in support of meditation, while emphasizing any negative findings.

Benson and Friedman (1985) objected to the selective inclusion of data from their own research which Holmes (1985) cited. They summarized research findings which indicated a statistically significant difference between the physiological correlates of meditation and simple rest. Morrell (1986) hastened to point out that physiological measures, which have been compared, are subject to a biological and statistical floor effect, in that at very low levels they are unlikely to be reduced further. Due to this, it is unlikely that extreme differences between meditation and simple rest would be found. However, Morrell pointed out that several studies (nine), which meet Holmes' criteria for research design, document statistically significant differences between meditation and simple rest.

Dillbeck and Orme-Johnson (1987), employed meta-analytic techniques to determine statistically significant differences between Transcendental Meditation (TM) and simple rest for basal skin resistance, respiration rate, and plasma lactate. They pointed out that Holmes employed vote-counting methods for determining the over-all outcome for physiological measures in meditation vs. simple rest studies. Dillbeck and Orme-Johnson summarized research which indicates that vote-counting is biased toward not finding significant differences even when a significant effect size (e.g., of approximately .40) is known to be present. Dillbeck and Orme-Johnson's meta-analysis concluded that meditation was effective in reducing the examined somatic markers of stress reactivity.

Summary of Physiological Correlates of Meditation

Although a controversy exists related to the physiological correlates of meditation (Elkins, Anchor, & Sandler, 1978), the most recent quantitative analysis (Dillbeck & Orme-Johnson, 1987) suggested meditation is associated with statistically significant reductions in several physiological functions. In addition, other results suggest meditation is associated with reductions in blood pressure, and with specific brain phenomena, such as the production of alpha and theta brain waves. Finally, meditation also appears to be associated with

changes in hemispheric dominance patterns (Delmonte, 1984; Shapiro, 1985; Dillbeck & Orme-Johnson, 1987).

Hypnosis

Hypnotic techniques have been employed for thousands of years in aid of various healing activities. However, until modern times (the 18th century) trance phenomena was typically employed by naturalistic healers or psychics to attaining altered states of consciousness. The altered states of consciousness were typically employed in healing rituals (Ellenberger, 1970).

Mesmer, and those who followed him, shifted the focus of trance or hypnotic experience onto the identified patient. He employed his method (magnetizing) in the treatment of a variety of medical and psychological concerns. Most of the problems he treated, would now be viewed within the confines of psychosomatic medicine. Although Mesmerism's claims were studied by a royal commission in France during 1784, and discounted as products of the imagination, hypnosis survived in the more acceptable forms advocated by Mesmer's student Puysegur. In the 19th century, figures of such note as William James, Breuer, Freud, Braide and Esdaile employed hypnotic methods in the treatment of various disorders (Ellenberger, 1970; Gay, 1988).

The role of hypnosis was profoundly affected by Freud's dismissal of the technique in favor of free association. Under the influence of Charcot, Freud began to use hypnotic techniques in an attempt to treat hysteria. He hypnotized hysteric patients and suggested that the symptoms disappear. This method proved partially successful, however some patients resisted hypnosis and others did not appear to benefit from the technique (Fancher, 1979).

For a number of years, Freud continued to employ hypnosis in the treatment of hysterics. However he became frustrated, due to what he perceived as the technique's limitations in uncovering repressed memories. Freud came to believe that these memories actually caused hysteric symptoms. His effort to modify hypnosis, by introducing the pressure technique, proved inconsistent in eliciting the sought after memories. While experimenting with this and other methods, Freud began to notice that patients responded to being allowed to simply talk while in a reclined posture. With more exploration, this led to the free association method which Freud adopted to replace hypnosis. He concluded that while hypnosis was viable treatment for some individuals, free association seemed useful for more patients (Fancher, 1979).

Initially in this century there was little interest in hypnosis in the United States. This appears to have been true, due to the opposition of organized medicine, psychoanalysis,

and because of the extraordinary events associated with the hypnosis of Mesmer. However, after therapeutic work involving hypnosis was conducted following World War I with traumatized veterans, interest in hypnosis began to re-emerge. By the 1950's hypnosis had begun to be scientifically studied, and was pronounced an acceptable form of treatment within the confines of modern medicine, psychiatry, dentistry, and psychology (Fromm and Shor, 1979).

Despite this long history, there is still very little agreement concerning an appropriate definition of hypnosis or an explanation for hypnotic effects (Pratt, Wood, & Alman, 1988). Uncounted numbers of theories have been advanced to explain the action of hypnosis and to account for what appears to be its effectiveness in treating many disorders. Although it would be impossible to include all theoretical formulations related to the effects of hypnosis, several of the most prominent concepts will be discussed in order of their historical appearance.

Theoretical Explanations of Hypnosis

Historical Antecedents

Just as Mesmer was the first physician to employ hypnosis to treat individuals, he was also first to advance a theory regarding the way hypnosis worked. Mesmer concluded "magnetism's" effects were related to a subtle physical fluid

that was spread through out the universe and served as a medium which interacted between humans and other elements in the universe. He also felt that disease was the result of an unequal distribution of this substance within the human body (Ellenberger, 1970).

Mesmer thought that some methods allowed the fluid to be stored and transferred to other individuals. He also felt that the magnetizer could produce a "crises" in the diseased individual which was an indication of the ailment which afflicted the person. Mesmer concluded that each disease manifested itself in a specific way through the so called crisis. These crises gradually became less severe and eventually disappeared. This outcome was taken to imply a cure of the disorder. Unfortunately, Mesmer promoted magnetism as a cure for all of humanities ills (Crasilneck & Hall, 1985).

Puysegur, Mesmer's student, initially experimented with group magnetizing and public demonstrations, however he came to see the effects of hypnosis as involving the manipulation of the subject's will by the magnetizer. He employing induction techniques such as touching the subject with a special walking stick, which he thought produced a "perfect crisis". This type of crisis came to be known as artificial somnambulism. The perfect crisis resembled a waking state, however the patient typically followed the suggestions of

the magnetizer and afterward remember nothing which had transpired during the hypnotic state (Ellenberger, 1970).

During the 1840's the Scotsman, James Braid became interested in the phenomena of mesmerism and conducted a scientific investigation which he concluded disproved the existence of Mesmer's magnetic fluid theory. Braid is also credited with coining the term hypnosis. However, he did not see hypnosis as related to sleep, as the name implies. In fact, Braid concluded that hypnosis involved powers of suggestion on the part of the hypnotist which worked in combination with the need for suggestibility in the patient (Crasilneck & Hall, 1985).

Braid saw hypnosis as including a concentration of attention to a specific idea which might be brought about very quickly. He felt that it was an all or nothing state, during which one was either hypnotized or not hypnotized. Braid further stated that although hypnosis appeared similar to sleep, the hypnotized person is alert enough to be easily influenced verbally. Braid also felt that amnesia was typically present, to the point that the hypnotized person would not remember what had transpired during the hypnotic session (Fancher, 1979).

Initially, Braid felt that hypnosis which employed the eye fixation method, worked due to the fatigue felt in the muscles of the eyelids. He thought that eye fatigue generalized to the

rest of the body. Braid suggested that fatigue produced a stupor-like state which caused decreased central nervous system activity. However, his later work caused him to re-examine the role of psychological elements in explaining the effect of hypnosis. At that point, Braid advanced the notion of monoideism, which stressed the role of focused attention in hypnotic processes (Fancher, 1979).

In the 1870's, Charcot, the chief physician at Salpêtrière hospital became interested in hypnotism, primarily as the result of his study of female hysterics housed at the hospital. Charcot approached hypnosis from the perspective of neurology and described these patients as capable of hypnotic states without the involvement of a hypnotist or magnetizer. These findings were presented to the same committee (French Academy of Sciences) which previously had rejected mesmerism. However, in this instance, due largely to the reputation of Charcot, hypnosis was accepted. Charcot saw hypnosis as a pathological state which was typically restricted to hysterics and was due to a neurological or psychiatric disorder (Ellenberger, 1970).

Opposition to this theory came from Bernheim and the Nancy School of hypnosis. Bernheim concluded that hypnosis was not restricted to hysterics, rather the hypnotic state was the result of suggestions from the hypnotist to the subject. The impact of suggestion was thought to be based on the

patient's desire to use ideas to produce personal changes. He rejected Charcot ideas of hysterical hypnotic states and eventually decided that the effects of hypnosis could also be achieved by making suggestions to waking patients. In addition, Bernheim was one of the first to experiment with post-hypnotic suggestions, although this concept had been described by others as early as the 1790's (Crasilneck and Hall, 1985).

The theoretical foundations of the Nancy school of hypnosis rested on the idea of suggestibility. This notion is based on 18th century concepts of how ideas functioned within the human mind. Many thought ideas possess specific kinds of mental energy which were transmuted into physiological elements. A mental chemistry was thought to take place, which allowed the combination of all energies into an acceptable synthesis of mental/ physiological products. Hypnosis was conceptualized by some to involve a mental state in which a particular idea had become dominant in consciousness (Ellenberger, 1970).

Hypnosis was thought to produce suggestibility by focusing the patient's attention upon a single idea, typically that of experiencing an induced hypnotic sleep. In this state, the patient was thought to be more open to suggestion. As a result, any ideas suggested by the hypnotist were thought to be

retained within the patient's awareness as central concepts which they would then act upon (Fromm and Shor, 1979).

During the 1880's, Breuer (who became Freud's collaborator) began to treat hysterics' symptoms through a hypnotic method which attempted to elicit a recall of repressed trauma. In the Anna O. case, hypnosis was used to bring out a phobia related to the patient having seen a pet dog drink out of the patient's drinking glass. Apparently this was so traumatic for the woman that she was unable to drink water for several weeks. Breuer's theory suggested that hypnotic states allowed access to repressed or unconscious memories of a traumatic nature with which the patient was not able to consciously cope (Ellenberger, 1970).

Breuer came to believe that hypnosis allowed the re-experiencing of hidden emotion, and the emergence of important symptoms. This led to the development of the theory of hypnotic catharsis. He thought that this catharsis allowed the release of stored emotions from the unconscious, since they were emotions associated with hidden memories (Fromm and Shor, 1979).

Modern Theories

Several theorists have proposed classical conditioning as a likely explanation for the effects of hypnosis (Kornfeld, 1985; Pratt et al., 1988). In this conceptualization, hypnosis is a form

of conditioning which is linked by the words employed in trance induction and deepening. The trance associated words become like a conditioned stimulus which elicits the hypnotic experience in the patient (relaxation, attention, and an accepting attitude regarding suggestions offered by the therapist).

This theory also suggests that individuals have a predetermined idea of how to respond to hypnosis, which is elicited as the result of the trance words (conditioned stimulus). Further support is suggested by the effects of post-hypnotic suggestions, which often are thought to be triggered by certain words or events (Crasilneck and Hall, 1985).

E. R. Hilgard's (1965) theory employed a dissociative interpretation of hypnosis. According to this theory, hypnosis involved a division of consciousness into multiple streams of mental activity, all of which are present concurrently. Dissociation is thought to occur when one or more of these streams of consciousness influences experience, thought, or action, in a way which seems to be outside of normal awareness or voluntary control. Hilgard pointed to the ability of people to engage in more than one activity at a time, and suggested that consciousness is both active and receptive. He also highlighted voluntary-involuntary and conscious-subconscious mental distinctions.

Hilgard suggested that these concepts are significant because people in hypnotic trances are often unable to perform activities which were once voluntary, while involuntarily functions are able to be brought under voluntary control. Hilgard's theory explained that these events are simply intensified versions of events or activities which are also part of life outside the hypnotic experience (Hilgard, 1965).

He also discussed some of the typical events which occur during hypnosis (motor automatisms, analgesia, blindness, deafness, amnesia) as examples of the dissociation process. This theory points to analgesia and amnesia, where there is a "loss" of awareness as examples of the dissociation process in hypnosis. Support for dissociation theory, according to Hilgard, is suggested by the fact that the "hidden observer" technique shows critical perceptions and memories were registered in the client's consciousness and by the reversibility of the hypnotic amnesia technique. Hilgard sees additional support for his theory in the loss of voluntary control during motor automatisms (like automatic writing). Finally, he also suggested that post hypnotic suggestions (when followed) are examples of the dissociative process (Hilgard, 1965, 1977).

Hilgard described hypnosis as involving an alteration in the control system of the individual, rather than some major change in subjective experience. He concluded there was little similarity between the shift from hypnotic to ordinary

experience, and the movement from waking to sleep consciousness. This approach to hypnosis sees it as closer to typical conscious experience, and in most cases quite different from Tart's altered states of consciousness (ASC's).

Hilgard developed a model of cognitive control structures to support his notion of hypnotic dissociation. He described an "executive ego" which is the central cognitive controlling structure. The executive ego has some constraints placed upon it, since it is part of a system which includes other cognitive controlling structures. These cognitive controlling structures, according to the theory, function as a hierarchical system. Hilgard used the concept of a triad of control structures to emphasize that there are several cognitive functions which may be dominant, while others are not consciously engaged. In addition, these subsystems are pictured as being interactive (Fromm and Shor, 1979).

The neodissociation theory of hypnosis suggests that executive and monitoring functions may be modified, so that the hierarchical relationships of the subsystems are likely to change. According to Hilgard, voluntary functions may become involuntary, and involuntary functions may come under voluntary control. It then follows, according to Hilgard, that what was once in awareness may at some other time not be attended to, and something which was not actually available

for perceptual awareness may be thought to be present (Hilgard, 1965, 1977).

Hilgard suggested that hypnosis produces a readiness for dissociative experiences as a result of an agreement, at the initiation of hypnotic treatment, between the patient and therapist. The agreement produces cooperation which generates behaviors expected during hypnosis. However, this does not imply that the behaviors are simply role playing. The treatment agreement, according to Hilgard, allows hypnotic induction to produce a condition which permits the subject to experience hypnotic behaviors. He additionally suggested that the initial experience with hypnosis allows the client to become open to the dissociative process (Hilgard, 1965).

Hilgard stresses that much of the typical hypnotic induction involves training the client in the process of dissociation. The patient may be asked to focus their eyes on an object, and then is told their eyes will become very tired, eventually too tired to stay open. The stress on relaxation, and immobility in hypnosis, is used to focus the person on how they may allow themselves to loosen their ties with "ordinary" cognitive processes. In addition, the hypnotic tradition of suggesting that everything be set aside mentally by the client, implies that there are alternative ways to focus the mind (Hilgard, 1965).

During the hypnotic session, according to Hilgard, the functions of the central executive system are divided between the hypnotist and the hypnotized person. Patients retain much of their typical cognitive control, however by agreement, turn over some executive functions to the hypnotist. As a result, the patient is more willing to follow suggestions. The extent to which the control will be relinquished and the intensity of the experience, are thought to depend on the hypnotic responsiveness of the client. In addition, the level of involvement which the patient will allow during hypnosis influences the outcome of the hypnotic treatment (Fromm and Shor, 1979). Hilgard (1965) suggested that during the hypnotic session, goal directed behavior is largely relinquished to the hypnotist. He further suggested that the patient tends to stop planning functions, and new lines of independent thought during hypnosis.

In this theory, self-hypnosis is suggested to be another example of the division, or dissociation of cognitive processes. The executive functions become divided so that one part represents the role of the hypnotist, and the other part the patient. Hilgard viewed self-hypnosis as dissociation which allows patients to split their executive controlling functions so that one aspect participates in the hypnotic process while another observes and monitors the process (Fromm and Shor, 1979).

Hilgard's theory (1965, 1977) suggests that selected experiences are "automatized" (not consciously controlled). According to his theory, dissociation is more similar to preconscious processes than to unconscious processes. Hilgard described his concept of dissociation as a vertical split in conscious awareness. This suggests that hypnosis is part of the conscious process (simply a divided one), rather than being an unconscious process. He saw hypnosis as a process of using the dissociative aspects of consciousness to benefit the patient. Hypnosis then, is the attempt to integrate the dissociated aspects of consciousness in a positive way for hypnotic patients.

In some sense, Hilgard is using a weakened version of the state approach to hypnotic theory. He sees hypnosis as a label which represents some characteristic phenomena (suggested behaviors and self reports of experience). However this theory fails to explain why "hypnotic" phenomena may also be observed post-hypnotically. Hilgard's theory may be traced back to the dissociation theory of consciousness which was popular at the turn of the century. However, his theory, with its emphasis on divided consciousness, allows hypnosis to be linked to current theories of attention and memory (Fromm and Shor, 1979).

Psychoanalytic writers have tended to see hypnosis as a process involving the regression of the patient to a mental

recreation of childhood. In this mental state the hypnotic subject is thought to experience a form of transference which causes them to wish to follow the suggestions of the hypnotist (Fromm, 1981). This Ego-Psychology oriented theory of hypnosis was proposed by Erika Fromm.

Fromm considered hypnosis to be an altered state of consciousness, with different levels of intensity (light hypnosis, medium hypnosis and deep hypnotic states). According to Fromm, light hypnosis is similar to a state of relaxation which might be achieved in many ways. However, she describes deep hypnosis as producing a profound altered state of consciousness (Fromm, 1981).

Fromm's conceptualization of hypnosis (within the context of an altered state of consciousness) also included the concepts of primary and secondary processes and explained how these different types of mental processes influence the individual. Primary process is the mental functioning typical of early childhood. It lacks a reality orientation, is largely nonverbal, and is unable to delay gratification. The instinctive drives of primary mental process, strive for immediate gratification without awareness of consequences. Primary process thinking aims for immediate and complete discharge of tension. Fromm also described primary process thinking as dominated by imagery (Fromm and Shor, 1979).

In psychodynamic theory, as the individual develops they move toward secondary process. In contrast to primary process thinking, secondary process thinking is verbal, and often takes the form of complete sentences, imagery is very diminished. Fromm concluded that the two mental styles interact, so that even though a person is functioning as an adult (mainly using secondary process thinking), the imagery of primary process is also present (Fromm and Shor, 1979).

In turn, even when we are dreaming, and functioning on the primary process level, there is some aspect of the rational secondary process thinking present. In the psychoanalytic tradition, the primary-secondary process dichotomy refers to more than cognitive elements. The two types of mental processes are also conceptualized as being types of psychic energy (Fromm, 1981).

In adults, primary/unconscious mental functions indicate a type of regression which may be either healthy or pathological. Fromm suggested that primary process thinking may be associated with the brain's right hemisphere. Secondary process, according to her, is associated with the left hemisphere. Fromm conceptualized consciousness as ranging between the extremes of drive dominated imagery thinking, and thinking dominated by pure logic and reason (Fromm, 1981).

In Fromm's theory, hypnosis is seen as inducing a return to primary process thinking. This move into primary process is thought to intensify as hypnosis becomes deeper. In the lighter stages of hypnosis, secondary process is more present, however, as hypnosis deepens the secondary process declines as a force in the individual's mental processes. The deeper the patient goes into the hypnotic state, the more they come into contact with their unconscious, with imagery and emotional thinking (Fromm, 1981).

The therapist, according to Fromm (1981), communicates with the patient in the language of primary process (imagery). The hypnotist encourages the client to engage in imagery dominated thinking. In very deep hypnotic states, imagery displaces most secondary process thinking. She described hypnosis as inducing a reduction in the reality perceptions of the individual's ego, which in turn produces greater suggestibility.

Fromm sees hypnosis as producing ego receptivity, which in turn produces a special type of trance logic similar to dream logic (very vivid and imagery dominated). The patient reacts to the therapist in terms of the influence of significant figures in the patient's past. This has been conceptualized in terms of both transference, and as patient-to-therapist projections. Beyond this issue, lies the notion that the patient allows the hypnotist to take temporary control of their ego, in order to

positively influence their psychological well being (Fromm and Shor, 1979).

In Fromm's theory (1981), the hypnotic state allows the client to experience partial regression to the primary process mental state, which in turn allows more access to significant images and memories. However, despite the dominance of primary process thinking, the patient is still able to use the logical language of secondary processes in order to logically process significant images or memories.

Since this is a psychodynamic oriented theory of hypnosis, Fromm suggested that hypnosis is most applicable to working with early experiences which have negatively influenced the patient (often done through age regression). During this process, the client is able to re-experience events in this induced form of primary process thinking, and to re-process the experience from the adult/secondary process mental perspective (Fromm, 1981).

Spiegel (1988) conceptualized hypnosis as a naturally occurring event which involves the intensification of concentration on a specific stimuli, while at the same time restricting awareness of other phenomenon. Spiegel further described hypnosis as a method for increasing receptive awareness, in connection with a dissociation of awareness. This is accomplished through the breaking down of awareness into separate elements. He concluded that hypnotic methods result

in heightened suggestibility, which results in the patient accepting instruction rather uncritically.

Spiegel summarized the effects of hypnosis as including dissociation, suggestibility, and absorption. He also suggested that the ability to experience or benefit from hypnosis was subject to the laws of individual differences. Some people are more able to become absorbed in experience, and as a result will be more likely to completely involve themselves in hypnosis. In addition, hypnosis typically involves some level of dissociation, so that some experiences which were conscious are pushed out of awareness. Finally, when patients are fully absorbed in a hypnotic state, a reduction in the distinction between self and other occurs.

Due to this, the patient may be unsure if a suggestion is offered by another or if it originates in their own consciousness. Spiegel concluded that hypnosis is simply a method for mobilizing the patient's pre-existing abilities, or for instructing them in how to develop the ability to intensify concentration, suggestibility, dissociation and relaxation (Spiegel, 1988).

Barber (1984) described the tendency for hypnotic techniques to suggest either deep relaxation, and to provide suggestions aimed toward increasing the likelihood of patient acceptance of future suggestions. He concluded that most hypnotic techniques also attempted to make either direct or

indirect suggestions aimed at specific therapeutic goals such as diminishing substance abuse/use, loss of weight, and reductions in addictive type behaviors.

Barber (1984) focused primarily on therapeutic suggestions aimed at producing deep relaxation. In support of his notion that relaxation is central to hypnotic effect, he provided a review of how suggestions for relaxation have developed through out the history of hypnosis. Hypnotic relaxation involves a state of mental and physical well being also associated with reductions in physiological markers of relaxation.

Barber further suggested that a by-product of this deep relaxation was a reduction of critical and evaluative thinking. This cognitive change allows the patient to more effectively cope with life stressors and to rehearse difficult tasks in an effort to over come anxiety associated with certain behaviors. The relaxation which is labeled hypnosis, also seems associated with allowing the patient to accept the opportunity to withdraw from daily concerns for a short period of time. He concluded his review by suggesting that hypnosis is very effective in producing both physical relaxation and a mental state of mind which has typically be characterized as a sense of well being or peace of mind (Barber, 1984).

Kihlstrom (1985), in a major review of hypnosis, summarized the divergent theories of hypnosis. He discussed

the idea that hypnosis is very similar to relaxation, however concluded that this is largely restricted to what is referred to as neutral hypnosis. So called neutral hypnosis makes a specific effort to avoid eliciting strong emotions, or suggesting changes in thought, behavior or evaluations of experience. In addition, Kihlstrom stated that the body of existing research supports the central role of suggestibility in explaining the effects of hypnosis.

In this same review, Kihlstrom (1985) evaluated the status of the controversy about whether hypnosis is a special or altered state of consciousness. Kihlstrom suggested that future investigations should be focused on explaining differences in hypnotic susceptibility, and describing subjective aspects of hypnotic experience.

Finally, Kihlstrom summarizes the viewpoint that described hypnosis as a form of social influence. In this theory, hypnosis is pictured as a form of role playing. This point of view uses the acknowledged significant role of suggestion to support the contention that hypnosis involves social influence and acceptance of influence. Kihlstrom concluded by pointing out that it is not necessary to accept or reject any one theory, since most objective evaluations of hypnotic experience have seen it as involving both cognitive and interpersonal elements (Kihlstrom, 1985).

Edmonston (1986), reviewed the history of hypnosis and provided details which suggested that up until this century, hypnosis was primarily associated with sleep and secondarily with the effects of relaxation. According to this analysis, however, it was actually relaxation which accounted for most of the effects of hypnosis upon various disorders such as hysteria, pain, or the addictions.

Edmonston (1986) added a detailed description of research comparing hypnosis with other relaxation methods. He concluded that there was no significant difference between the effects of hypnosis and other well designed relaxation methods. Finally, Edmonston provided a summary of the findings from his own research program. It was his conclusion that there was no difference between hypnosis and relaxation techniques in terms of psychological and physiological indices. On the basis of this, he suggested that the central active mechanism of hypnotic effect was relaxation. Edmonston also offered the term *Anesis* to replace hypnosis, since the new term would correctly imply treatment which assisted patients in attaining therapeutic relaxation.

In a comprehensive text devoted to providing descriptions of clinical hypnotic techniques, Golden, Dowd, and Friedberg (1987) attempted to convey the theory of so called modern hypnotherapy. They concluded that the appropriate approach in hypnosis is an integrative method which makes

use of cognitive-behavioral hypnotherapeutic methods, and hypnotic skills training techniques in combination with some of the more traditional methods.

Golden et al. (1987) conclude that hypnosis is based on the willingness of the patient to cooperate with hypnotic treatment. An associated factor, according to this theoretical description, is patient motivation for change. However, they also describe methods which do not require conscious cooperation or motivation, such as Ericksonian hypnosis.

Leskowitz (1988) used the often employed eye-roll test as a point of departure for his psychoendocrine model of hypnotizability. He discussed the positive correlation between scores on the ER test and ability of individuals to benefit from hypnosis. According to Leskowitz, conscious attempts to attend to the area above the eyeballs are correlated with altered states of consciousness (dissociation). He supported this contention by pointing out that several methods of inducing hypnosis employ the eye-roll technique to encourage dissociative experiences.

Leskowitz (1988) speculated that hypnotic trance is in some way tied to endocrine function in the body, and also linked to the focusing of the eyes as enacted in the eye-roll technique. He concluded that endocrine balance is required for high level mind-body coordination and for voluntary self-regulation. From this perspective then, dissociation involves a

high level of psychophysiological coordination, as opposed to the psychoanalytic notion of dissociation as a defense against anxiety.

Leskowitz concluded by saying that since he felt that dissociation was related to normal or enhanced endocrine functioning, the eye-roll exercise should have some appreciable influence upon pituitary functioning. He attempted to support these speculations by describing the relationship between endocrine imbalances and elevated levels of anxiety. Leskowitz also discussed findings that patients with generalized anxiety disorders are known to be poor hypnotic subjects. Further support for his theory was seen in several research projects which indicated that no endocrine dysfunction was found in superior hypnotic subjects. Leskowitz additionally reported that some evidence supported the contention that pituitary functioning could be positively influenced through the application of the eye-roll technique (Leskowitz, 1988).

Summary of Hypnotic Theory

Modern theories explain the effect of hypnosis from several perspectives. Hilgard's (1965, 1977) theory describes hypnosis as a form of dissociation which is more closely related to so called normal consciousness rather than with altered states of consciousness. He described hypnosis as a special form of dissociation which allowed the patient to become more open

to suggestions for positive change and relaxation. Hilgard's theory sees the therapist as a hypnotic skills trainer who assists the patient in developing these special dissociative abilities.

Fromm (1981), from the psychodynamic viewpoint, conceptualized hypnosis as an altered state of consciousness which allows the patient and the therapist access to the primary process mental state. This mental state is dominated by affect and imagery. Fromm saw hypnosis as allowing the patient to re-experience early trauma from both the primary and secondary process viewpoints. This combination of views, was thought to allow the patient to overcome very difficult experiences.

Others have seen the effect of hypnosis as being based on the intensification of attention and concentration, in combination with a restriction of awareness to other stimuli in the environment which is part of the technique (Spiegel, 1988). While others have described the effect of hypnosis as being based largely upon the relaxation produced by the treatment (Barber, 1984; Edmonston, 1986; Kihlstrom, 1985). Finally, some theories have advanced the idea that the effect of hypnosis is based primarily upon the patient's willingness to cooperate and motivation for change (Golden et al., 1987).

Hypnosis and Anxiety Reduction Research

There is a long standing belief, found in numerous works related to hypnosis, concerning the positive effects of hypnosis upon anxiety and anxiety related symptoms (Sigmund & Phillips, 1985). An over-view of this subject will be provided in order to present a summary of the available clinical, experimental and case study research in this area. A complete narrative summary, within a meta-analysis, falls beyond the scope of the study. This is particularly true since the main task of this undertaking is to determine a quantitative judgement on this same topic. What follows then, is a representative sample of the recent research in this area.

Humphreys (1984) presented a review of the effects of neutral hypnosis on anxiety and anxiety related symptoms. In his review, he concluded that neutral hypnosis was effective in reducing anxiety (as measured by self-report instruments), and was also associated with reductions in migraine headaches, hypertension, tension headaches, and insomnia. In each of these cases, hypnosis was superior to a non-treatment control, however, was about equal with a relaxation treatment group.

Crasilneck and Hall (1985) reviewed literature related to the modification of anxiety and concluded that hypnosis seemed to be associated with the effective reduction of anxiety and associated anxiety symptoms. These include both state and trait anxiety as measured by self-report measures of anxiety.

In addition, these findings were supported by clinical case studies in which individuals were seen to have reduced anxiety symptoms. They concluded their summary by suggesting that hypnosis may prove to be the treatment of choice in dealing with anxiety.

Supporting this notion is the recent work of Golden, Dowd, and Friedberg (1987) who discussed the role of hypnosis in an integrative approach to hypnotic treatment. They suggested that hypnosis has been effective in assisting patients in learning to relax, through the application of hypnotic desensitization techniques. They also described ways of employing cognitive-behavioral hypnotic methods to assist patients with cognitive restructuring. Finally they described hypnosis as an effective method for uncovering anxiety related material, by promoting insight as a result of hypnosis targeted to anxiety and its specific symptoms.

Smith and Womack (1987) reviewed the effects of a number of stress management techniques in treating children and adolescents. They described hypnosis as an effective method for treating anxiety related disorders such as headache. A brief case example is provided which concluded that hypnosis was effective in the treatment of childhood anxiety and migraine headache.

Pratt et al. (1988) discussed the role of hypnosis in what they characterized as stress management programs. They

discussed the central role which stress reactivity plays in the development and perpetuation of major illnesses such as heart disease and cancer. In addition, they summarize information which strongly supports the role of stress in aggravating disorders such as diabetes, and hypertension.

They further suggested that hypnosis reduced the amount of steroids circulating in the system, and as a result this allows the body to resist stress related difficulties. The authors additionally concluded that hypnosis was useful in reducing both physical and mental aspects of stress reactivity and anxiety. They describe how hypnosis may be used by itself to treat anxiety, or may be employed in combination with or as an adjunct to psychotherapy (Pratt et al., 1988).

Spiegel (1988) in a general review of hypnosis, concluded that it was effective in the reduction of anxiety, as either a single treatment or in conjunction with psychotherapy. He pointed out that the role of hypnotizability was often overlooked, and that perhaps the single best predictor of effective outcome was the patient's desire to be treated with hypnosis. Spiegel cautioned that one out of every four outpatient is likely to resist hypnosis, so it is important to assess the patient's desire for hypnosis and their ability to engage in dissociative practices.

Spiegel (1988) also described hypnosis as an effective method for the treatment of habit disorders, phobic conditions,

psychosomatic disorders, and many types of pain. However, one of the most significant roles hypnosis may play in future mental health treatment is highlighted by the alarming level of anxiety disorders found present in the population. The best estimates to date suggest that as many as 15% of all people may be afflicted with this problem.

Summary of Hypnosis and Anxiety Reduction Research

Traditionally, hypnosis has been seen as effective in reducing anxiety. Humphrey's review of the literature (1984) supported this assumption related to neutral hypnosis, however suggested that hypnosis was not significantly superior to other forms of relaxation therapy. Crasilneck and Hall's review (1985) concluded that hypnosis was effective in reducing psychometrically measured anxiety and related symptoms. They went on to suggest that hypnosis was the treatment of choice for these symptoms. Others agreed, and also suggested that hypnosis was effective in assisting patients in dealing with anxiety related feelings (Golden et al., 1987).

Hypnosis was also described as effective in the treatment of childhood anxiety disorders, in stress management programs, and in conjunction with health psychology interventions (Smith & Womack, 1987; Pratt et al., 1988). Finally, Spiegel (1988) concluded that hypnosis is an effective

treatment for anxiety alone or in combination with psychotherapeutic interventions.

Physiological Correlates of Hypnosis

A somewhat clouded area of hypnosis research involves the assessment of possible physiological correlates of hypnotic practice. Some authors (Crasilneck and Hall, 1985) have concluded that so called neutral hypnosis is associated with decreased pulse rates, however, others have reported research summaries which conclude that neutral hypnosis is not consistently associated with changes in heart rates (Tebecis & Provins, 1976). However, the same authors report research which found an overall trend toward decreased heart rate during hypnosis. Other reviews have reported trends in research which support the idea that hypnosis is associated with reductions in heart rate, respiration, muscle tension, and skin resistance (Humphreys, 1984).

Edmonston (1981) summarized the status of research related to physiological aspects of neutral hypnosis. His review concluded that neutral hypnosis was associated with decreases in heart rate, respiration, increases in Alpha and Theta brain waves, decreased arterial oxygen saturation, decreases in systolic blood pressure, increases in peripheral blood flow, and basal skin resistance. In all cases, these findings were superior to non-treatment controls, however, the hypnotic effects were

largely equivalent with non-hypnotic relaxation treatments. This led Edmonston to conclude that there was little difference between hypnosis and relaxation methods. However, another explanation would be the possibility that relaxation actually results in a hypnotic state. Unfortunately, the problem is that there is no independent criterion to measure the presence of a hypnotic state.

Sarbin and Slagle (1979) presented a rather critical review of the physiological outcomes associated with the practice of hypnosis. They concluded that there are no special physiological states which are unique products of hypnosis. They essentially came down on the side of the argument which sees hypnosis as a form of relaxation, and they pointed out that any physiological outcomes associated with hypnotic states tend to be similar to results associated with relaxation methods. They suggested that the search for a specific physiological marker of hypnotic trace is misguided, since it seems obvious that some process allows various techniques to influence somatic processes.

Benedittis and Sironi (1985) described the results of their own study which indicated that hypnosis was associated with an increase of alpha and relatively high frequency beta activity. They also found that hypnosis and sleep EEGs are different, so there is little to suggest that there is a major similarity between sleep and hypnosis. They also found

evidence which suggested the importance of the limbic system in trance experience. Finally they concluded that hypnosis is effective in reducing epileptic seizures.

Macleod-Morgan (1985) discussed the topic of hemispheric specificity as related to hypnosis. The author concluded that hypnosis is associated with right-hemisphere functions and as a result suggestibility is understood to be more effective due to the reduced strength of left hemisphere logical-sequencing and reality testing abilities. The author went on to suggest that hypnotic amnesia is understandable since events experienced during hypnosis may be largely restricted to right hemisphere experience less likely to find verbal expression.

Macleod-Morgan (1985) also suggested that the differences may be resolved between those who see hypnosis as associated with special state and those who reject the notion of special states. This is possible by viewing individuals as differing in abilities to experience hypnotic states, with some individuals able to easily experience trance both during the hypnotic setting and also in daily life. The primary difference it would then seem lies in eliciting the response more easily and at a deeper level during the hypnotic process.

Spiegel (1988) reviewed research regarding the physiological concomitants of hypnosis which indicated that there was some relationship between hypnotic trance and right

cerebral hemisphere functions becoming more accentuated. However, investigations focusing on the possible role of endogenous opiates in hypnotic pain reduction indicated that naloxone (which should block pain reduction if it is due to endogenous opiates) did not block hypnotic analgesia.

Summary of Physiological Correlates of Hypnosis

Research regarding the physiological correlates of hypnosis is equivocal in nature. Some research has suggested that hypnosis was associated with reductions in pulse rates, respiration, muscle tension and skin resistances (Humphreys, 1984). While others (Edmonston, 1981) concluded that any measured physiological correlates were simply the result of relaxation in general, rather than specific to the technique of hypnosis.

Finally, other researchers have found associations between hypnosis and alterations in brain functions as indicated by measures of brain waves. Hypnosis is thought to be associated with increases in alpha and beta brain wave activity. Other research has also suggested that hypnosis appears to be more associated with right-brain activity (Benedittis & Sironi, 1985; Macleod-Morgan, 1985; Spiegel, 1988).

CHAPTER III

METHOD

In this chapter I will discuss the methods of analysis that were employed (meta-analysis), the procedure used to identify related research studies, the major dependent variable (State-Trait Anxiety Inventory) (Spielberger, 1983) used in computing effect sizes, along with a brief over-view of other related instruments used in some studies. In addition, a description of variables to be coded in the statistical analysis will be included.

Methods for Evaluating Primary Research

Meta-analysis is one of several methods available to social science researchers attempting to evaluate large groups of primary research data. The other major methods include narrative reviews and research synthesis methodologies.

Narrative or Traditional Reviews

Narrative reviews do not typically involve a quantitative analysis of the examined data. Rather, they traditionally involve a subjective determination of the over-all tone of existing research which is used to generate findings related to a research topic. The research synthesis, on the other hand makes an attempt to judge a body of research by employing what has been called the vote-counting method (Wolf, 1988).

The traditional narrative review has a number of possible problems associated with it, including incomplete literature searches, and subjective decisions in determining the status of a particular area of research. Specifically, several authors have commented on the strong trend in these reviews to employ inadequate literature samples, or at the very least to fail to describe search methods.

Most narrative studies also fail to clearly explain how summary judgements related to the nature of the research outcomes were determined. Another problem is often the lack of reliability in judging the effect of a treatment. There are examples of narrative reviews which were so subjective in how they summarized the state of the research in a given area, that two narrative reviews conducted on the same set of articles came to opposing judgements (Cook & Leviton, 1980). Finally, narrative reviews often discard many studies due to the reviewer's decision regarding the quality of a study's research design. Some commentators have suggested that this introduces a bias into the review (Glass, McGaw, & Smith, 1981).

Research Synthesis

The other major method, the research synthesis, involves attempting to gather a large number of studies and then determining whether or not the results attain statistical significance. Reviews which have employed these methods

usually divide studies into two categories: statistically significant, and not statistically significant. In doing so, this type of review will often group studies which have fallen just short of attaining the commonly employed .05 level of significance, with studies indicating negative outcomes for the examined treatment (Wolf, 1988).

Due to this, research synthesis methods have been criticized by several commentators as biased toward finding negative outcomes in groups of research studies. An example is a study which tested the hypothesis that a group of studies with an average effect size of .50 (which according to Cohen is a medium effect for the treatment) would be found to have an average effect of treatment which was not statistically different from zero (Hedges & Olkin, 1985). In this analysis, it was found that even with a medium effect size, the group as a whole could be divided (using vote-counting methods), in a way which would slightly favor the group of studies which did not reach statistical significance. This finding was seen as supporting the contention that vote-counting is biased in favor of finding that a treatment effect was not statistically different from zero. In addition, the research synthesis type of review is also prone to the criticisms leveled against narrative reviews: inadequate literature searches and subjective exclusion of some studies on the basis of research design (Hedges & Olkin, 1985).

Meta-Analysis

In an attempt to counteract the limitations of previous methods for aggregating large bodies of research findings, meta-analysis was developed to provide a quantitative way of evaluating a research question. Meta-analysis is the more statistical of the methods described, in that a meta-analysis calculates a treatment effect for each study. These effect sizes are then grouped to produce a group treatment effect measure. Meta-analysis determines a measure which indicates a magnitude of difference between treatment effect and control outcomes. In this way, meta-analysis provides not only a measure of whether a treatment is different from a control in terms of effect, it also allows some indication of how much the treatment differs from the control condition. An additional advantage of the meta-analytic method is the requirement for an explicit description of literature search methods, the report of the number of studies identified, reasons for excluding studies, and the study variables which will be evaluated in relation to the computed effect sizes (Smith et al., 1977).

Criticisms of Meta-Analysis

Despite these admirable qualities, a number of criticisms concerning the meta-analytic method have been made. In general these have fallen into the following categories: (1) concerns about the quality of studies aggregated; (2) possible problems in comparing studies which include different

dependent measures, populations, and definitions of dependent and independent variables; (3) possible bias as the result of restricting evaluated studies to those published in professional journals (possible bias in favor of significant outcomes); and (4) possible difficulties as the result of employing multiple effect sizes from a single study (questions about violating the notion of statistical independence) (Smith et al., 1977; Hedges & Olkin, 1985).

These criticisms, however, have not greatly reduced the application of the meta-analytic research methodology. A literature review done as part of this investigation indicated that over 600 meta-analytic studies (journal articles, dissertations, and paper presentations) have been conducted in the years since the technique was first introduced. Since the first meta-analysis (Smith & Glass, 1977) concerning the psychotherapy outcome literature was conducted, many of these concerns have either been clearly refuted or meta-analytic methods have been developed to correct for these criticisms (Hedges & Olkin, 1985; Wolf, 1988).

With regard to the first criticism, concerning the possible effects of including different types of research designs within the same meta-analysis. This has been typically handled by coding the evaluated studies according to type of design and then empirically testing whether design is related to computed effect size in a way which biases the result. The implication is

that poorer designs (those lacking random selection and assignment to treatments, or studies without non-treatment control comparison groups) produce greater computed effect sizes. However, the research to date does not clearly support this belief. Glass and Smith (1977) found that "weak" and "strong" designs produced about the same effect sizes. Landman and Dawes (1982) however, found that on average, higher effect sizes were associated with studies which incorporated better research designs. This would seem to suggest that weaker studies, in terms of research design, are not significantly associated with higher computed effect sizes. Finally, a recent meta-analysis (conducted on studies available through the year 1982), concluded that positive design quality was actually associated with marginally higher effect sizes (Eppley, Abrams, & Shear, 1989).

The second criticism, is often termed the "apples and oranges" problem. Some critics of meta-analysis have suggested that different types of studies have been compared within a meta-analysis, thereby obscuring the meaning of the over all analysis. It has been argued that the combination of different instruments or treatments, causes the meaning of the meta-analysis to be diminished due to uncertainty about just what has been analyzed. The clearest example, was the controversy generated by the Smith and Glass (1977) article due to their method of classifying different psychotherapies into fairly

broad categories. They were also criticized with regard to not distinguishing between dependent measures employed in the studies (Wolf, 1988).

Since that initial study, there has been more attention focused on coding study characteristics and then empirically testing them to determine how these variables relate to computed effect size. A second approach has seen many meta-analysis studies focus on more narrowly defined research questions, and in so doing avoiding part of the apples and oranges problem.

The same approach has proven successful in relation to assessing the possible effects of multiple dependent measures. Meta-analysis studies have often either restricted the analysis to one dependent measure or to a group of highly related dependent measures. Another way of taking this concern into account is by coding the different dependent measures, and then empirically examining them in relation to computed effect sizes in order to determine if a particular instrument is significantly different in terms of treatment effect size (Wolf, 1988).

The third of the major criticisms, referred to the concern that since many meta-analysis studies examined only published research, there was a strong bias in favor of significant results built into a meta-analysis conducted on this basis. This has been addressed in many studies by simply

including the research reported in books, dissertations, and those studies available from presentations at conferences. The different sources are then compared to determine if there are significant differences based on this characteristic. Glass, McGaw, and Smith (1981) in an attempt to examine this question, reviewed the existing meta-analyses to determine the computed effect sizes by source of publication. They found that published articles produced the largest effect size ($E_s = .64$), however unpublished studies had an effect size of .58, and dissertation research produced an effect size of .48. In the more recent meta-analysis conducted by Eppley, Abrams and Shear (1989), they found no significant differences in computed effect sizes based on the source of the study.

The fourth criticism, which questions the statistical use of multiple effect sizes from a single study, has been examined empirically by several researchers (Brown, 1987). Many of these criticisms were focused on the initial Smith and Glass article (1977) due to their use of multiple measures for the same subjects on several outcome measures and at different follow-up periods. Critics suggested that this resulted in a very dependent set of data which may have biased the results of the meta-analysis (Landman & Dawes, 1982). However, a replication of the Smith and Glass study (1977) which employed only one effect size for each study found no significant differences when compared against the initial study.

However, this may only be the case for meta-analyses similar to the Smith and Glass study, which had an average of 2.22 effect sizes per study (Brown, 1987; Landman and Dawes, 1982).

Many of the most recent meta-analyses have limited the use of data to one effect size per study analyzed. However it has also been suggested that it is essential to narrow the focus of the analysis to the relevant outcome measures and avoid obscuring the method by including unrelated dependent measures in the statistical calculation. Another related concern has been how to handle multiple outcome measures obtained at different follow-up testing sessions. The basic approach taken in recent studies, again involves coding for the separate testing points, and assessing the association between the different follow-up results in relation to the computed effect size for the study in question (Brown, 1987; Wolf, 1988).

Techniques of Meta-Analysis

This study employed the statistical methods of meta-analysis in order to examine the effectiveness of meditation and hypnosis in the reduction of self-reported anxiety. Due to the criticisms previously described, this study attempted to carefully attend to coding study characteristics in order that the empirical questions related to publication source, dependent measures, and research design may be explored.

With regard to the "apples and oranges" argument, this study has been narrowed so as to examine a specific area of research (the effect of meditation and hypnosis on self-report measures of anxiety) and in so doing has eliminated this as a major concern.

Meta-analysis is a group of evolving techniques which may be defined as statistical methods for aggregating the findings from numerous empirical investigations. Although there are a number of ways to aggregate research findings, the basic design to be followed in this study is that initiated by Glass and associates (Smith & Glass, 1977). This method involves the calculation on an effect size(s) from individual studies which are then combined to allow a comparison of the aggregate result against a non-treatment control aggregate (Glass, McGaw & Smith, 1981).

The effect size is similar to a Z score, such that it also is a unit-less metric which may be interpreted in terms of percentile ranks. An effect size of +1.0, for example, indicates that the treatment group is one standard deviation higher than the control condition, in terms of results. This tends to be viewed, in practice, as indicating that the effect size, in such as case, is similar to achieving the 84th percentile of the control group's results (Glass et al., 1981)

Meta-analysis involves the use of an effect size statistic for each individual study. These effect sizes are then averaged

to produce a composite effect size which describes the amount of the treatment effect. The method typically used involves the following equations:

$$ES1 = \frac{\bar{X}_e - \bar{X}_c}{SD_c} \quad \text{or} \quad ES2 = \frac{\bar{X}_e - \bar{X}_c}{SD_{\text{pooled}}}$$

\bar{X}_e is the mean for the post test treatment group, and \bar{X}_c is the mean for the post test control group. SD_c refers to the post test standard deviation of the control group. SD_{pooled} refers to using the post test standard deviation of the control group and the experimental group to obtain a pooled estimate of the standard deviation (Hedges & Olkin, 1985).

Meta-analysis also involves coding the various study characteristics which may be found to influence the effect size of an individual study. In this way the characteristics of a group of studies may be evaluated in order to determine if age of participants, length of treatment, level of treatment expectation, or gender ratio of participants is significantly related to the effect size of the group of studies.

In the event basic statistics are not provided, methods exist which allow for the estimation of effect sizes. For instance, in studies where there is only a treatment group standard deviation or no true control group for comparison, the post-test treatment statistic may be used in computing effect sizes. Studies which only report mean square within estimates, from analysis of variance or analysis of covariance statistical

procedures, may also yield an estimate of the standard deviation by using the square root of the estimated mean square within (of the raw within) estimate (Smith & Glass, 1977). A full listing and description of all statistical calculations is detailed in Appendix A.

However, in some cases, there was not enough statistical information provided to estimate the effect size. In such cases, it was necessary to exclude the study from consideration. In other cases, where studies provided group averages (means), yet did not report standard deviations, information obtained from norms published by Spielberger (1983) in connection with the State-Trait Anxiety Inventory were substituted. So, in the event a study does not provide a standard deviation, the data from the STAI manual, from the most similar group of tested people was employed. Previous meta-analysis studies have attempted to contact authors of studies in order to obtain information. However, one study reported that fewer than 12% of authors contacted responded to the inquiry (Ferguson, 1981). On the basis of this finding, and also due to time and financial constraints, it was decided that authors would not be contacted.

Literature Search

The data bases, and abstracts which were searched included: Dissertation Abstracts, ERIC, Index Medicus, Psyclit, Psychological Abstracts, Sociological Abstracts, Science Index,

and Social Science Index. In addition, bibliographies in obtained articles were searched in an effort to locate additional studies for inclusion in the study.

Dependent Variables

One of the most frequently examined dependent variables in hypnosis and meditation research has been self-reported anxiety, primarily as measured by the State-Trait Anxiety Inventory-Revised (Spielberger, 1983) and other self-report instruments (IPAT Anxiety Scale, Multiple Affect Adjective Check List-Revised, SCL-90-R, or the Taylor Manifest Anxiety Scale) (Cattell & Scheier, 1976; Derogatis, 1977; Zuckerman & Lubin, 1985). As a result, the primary dependent measure employed in the calculations of study effect sizes is the STAI-R, and secondarily other highly related self-report measures of state and trait anxiety mentioned above.

The STAI-R is based on the concepts of state and trait anxiety, which were first discussed by Cattell and later followed up on by Spielberger. According to Spielberger, anxiety states are seen as a subjective feeling of tension, apprehension, nervousness, or worry and also includes activation or arousal of the autonomic nervous system. He conceptualized anxiety by also discussing personality traits, which he described as relatively enduring differences in how people interpret their environment. Personality traits also

involve dispositions to react or behave in certain ways which are fairly predictable and consistent (Spielberger, 1983).

Trait Anxiety is described as an individual's long standing tendency toward anxiety-proneness and their characteristic way of perceiving situations as dangerous. Spielberger (1983) suggested that the stronger trait anxiety is, the more likely it will be that an individual will experience elevations of state anxiety when they feel at risk.

State anxiety is a transitory feeling of worry or perceived threat which almost all people feel at some time during their lives. However, Trait Anxiety is very related, in that it is a disposition to respond to stressful situations with various amounts of State Anxiety. Spielberger (1983) suggested that people with high Trait Anxiety have high levels of State Anxiety more often than people with low Trait Anxiety. He felt that this was true because they interpret more situations as threatening. Individuals with high T-Anxiety are also characterized as producing more S-Anxiety in situations involving interpersonal relationships or threats to self-esteem. Situations which involve experiences of failure or threats to the person's feeling of adequacy are also seen as more threatening for those with high levels of T-Anxiety.

The State-Trait Anxiety Inventory is the most widely used measure of anxiety, and involves two separate sets of 20 questions which assesses both types of anxiety. A literature

search conducted as part of this project indicated well over 3000 citations found in published research. The test was developed by selecting an item pool of 177 questions taken from the Taylor Manifest Anxiety Scale, the Welsh Anxiety Scale, and the IPAT Anxiety Scale. After over six years of test construction efforts, 20 items were selected as best in identifying both state and trait anxiety. However, Spielberger decided to re-examine the item pool in order to identify the best items for assessing both state and trait anxiety (Spielberger, 1983).

The test originally became available in 1970, however revision was started in 1979 and published as Form Y, in 1983. The revision attempted to balance the anxiety absent and anxiety present items, and to alter some of the items which did not hold up psychometrically with non-college subjects. The authors also attempted to address criticisms that some items seemed more related to depressive symptoms rather than anxiety states. Psychometric considerations resulted in six items on each scale being removed and replaced with new items based on extensive item and factor analyses (Spielberger, 1983).

Despite these changes, the new version is highly related with the previous X Form of the STAI, as indicated by an overall .95 correlation between the old and new forms. The STAI is written at the sixth grade reading level and is

appropriate for high school, college, and adult populations. There is also a children's version of the test available for younger subjects (Spielberger, 1983).

The test is divided into two sections which are on opposite sides of the one page form. Both state and trait sections consist of twenty items which may be given to individuals or used in group settings. It is not a timed test, however, the STAI is easily completed in approximately 10 minutes. The test provides two scores, State Anxiety and Trait Anxiety, with a range of between 20 to 80. The higher the score, the more anxiety is indicated. One score reflects the person's current level of anxiety, while the other is an indication of their long term tendency to experience anxiety (Spielberger, 1983).

The scores are typically interpreted in terms of high scores indicating increased levels of both types of anxiety, and lower scores suggested less anxiety. The test manual (Spielberger, 1983) provides standard scores and percentile ranks for several populations, however individual interpretations of test scores should be undertaken carefully, due to the subjective differences in what the different tests item response options may mean for a given individual.

Reviews suggest that the test is useful in both applied and research settings (Chaplin, 1984). Information provided from the publisher (Spielberger, 1983) suggests that the STAI

has been used in research related to test anxiety, in examining the relationship of anxiety to performance, anxiety related to medical conditions, and in assessing the effect of various experimental treatments on self-reported anxiety. In clinical settings the test has been employed as a measure of an individual's anxiety in connection with treatment interventions. The state scale has proven effective in many research settings.

The trait anxiety scale, however, has proven to be less effective in applied settings, for uses such as employee selection, due to the strong tendency for subjects to attempt to present themselves favorably. In addition, the trait scale seems best suited in applied settings, to the prediction of state anxiety responses in individuals who are faced with threats to their self-esteem. Spielberger's research indicated that the trait scale is unlikely to be an accurate measure of anxiety related to threats of a physical nature. So, it would seem that in applied settings, the trait scale is primarily a measure of anxiety as related to threats perceived to self-esteem or to situations which threaten the individual with failure (test or evaluation situations). This may be due to the possibility that people tend to react in much the same way when faced with physical threats.

Psychometrically the STAI has fared rather well, in terms of measures of internal consistency, test-retest coefficients, and construct validity. The trait scale achieved

internal consistency alpha coefficients of between .89 to .91 for both genders and with different tested populations. Results for the state scale on this same measure were between .86 to .95. Test-retest results for the trait scale ranged from .65 to .86 depending on the interval between tests. As the interval increased, the reliability coefficient decreased. The state scale, as expected, produced test-retest results ranging between .16 to .62 with the result decreasing as the interval increased (Chaplin, 1984).

In terms of concurrent validity, the trait scale achieved correlations with other tests measuring essentially the same construct (TMAS, IPAT Anxiety Scale) of between .73 to .85. Due to this finding, (which is in the range of the measured reliabilities of these instruments), it has been suggested that the tests appear to be equivalent measures of trait anxiety.

Evidence cited related to the construct validity of the state scale involves a comparison of scores obtained from military recruits prior to stressful training activities with scores obtained from people of the same age group in a non-stressful situation. The comparison indicates significantly higher levels of state anxiety for the military group, to the point where the state score exceeded the trait scores. The opposite was found for the other tested group. Also cited in support of the state scale, are test results obtained from college students prior to an exam and scores for the same individuals

following a relaxation training intervention. This comparison found the scores prior to exam to be significantly higher than scores obtained following the relaxation treatment. These results seem to strongly support the notion that the state scale measures situational anxiety.

Finally, evidence cited in the STAI-R manual (Spielberger, 1983) suggests that the test discriminates between normal and psychiatric populations (with various diagnosed disorders). This result tends to support the previously mentioned notion that anxiety is an associated feature for most serious psychiatric disorders and therefore an area for concern in terms of how to best manage this additional condition in combination with other serious mental disorders.

Due to the high correlations between the STAI-R trait scale and other measures of trait anxiety, this study will include effect sizes calculated from instruments such as the Taylor Manifest Anxiety Scale, and the IPAT Anxiety Scale. Other measures such as the SCL-90-R, the Multiple Affect Adjective Check List Revised, and the tension-anxiety scale of the Profile of Mood States will be employed and coded in order to empirically explore for significant differences between effect sizes calculated from these instruments and the measures known to eliminate the same construct (trait anxiety).

Search Terms

The search terms included: anxiety, autogenic therapy, auto-hypnosis, guided imagery, hypnosis, hypnotherapy, meditation, relaxation therapies, self-hypnosis, state anxiety or trait anxiety, yoga, and zen. These terms were employed with automated data bases and also with traditional professional abstracts.

Sample Selection

This meta-analysis was limited to English language journal articles and dissertations which were either available in the Texas A&M University library or through inter-library loan arrangements for no cost to the author or for under \$5.00 per item. In order for the article to be employed in this meta-analysis, quantitative data were required to have been reported. This resulted in the exclusion of narrative review articles and most studies which reported clinical judgements regarding treatment outcomes in case study articles. All applicable studies received prior to March 1, 1990 were used in this meta-analysis. In the event that a study was reported in more than one source (e.g., a dissertation from which data were also included in a published journal article) data was used to calculate only one effect size.

Coding Variables

In order to be able to empirically evaluate the possible influences of various study characteristics, variables were coded from each study. These variables are listed in Table 1.

Table 1

Coding Variables Used in Evaluating Studies for Inclusion in Meta-Analysis

-
- publication date
 - source of publication
 - location of study
 - training of experimenter
 - level of experimental blinding
 - demand characteristics
 - subject population
 - number of subjects
 - average age
 - percentage of males and females
 - method of assignment
 - mortality rate
 - number of comparisons in study
 - number of outcome measures employed
 - type of treatment
 - level of subject-therapist contact
 - length of treatment
 - dependent measure(s) used
 - type of comparison
 - type of control group
 - allegiance of experimenter to treatment
 - effect size
 - number of weeks post-treatment measure taken
 - method used in calculation of effect size
-

Effect Size Quantification Procedures

The outcomes from all studies were employed to calculate an effect size (or sizes) for each study. The effect sizes were then aggregated to comprise an over-all study effect size for each major treatment condition (hypnosis and meditation techniques). In this study, effect size was defined as the difference between treatment and control group outcomes on dependent measures of state and trait anxiety as calculated at post-test (following treatment conditions), and this sum was then divided by the pooled standard deviation. The pooled standard deviation was based on a pooled estimate of the standard deviation suggested by Hedges and Olkin (1985). In addition, calculation of effect sizes was also conducted in the manner suggested by Smith and Glass (1977), using the standard deviation of the control group. A comparison of these methods was conducted to determine if there were significant differences between these outcomes.

In instances where the data was readily available, effect sizes were calculated from means and standard deviations. With studies which provided post-test group means, however did not report standard deviations, the STAI-R norm standard deviations for the most similar norm group were used to calculate pooled standard deviations which were employed. In some cases even this basic information was not provided and Glass et al. (1981) were consulted for methods to translate

reported statistical information. Approximately 96% of the effect sizes were computed using the primary methods or by employing the STAI-R derived pooled standard deviations.

In some studies more than one effect size was available due to the use of more than one self-report anxiety measure, or the inclusion of more than one study in a published work. Again this question was handled in an empirical fashion by calculating the over-all effect size to include all effect sizes, and with a separate calculation which employed a single effect size from each study.

It is also essential to note, that in a study examining the effects of treatments on self-reported measures of anxiety, most results indicating a reduction in anxiety will involve a negative numeric sign. This tends to be true because at post test the treatment group's mean result is often lower than the control outcome. Due to this, a negative effect size reflects a positive outcome for the treatment.

Descriptive statistics including the mean, the standard deviation, and the direction of the effect size were calculated for the entire group of evaluated studies. Then separate calculations were undertaken for the major treatment categories (meditation and hypnosis). Following this, the results for the two primary treatment categories were compared with independent t-tests to determine if statistically significant (alpha level = .05) differences existed between the types of

techniques. In addition, the role of practice time and source of publication on effect size was also examined.

Effect sizes were also computed for sub-types of techniques to determine if there were statistically significant differences on the basis of techniques employed. The effect sizes were then compared through the application of independent t-tests. Finally, the possible influence of level of therapist/instructor contact with treatment subjects was also explored.

Outcome of Literature Search

The search of the automated data bases, the professional abstracts, and searches of bibliographies from obtained articles yielded the following results for the search terms:

1. Hypnosis and other related terms (autogenic, auto hypnosis, guided imagery, hypnotherapy, or self hypnosis) located 3984 possible studies.
2. Meditation and other related terms (Zen, yoga, TM, Clinically Standardized Meditation, Relaxation Response) located 1393 possible studies.
3. State Anxiety or Trait Anxiety and related measures located 1851 possible studies. When search terms from hypnosis and anxiety were combined, 31 possible studies were located. When the search terms of meditation and anxiety were combined, 78

possible studies were located. The combined located total, for both types of techniques, was 109.

Summary

In this chapter, a discussion of the attributes of various research methods for analyzing large amounts of primary research data was provided. Meta-analysis was described as the most quantitative and objective method for determining the effectiveness of a treatment and a description of criticisms of the method was undertaken. In addition, meta-analysis as a technique was described and the specifics of how it will be applied in this study was discussed.

CHAPTER IV

RESULTS

This chapter examines the effectiveness of hypnosis and meditation in reducing self-reported measures of state and trait anxiety. A description of the studies included in the analysis will be provided, a discussion of the relevant quantitative issues will be undertaken, and data pertaining to the research questions will be presented and discussed.

Studies Included in the Analysis

Hypnosis Studies

A total of 31 potentially related articles were identified and obtained (from journals and dissertations) for possible inclusion in this study. From this obtained sample, 21 were included in the analysis. Reasons for excluding the remaining studies involved: 1) lack of necessary statistical data needed to compute effects sizes; 2) the use of mixed treatments (e.g., hypnosis or autogenics with EMG biofeedback or "relaxation" techniques) which made it impossible to identify a single treatment; 3) failure to employ the relevant dependent instruments as post-test outcome measures; 4) the use of case study research designs which employed clinical judgements regarding patients' therapeutic gains; and 5) grouping all post-

test treatment outcomes in a manner which prevented the calculation of an effect size for individual treatments.

From this group, 24 state anxiety effect sizes and 26 trait anxiety effect sizes were computed. Eight of the state anxiety effect sizes were derived from journal articles, while 16 came from dissertations. None of the hypnosis data was obtained from published books. Ten of the trait anxiety effect sizes were from journal articles, 16 from dissertations. Once again, effect sizes for trait anxiety were not derived from published books or monographs. Data from these studies represented 294 treated individuals.

Meditation Studies

A total of 78 studies were identified and obtained for evaluation (from journal articles, dissertations, the published papers presented at professional conferences, and books or monographs). From this obtained sample, a total of 54 studies were included in the analysis. Reasons for excluding the other studies included: 1) failure to provide adequate statistical data for determining an effect size; 2) use of mixed treatment groups which prevented the determination of effect sizes for separate treatment methods; 3) the report of only unrelated dependent measures; 4) the use of the same data in multiple journal articles; 5) the combination of all post-test treatment data which prevented computation of separate effects sizes;

and 6) failure to either use or report post-test means for anxiety measures.

Data from these 54 studies yielded 37 state anxiety effect sizes, and 62 trait anxiety effect sizes. Fifteen of the state anxiety effect sizes were obtained from journal articles, 18 from dissertations, and four from published books. Thirty-two trait anxiety effect sizes derived from journal articles, 19 from dissertations, and 11 from published books. Data from these studies represented a total of 1392 treated individuals.

Quantification of Effect Sizes

The primary measure of treatment impact was the effect size. In this study, effect size was defined as the difference between the post-test group mean for the treatment group and the post-test group mean for the control group, divided by the pooled standard deviation of the control and the treatment groups. In instances where a non-treatment control group was not employed, the difference between the post-test treatment group mean and that of the pre-test treatment group mean (divided by the pooled standard deviation) was used to determine an effect size.

Interpretation of Effect Sizes

Glass (1977) suggested the use of a measure, in describing the quantitative aggregation of research findings, which he referred to as the effect size. He defined it to mean

the difference between the treatment group mean and the control group mean, divided by the control group standard deviation. This measure appears have been heavily based upon the the work of Cohen (1977), who described the effect size as reflecting the amount of a phenomenon present in a given population. Cohen also suggested that effect size was an indication of whether or not the null hypothesis was sustained. He described an effect size of zero, as suggesting that the null hypothesis could not be rejected for a treatment outcome.

Cohen (1977) offered a guideline for the interpretation of effect sizes which suggested that .20 should be considered a small effect, .50 a medium effect, and .80 a large effect. Wolf (1986), who summarized various views on the interpretation of effect sizes, reported that a minimum of .25 to .33 was considered indicative of a significant treatment effect.

As has been previously stated, an effect size is reported in terms of standard deviation units, and has often been described as a type of Z-score which may be interpreted in relation to areas of the standard-normal curve. The effect size then, is the z-score of the average post-test outcome for the treatment group, expressed with reference to the frequency distribution of the control group average result (Glass & Hopkins, 1984). For instance, an effect size of -.50, for an anxiety reduction treatment, would indicate the average

subject in the treatment group had a lower level of anxiety than approximately 69% of the control group.

Hedges and Olkin (1985), described the pooled sample standard deviation as the most accurate estimator of the population variance, based on their belief that population variances are likely to be equal in most instances. They further suggested that in most cases, since only two group estimates of population means are considered, a pooled standard deviation is more appropriate than the single control group standard deviation. Hedges and Olkin (1985) have also shown that, in most cases, the bias and variance of the effect size based on the pooled standard deviation is less than that found when calculations employ the control group standard deviation to estimate population effect sizes. For these reasons, the primary measure of treatment effect was the pooled standard deviation method of computing effect sizes.

Findings Related to Research Questions

This section will present statistical findings related to the six research questions. Each research question will be restated, a narrative description of the results will be provided, and tables will be used to examine the data as it relates to the research questions. Effect sizes were computed with regard to the research issues, and statistical questions were undertaken where appropriate employing the unpaired t-test, the analysis

of variance (ANOVA) procedure, and the Scheffe' post hoc analysis (Glass & Hopkins, 1984). Statistical analysis, exclusive of post hoc comparisons, were conducted with the statistical software package "StatView" (BrainPower Inc., 1980). Data sets which included two or less effect sizes, were not included in ANOVA or Scheffe' statistical procedures.

Research Question 1

1. Determine if hypnosis and meditation will be shown to be effective in reducing psychometrically measured anxiety when the primary data from a large group of studies is aggregated in a meta-analysis.

Hypnosis Studies

When employing the pooled standard deviation, the mean computed state anxiety effect size for all hypnotic treatment techniques was $-.858$ (24 effect sizes). This may be interpreted to suggest that the average subject in hypnosis treatment groups had less self-reported state anxiety, after treatment, than approximately 80% of the subjects in the control groups. The trait anxiety effect size was $-.347$ (see table 2 for a summary of these results) indicating that the average participant in hypnosis treatment groups obtained self-reported levels of trait anxiety which were lower than approximately 64% of the subjects in control groups.

Table 2

Hypnosis State and Trait Anxiety Effect Sizes Employing the Pooled Estimate of Standard Deviation

Type of Anxiety (State or Trait)	<u>n</u>	Effect Size	Std. Dev.
State Anxiety (Hypnosis studies)	24	-.858	1.036
Trait Anxiety (Hypnosis studies)	26	-.347	.723

Meditation Studies

The mean state anxiety effect size for meditation treatment groups was $-.745$ ($n = 37$). This effect size suggests that the average subject in a meditation treatment group obtained a lower state anxiety test score than approximately 77% of the subjects in the control group. The effect size for trait anxiety was $-.686$ ($n = 62$). See table 3 for a summary. This may be interpreted as suggesting that the average subject in a meditation treatment group obtained a lower trait anxiety score than approximately 75% of the control group subjects.

Table 3

Meditation State and Trait Anxiety Effect Sizes Computed With the Pooled Estimate of the Standard Deviation

Type of Anxiety (State or Trait)	<u>n</u>	Effect Size	Std. Dev.
State Anxiety (Meditation studies)	37	-.745	.537
Trait Anxiety (Meditation studies)	62	-.686	.533

Research Question 2

2. Determine which of the two types of techniques (hypnosis or meditation) will produce the larger effect size in terms of anxiety reduction.

On the basis of this analysis it appears that in general, both hypnosis and meditation have been shown to be effective as methods for reducing state and trait anxiety. Hypnosis produced a somewhat larger state anxiety effect size (Hypnosis Effect Size= -.858 versus Meditation= -.745) and therefore may be assumed to produce a somewhat larger reduction in state anxiety. However, an unpaired t-test, which compared the state anxiety group means, failed to find a significant difference ($t = .559, p = .29$, table 4). The unpaired t-test of trait anxiety hypnosis and meditation effect sizes suggested that meditation

was associated with larger effect sizes ($t = -2.442$, $p = .0166$ table 5).

Table 4

Unpaired T-test Comparing State Anxiety Group Means for Meditation and Hypnosis Studies

Unpaired t-test X: Meditation State Anxiety Effect Sizes
y: Hypnosis State Anxiety Effect Sizes

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
59	37	24	-.745	-.858	.559

$p = .29$

Table 5

Unpaired T-test Comparing Trait Anxiety Group Means for Meditation and Hypnosis Studies

Unpaired t-test X: Meditation Trait Anxiety Effect Sizes
y: Hypnosis Trait Anxiety Effect Sizes

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
86	62	26	-.686	-.347	-2.442

$p = .0166$

Research Question 3

3. Determine if the role of practice time is significantly associated with reductions of measured anxiety.

For the purposes of this study, practice time was categorized as either: brief, medium, or extended in duration on the basis of the number of weeks a treatment was conducted. Brief was defined as including treatments which ranged from one-time treatments to those of up to three weeks in duration. The medium length treatment category included treatments of over three and up to six weeks in duration. Finally, the extended treatment category included treatments which were greater than six weeks in duration. This division was made on a logical basis and also as a result of a review of the existing literature.

Hypnosis Studies

State anxiety studies included in the brief practice category, produced a -.248 effect size (n=4). The medium length practice category resulted in a -1.507 effect size (n=9), and the extended practice category produced an effect size of -.59 (n=12) See table 6 for a summary of these results. A one-way ANOVA of the three group means indicated that a significant difference existed ($F= 3.634$, $p = .0432$; see table 7).

Table 6

Hypnosis State Anxiety Effect Sizes by Treatment Length Categories

Practice Length Category	n	Effect Size	Std. Dev.
Brief (one time thru three weeks)	4	-.248	.655
Medium (three to six weeks)	8	-1.565	1.384
Extended (> six weeks)	12	-.59	.574

Table 7

One Way ANOVA (three groups) Comparing Hypnosis State Anxiety Group Effect Sizes by Practice Time Categories

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	6.353	3.177	3.642
Within groups	21	18.319	.872	p = .0432
Total	23	24.672		

Model II estimate of component variance = .314

Group:	Count:	Mean:
Practice time medium	8	-1.565
Practice time brief	4	-.248
Practice time extended	12	-.59

Scheffe's procedure was used to evaluate a posteriori contrasts among means. This analysis determined that there was a significant difference between the mean effect size for the medium category and that of the brief category. This additional analysis suggested, that while a moderate level of hypnotic practice time is associated with superior treatment effects (when compared with brief interventions), there may also be a ceiling in terms of treatment effect. The Scheffe' test failed to find significant differences between brief and extended practice length categories and between medium and extended practice categories. The results indicate that hypnosis produces it's most significant treatment effect within 4 to 6 weeks. In fact, this data suggests that it may be possible that extended treatments are associated with somewhat diminished treatment outcomes of a statistically insignificant nature.

Trait anxiety effect sizes ranged from +.101 for the brief practice category (n= 2), to -.984 for medium length treatments (n= 6). The extended length treatment category produced a somewhat smaller average effect size -.349 (n=13; see table 8 for a summary of these results). In accord with the previously stated decision rule, categories including two or less effect sizes were not compared in statistical procedures. An unpaired t-test comparing the mean effect sizes for the medium and the extended treatment length categories, found a significant difference ($t = -2.423$, $p = .013423$; table 9).

Table 8

Hypnosis Trait Anxiety Effect Sizes by Treatment Length Categories

Practice Length Category	n	Effect Size	Std. Dev.
Brief	2	.101 ^{***}	1.578
Medium	6	-.984	.728
Extended	13	-.349	.422

Table 9

Unpaired T-test Comparing Hypnosis Trait Anxiety Group Effect Sizes by Practice Time Category

Unpaired t-test X: Practice time medium t-pooled
y: Practice time extended t-pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
17	6	13	-.984	-.349	-2.423
					p = .013423

Meditation Studies

The brief practice category produced an average state anxiety effect size of $-.802$ ($n= 12$). The medium length treatment programs produced an average effect size of $-.676$ ($n= 11$) and the extended length category produced an effect size of $-.784$ ($n= 13$). See table 10 for a summary of these

results. A one-way ANOVA, comparing the three mean effect sizes, indicated no significant differences ($F = .165$, $p = .1514$, table 11).

Table 10

Meditation State Anxiety Effect Size by Treatment Length Category

Practice Length Category	<u>n</u>	Effect Size	Std. Dev.
Brief	12	-.802	.697
Medium	11	-.676	.411
Extended	13	-.784	.556

Table 11

One Way ANOVA (three groups) Comparing State Anxiety Group Effect Size by Practice Length Categories

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.107	.054	.165
Within groups	33	10.737	.325	$p = .1514$
Total	35	10.844		

Model II estimate of between component variance = $-.023$

Table 11 (Continued)

Group:	Count:	Mean:
Practice time brief	12	-.802
Practice time medium	11	-.676
Practice time extended	13	-.784

Trait anxiety effect sizes for the three different practice length categories included $-.667$ ($n= 11$) for the brief treatment category, $-.678$ ($n= 32$) for the extended category, with the medium length treatment group producing an effect size of $-.589$ ($n= 16$). See table 12 for a summary of this data.

Table 12

Meditation Trait Anxiety Effect Sizes by Treatment Length Categories

Practice Category Length	n	Effect Size	Std. Dev.
Brief	11	-.667	.615
Medium	16	-.589	.404
Extended	32	-.678	.508

A one-way ANOVA of the three group mean effect sizes, found no significant differences associated with the different treatment length categories ($F= .171$, $p = .8433$, table 13).

Table 13

One Way ANOVA (three groups) Comparing Trait Anxiety Group Effect Sizes by Treatment Length Category

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.087	.044	.171
Within groups	56	14.233	.254	p = .8433
Total	58	14.32		

Model II estimate of between component variance = -.012

Group:	Count:	Mean:
Practice time brief	11	-.667
Practice time medium	16	-.589
Practice time extended	32	-.678

Summary

This analysis suggested that length of hypnotic treatment period was associated with variation in state anxiety treatment effect sizes. Specifically, the medium length treatment category was associated with significantly larger average effect sizes (medium versus brief categories). A comparison (unpaired t-test) of trait anxiety effect sizes for medium and extended hypnosis treatment categories, also found a significant difference which favored the medium length treatment category. These results suggest that hypnosis treatments have a ceiling or a floor in terms of anxiety reduction, beyond which

additional practice does not appear to benefit the average patient.

Effect sizes for meditation treatments did not significantly differ on the basis of treatment length. Statistical comparisons of both state and trait anxiety effect sizes failed to find significant differences between the three treatment length categories. This may be viewed as suggesting that meditation techniques achieve a certain level of treatment effect and additional practice does not appear to result in significant additional anxiety reduction.

Research Question 4

4. Determine if there are significant differences in treatment effect sizes on the basis of source of publication (journal publications versus dissertations or other sources).

In order to explore the hypothesis that journal articles are biased in favor of significant statistical outcomes, a comparison of effect sizes (based upon the source of the data) was undertaken. It has been argued that journals are biased against studies finding non-significant results. As a result, meta-analysis based upon journal articles, it is argued, is biased in favor of positive outcomes. This research question was included to examine this possibility.

Hypnosis Studies

Since none of the hypnosis studies were obtained from books or monographs, the hypnosis comparison was restricted to examining journal and dissertation publication sources. The average state anxiety effect size for journal articles was -1.449 ($n= 8$), while the average for dissertation studies was $-.443$ ($n= 16$). See table 14 for a summary of these results.

Table 14

Hypnosis State Anxiety Effect Sizes by Source of Publication

Source of Data	<u>n</u>	Effect Size	Std. Dev.
Journals	8	-1.449	1.39
Dissertations	16	-.443	.769

An unpaired t-test indicated that the difference between the group means was significant ($t= -2.304$, $p = .01552$, table 15). The average trait anxiety effect size for journal articles was $-.732$ ($n= 10$) and $-.121$ ($n= 16$) for dissertation source studies (see table 16). A comparison of the group means indicated that they were significantly different ($t= -2.244$, $p = .01716$, table 17).

Table 15

Unpaired T-test Comparing Hypnosis State Anxiety Group Effect Size by Source of Publication

Unpaired t-test X: Source (journal) S-pooled
y: Source (t/d) S-pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
22	8	16	-1.449	-.443	-2.304

p = .0155

Table 16

Hypnosis Trait Anxiety Effect Sizes by Source of Publication

Source of Data	n	Effect Size	Std. Dev.
Journals	10	-.732	.583
Dissertations	16	-.121	.725

Table 17

Unpaired T-test of Hypnosis Trait Anxiety Group Effect Sizes by Source of Publication

Unpaired t-test X: Source (journal) S-pooled
y: Source (t/d) S-pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
24	10	16	-.732	-.121	-2.244

p = .01716

Meditation Studies

Meditation studies were derived from three sources (journals, dissertations, books/monographs) although a smaller number were obtained from books or monographs. The average state anxiety effect size for journal articles was $-.904$ ($n=15$), for dissertation source studies, $-.606$ ($n=18$) and for book or monograph source studies, $-.772$ ($n=4$). See table 18 for a summary of the results.

Table 18

Meditation State Anxiety Effect Sizes by Source of Publication

Source of Data	<u>n</u>	Effect Size	Std. Dev.
Journals	15	-.904	.725
Dissertations	18	-.606	.309
Books/Monographs	4	-.772	.478

An ANOVA comparing the three group means failed to find a significant difference ($F= 1.282$, $p = .29055$, table 19).

Table 19

One Way ANOVA (three groups) Comparing Mediation State Anxiety Effect Sizes by Source of Publication

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.728	.364	1.282
Within groups	34	9.661	.284	p = .29055
Total	36	10.389		

Model II estimate of between component variance = .007

Group:	Count:	Mean:
Source Journals	15	-.904
Source Dissertations	18	-.606
Source Books	4	-.772

Average trait anxiety effect sizes included -.795 for journal source studies (n= 32), -.509 (n= 19) for dissertation source studies, and -.67 (n= 11) for book source studies (see table 20).

Table 20

Meditation Trait Anxiety Effect Sizes by Source of Publication

Source of Data	<u>n</u>	Effect Size	Std. Dev.
Journals	32	-.795	.584
Dissertations	19	-.509	.435
Books/Monographs	11	-.67	.494

A one-way ANOVA comparing the three mean group effect sizes failed to find a significant difference ($F= 1.756$, $p = .1816$, table 21).

Table 21

One Way ANOVA (three groups) Comparing Meditation Trait Anxiety Group Effect Sizes by Source of Publication

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.978	.489	1.756
Within groups	59	16.422	.278	$p = .1816$
Total	61	17.4		

Model II estimate of between component variance = .011

Group:	Count:	Mean:
Source Journals	32	-.795
Source Dissertations	19	-.509
Source Books	11	-.67

Summary

This analysis supports the contention, with regard to hypnosis studies, that journal articles are more likely to produce larger effect sizes (reflecting state and trait anxiety reduction). A possible alternative explanation for the hypnosis results would be that this type of technique is more dependent upon therapeutic expertise. As a result, according to this argument, more experienced therapists (and those most likely

to be publishing in journals) are required to maximize the treatment effect of hypnotic techniques. However, an examination of meditation studies failed to support the "journals are significantly biased in favor of statistical significance" hypothesis. Comparisons of the average meditation effect sizes produced by the three study sources (journals, dissertations, and books) failed to find significant differences for either trait or state anxiety effect sizes on the basis of study source. This result, then either calls the bias hypothesis into question, or suggests that meditation is the more generalizable of the two techniques.

Research Question 5

5. In the event that sufficient sub-types of techniques are available, determine if significant differences exist in terms of computed effect sizes for the examined technique sub-types.

Hypnosis Studies

An examination of the hypnosis studies revealed two discernible subgroups: those employing autogenic methods and all other hypnotic treatment methods. The nature of the hypnosis literature precluded any additional subgroup classification, since there were few studies which clearly described their treatments in such a way as to identify with a particular school or type of hypnosis. Due to this situation, effect sizes for autogenic treatments were figured for both

state and trait anxiety and effect sizes for both state and trait anxiety were figured for the "all other" hypnosis group of studies. A comparison was then undertaken for these two categories.

The state anxiety effect size for autogenic hypnotic treatments was $-.409$ ($n= 8$), the "all other" hypnotic treatments produced a state anxiety effect size of $-.96$ ($n=16$, see table 22 for a summary of both of these results).

Table 22

Hypnosis State Anxiety Effect Sizes by Technique Category

Category of Technique	<u>n</u>	Effect Size	Std. Dev.
Autogenic Techniques	8	$-.409$.516
"All other" Techniques	16	$-.96$	1.231

A comparison (unpaired t-test) failed to find significant differences between the two group treatment averages ($t= 1.203$, $p = .1208$, table 23). The trait anxiety effect size for autogenic treatments was $-.086$ ($n=7$), and $-.443$ for all other hypnosis treatments ($n=19$, see table 24 for a summary of both of these results).

Table 23

Unpaired T-test Comparing Hypnosis State Anxiety Group Effect Sizes by Technique Category

Unpaired t-test X: Autogenic Therapy ES
y: All Other Hypnosis Techniques

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
22	8	16	-.409	-.96	1.203

p = .120882

Table 24

Hypnosis Trait Anxiety Effect Sizes by Technique Category

Category of Technique	n	Effect Sizes	Std. Dev.
Autogenic Techniques	7	-.086	.587
"All other" Techniques	19	-.443	.758

An unpaired t-test failed to indicate a significant difference between the mean effect sizes ($t = 1.123$, $p = .1362$, table 25), although a strong trend in favor of the "all other" group of hypnotic treatments appeared to be present.

Table 25

Unpaired T-test Comparing Hypnosis Trait Anxiety Group Effect Sizes by Technique Category

Unpaired t-test X: Autogenic Therapy ES T-Pooled
y: All Other Hypnosis Techniques T-Pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
24	7	19	-.086	-.443	1.123
					p = .1362

Meditation Studies

An examination of the meditation literature resulted in four categories of meditative techniques: Transcendental Meditation; Clinically Standardized Meditation; Relaxation Response; and "all other" meditation techniques. Effect sizes for each of these categories were computed for both state and trait anxiety. Additionally, statistical comparisons of the mean group effect sizes were undertaken where appropriate.

The state anxiety effect size for all TM treatment groups was -1.243 (n=10). The Relaxation Response treatments produced an effect size of -.362 (n= 8), while CSM studies had an average effect size of -.428 (n= 2). The category termed "all other" meditation techniques, produced a state anxiety effect size of -.67 (n= 17). See table 26 for a summary of these results. A one way ANOVA, of the three treatment groups found significant differences (F= 9.807, p = .0005, table 27).

Table 26

Meditation State Anxiety Effect Sizes by Category of Technique

Category of Technique	<u>n</u>	Effect Size	Std. Dev.
TM	10	-1.243	.693
RR	8	-.362	.287
CSM	2	-.428	.587
Other	17	-.67	.274

TM= Transcendental Meditation; RR= Relaxation Response; CSM= Clinically Standardized Meditation; Other= all other meditation techniques.

Table 27

One Way ANOVA (three groups) Comparing Meditation State Anxiety Group Effect Sizes by Category of Technique

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	3.737	1.868	9.807
Within groups	32	6.096	.191	p = .0005
Total	34	9.833		

Model II estimate of between component variance = .152

Table 27 (Continued)

Group:	Count:	Mean:
Subtype TM	10	-1.243
Subtype RR	8	-.362
Subtype Other Med.	17	-.67

Post hoc analysis (Scheffe's procedure) indicated that significant differences existed between the TM state anxiety effect size and that of the RR state anxiety effect size. However, the differences between the TM state anxiety effect size and the "all other" meditation category was not statistically significant. The trait anxiety effect size for TM treatment groups was $-.847$ ($n= 30$), $-.558$ for "all other" meditation treatments ($n= 23$), $-.508$ for RR treatments ($n= 4$), and $-.463$ ($n= 5$) for CSM (see table 28 for a summary). A one way ANOVA comparing the four group effect sizes, failed to find significant differences between the means ($F= 1.874$, $p = .1440$, table 29).

Table 28

Meditation Trait Anxiety Effect Sizes by Technique Category

Category of Technique	<u>n</u>	Effect Size	Std. Dev.
TM	30	-.847	.548
RR	4	-.508	.384
CSM	5	-.463	.413
Other	23	-.558	.52

TM= Transcendental Meditation; RR= Relaxation Response; CSM= Clinically Standardized Meditation; Other= all other meditation techniques.

Table 29

One Way ANOVA (four groups) Comparing Meditation Trait Anxiety Group Effect Sizes by Technique Category

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	3	1.529	.51	1.874
Within groups	58	15.782	.272	p = .1440
Total	61	17.312		

Model II estimate of between component variance = .019

Table 29 (Continued)

Group:	Count:	Mean:
Subtype TM	30	-.847
Subtype CSM	5	-.463
Subtype RR	4	-.508
Subtype Other Med.	23	-.558

Summary

Data analysis concerning the differential effects associated with specific hypnosis and meditation techniques was undertaken. The analysis indicated there were no significant differences between the two hypnosis categories for either state or trait anxiety effect sizes. A comparison of the state anxiety effect sizes (excluding categories with two or fewer effect sizes) for meditation techniques indicated a significant difference between TM and RR effect sizes, however, the TM and "all other" categories did not statistically differ. There were no significant differences between trait anxiety effect sizes for the specific meditation techniques, however, the TM category appeared to be the most effective.

Research Question 6

6. Determine if the level of contact between subjects and instructor or experimenter is associated with significant differences in computed effect sizes.

An examination of the meditation and hypnosis literature found three basic categories: low contact (studies in which there was either no direct contact between the experimenter or instructor, or only initial instruction with little subsequent contact-other than phone calls or post-testing interactions), medium contact (studies in which there was initial contact to teach the technique, weekly group meetings, and brief contacts between subjects and experimenters or instructors to verify correctness of practice), and high contact (initial instruction of technique, multiple weekly group or individual sessions, individual sessions to verify practice or treatments conducted completely on a one-to-one basis). An effort to classify studies, on the basis of hours of contact, proved unworkable due to the large number of studies which failed to provide this information. As a result, a division of studies on the basis of hours of contact, would have caused the majority of studies to be excluded from the analysis of data in reference to this research question.

Hypnosis Studies

The state anxiety low contact category resulted in a -.53 effect size (n= 5), the medium contact category produced a -.916 effect size (n= 15), and the high contact category resulted in a -1.123 effect size (n= 2). See table 30 for a summary of these results. An unpaired t-test of the low and medium

category state anxiety effect sizes failed to find a statistically significant difference ($t = .649$, $p = .2623$, table 31).

Table 30

Hypnosis State Anxiety Effect Sizes by Level of Contact

Level of Contact	n	Effect Size	Std. Dev.
Low	5	-.53	.973
Medium	15	-.916	1.198
High	2	-1.123	.134

Table 31

Unpaired T-test of Hypnosis State Anxiety Group Effect Sizes by Level of Comfort

Unpaired t-test X: Level of Contact (low) S-Pooled
y: Level of Contact (medium) S-Pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
18	5	15	-.53	-.916	.649
					$p = .2623$

The trait anxiety low contact category produced a .039 effect size ($n = 8$), the medium category resulted in a -.49 effect size ($n = 16$), and the high level category produced a -.741 effect size ($n = 2$). See table 32 for a summary of the results. A

comparison of the low and medium trait anxiety effect sizes indicated that there were significant differences between the group averages ($t=1.722$, $p = .04955$, table 33).

Table 32

Hypnosis Trait Anxiety Effect Sizes by Level of Contact

Level of Contact	<u>n</u>	Effect Size	Std. Dev.
Low	8	.039	.707
Medium	16	-.49	.712
High	2	-.741	.386

Table 33

Unpaired T-test Comparing Hypnosis Trait Anxiety Group Effect Sizes by Level of Comfort

Unpaired t-test X: Level of Contact (low) T-Pooled
y: Level of Contact (medium) T-Pooled

DF:	X Count:	Y Count:	Mean X:	Mean Y:	Unpaired t Value:
22	8	16	.039	-.49	1.722

$p = .04955$

Meditation Studies

The state anxiety effect size for the low contact category was $-.497$ ($n= 9$), $-.871$ for the medium level category ($n= 20$)

and $-.708$ for the high contact category ($n= 8$). Table 34 provides a summary of these outcomes.

Table 34

Meditation State Anxiety Effect Sizes by Level of Contact

Level of Contact	<u>n</u>	Effect Size	Std. Dev.
Low	9	-.497	.392
Medium	20	-.871	.651
High	8	-.708	.176

A one-way ANOVA, comparing the differences between the three group mean effect sizes, failed to find statistically significant differences ($F= 1.576$, $p = .2215$, table 35). These results suggest that level of contact does not appear to be associated with significantly increased state anxiety treatment effects for meditation groups.

Table 35

One Way ANOVA (three groups) Comparing Meditation State Anxiety Group Effect Sizes by Level of Comfort

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.882	.441	1.576
Within groups	34	9.508	.28	p = .2215
Total	36	10.389		

Model II estimate of between component variance = .014

Group:	Count:	Mean:
Level of Contact Low	9	-.497
Level of Contact Medium	20	-.871
Level of Contact High	8	-.708

The trait anxiety effect size for the low contact category was $-.515$ ($n=15$), $-.752$ for the medium contact category ($n=34$) and $-.68$ for the high contact category ($n=12$). A summary of the results is found in Table 36. The one-way ANOVA, comparing the three mean group effect sizes, failed to find statistically significant differences ($F=1.02$, $p=.3669$, table 37). Once again, level of contact does not appear to be associated with significant differences in treatment effect.

Table 36

Meditation Trait Anxiety Effect Sizes by Level of Treatment

Level of Contact	n	Effect Size	Std. Dev.
Low	15	-.515	.596
Medium	34	-.752	.548
High	12	-.68	.386

Table 37

One Way ANOVA (three groups) Comparing Meditation Trait Anxiety Group Effect Sizes by Level of Treatment

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	.582	.291	1.02
Within groups	58	16.536	.285	p = .3669
Total	60	17.118		

Model II estimate of between component variance = .000317

Group:	Count:	Mean:
Level of Contact Low	15	-.515
Level of Contact Medium	34	-.752
Level of Contact High	12	-.68

Summary

An examination of the meta-analytic data concerning the possible impact of level of subject-instructor contact was attempted. The data suggested that hypnosis state effect sizes did not differ significantly on the basis of level of contact, however, trait anxiety effect sizes did significantly differ in favor of the moderate level of subject-instructor interaction. For meditation, neither state nor trait anxiety effect sizes significantly differed on the basis of level of contact.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter will provide a summary of meta-analytic method and address the findings derived from the data analysis. In addition, the implications of these results will be explored. Finally, some suggestions for future research, and opinions concerning the nature of the examined scientific literature will be offered.

Summary of Meta-Analysis

Meta-Analysis is a group of techniques developed to assist in the quantitative evaluation of existing research literature. Although similar methods have been proposed for many decades, Glass and associates have done most to define and offer the core methodology to social scientists (Hedges & Olkin, 1985). Meta-Analysis attempts to address the shortcomings of traditional narrative reviews of research, by aggregating the results from all obtainable studies related to a given question. The chief measure employed is the effect size, which is a way of expressing the treatment effect in standard deviation units. The effect size then, is a Z-score of the average post-treatment outcome for the treatment group reported with reference to the frequency distribution of the control group average result (Wolf, 1988).

This study followed the suggestion of Hedges and Olkin (1985), in employing the pooled standard deviation in computing effect sizes. The effect size was defined as the difference between the post-treatment measure of anxiety for the experimental group and the post-test result obtained from the control group, divided by the pooled estimate of the standard deviation. Effect sizes for studies which lacked non-treatment control groups were figured by employing the difference between the post-treatment measure of anxiety and that of the pre-treatment measure, divided by the pooled standard deviation.

Meta-Analysis sets as a goal, obtaining the largest possible group of studies for examination (Glass, 1977). The initial phase involves a search of data bases and professional abstracts, to identify relevant studies. This study utilized the following automated data bases: Dissertation Abstracts International, ERIC, Index Medicus, Psyclit, Science Index, and the Social Science Index. In addition, the relevant associated hard bound abstracts were consulted, reference lists from obtained articles were cross-checked, and available bibliographies were examined.

Summary of Obtained Research

A total of 31 articles involving hypnotic treatments in association with possibly related dependent measures, were

identified and obtained for examination. From that sample, 21 were included in the analysis. The included studies yielded 24 state anxiety effect sizes and 26 trait anxiety effect sizes. Eight of the state anxiety effect sizes came from journal articles, and 16 from dissertations. Ten trait anxiety effect sizes came from journals and 16 from dissertations. Data from these studies represented a total of 294 treated individuals.

Hypnosis studies produced an over-all pooled standard deviation effect size (in terms of post-test levels of state anxiety) of $-.858$ ($n=24$). This suggests that the average hypnosis treatment subject had lower levels of state anxiety than 80% of subjects in control groups. The trait anxiety effect size was $-.347$, suggesting that the average participant in hypnosis treatment groups had a lower level of trait anxiety than approximately 64% of control group subjects.

An examination of the role of treatment length for hypnosis studies was also undertaken. The state anxiety effect size for brief hypnosis treatments was $-.248$ ($n=4$), -1.507 ($n=9$) for the medium length treatments, and $-.59$ ($n=12$) for the extended length treatments. An ANOVA comparing the three treatments found significant differences, and Scheffe' post hoc analysis indicated a significant difference between the medium length and brief treatment length categories.

Trait anxiety effect sizes were $+.101$ for the brief practice category ($n=2$), $-.984$ ($n=6$) for the medium length group of

studies, and $-.349$ ($n=13$) for the extended treatment category of studies. An unpaired t-test comparing the medium and the extended treatment categories found a significant difference in favor of the medium length treatment category.

The issue of the possible bias of study source for hypnosis data (journal, dissertations) was also explored. The average state anxiety effect size for journal articles was -1.449 ($n= 8$), and $-.443$ ($n=16$) for dissertation source effect sizes. An unpaired t-test determined that the difference was significant. The mean trait anxiety effect size for journal articles was $-.721$ ($n= 11$), and $-.16$ ($n=13$) for dissertation derived effect sizes. An unpaired t-test comparing the differences between the group mean effect sizes, also found these differences to be significant.

An examination of the possible differential treatment effects associated with specific types of hypnotic techniques was also undertaken. Due to the nature of the available literature, it was only possible to identify two broad categories: autogenic techniques and "all other" hypnotic methods. This resulted from the rather vague nature of treatment descriptions found in the hypnosis research literature. The non-autogenic studies, while clearly meeting the definition of this study for inclusion, typically failed to state an easily categorized type of hypnosis with which they were associated.

The state anxiety effect size for autogenic treatments was $-.409$ ($n= 8$), the "all other" category produced an effect size of $-.96$ ($n= 16$). This difference was not found to be statistically significant. The trait anxiety effect size for "all other" hypnosis treatments was $-.443$ ($n= 19$), and $-.086$ ($n= 7$) for autogenic methods. The unpaired t-test failed to find a statistically significant difference between the group effect sizes, however the "all other" hypnotic group did appear to be associated with somewhat larger effect sizes.

Finally, the possible impact of the level of contact between subjects and instructor or experimenter was examined in relation to hypnosis treatments. The state anxiety low level contact category produced a $-.53$ effect size ($n=5$), the medium category a $-.916$ effect size ($n= 15$), and the high contact group a -1.123 effect size ($n= 2$). A comparison (unpaired t-test) of the group means failed to find significant differences. The trait anxiety low level contact category resulted in a $.039$ effect size ($n= 8$), the medium category produced a $-.49$ ($n= 16$) effect size, and the high contact category had a $-.741$ ($n=2$) effect size. A comparison of the effect sizes failed to find significant differences.

A total of 78 meditation related studies were identified and obtained for examination from journals, dissertations, the published papers presented at professional conferences, and published books or monographs. From the sample, 54 studies

were included in the analysis. These studies yielded 37 state anxiety effect sizes, and 62 trait anxiety effect sizes. Fifteen of the state anxiety effect sizes were from journal articles, 18 from dissertations, and four from published books. Thirty-two trait anxiety effect sizes were from journals, 19 from dissertations, and 11 from published books. This data represents a total of 1392 treated individuals.

The average pooled standard deviation effect size (in terms of treatment effect on measures of state anxiety) was $-.745$ ($n=37$) for meditation treatments. This effect size may be interpreted as suggesting that approximately 77% of the subjects in control groups obtained higher levels of state anxiety than the average individual in meditation treatment groups. The effect size for trait anxiety was $-.686$ ($n=62$) which may be interpreted as suggesting that the average subject in a meditation treatment group obtained a lower trait anxiety score than approximately 75% of the control group subjects.

An examination of the possible impact of practice time on effect size was undertaken with regard to meditation treatment groups. The brief practice category produced an average state anxiety effect size of $-.802$ ($n=12$), the medium category resulted in a $-.676$ ($n=11$) effect size, and the extended length category produced a $-.784$ ($n=13$) effect size. A one-way ANOVA failed to find significant differences between the group effect sizes. Trait anxiety effect sizes were $-.667$ ($n=11$) for the

brief category, $-.589$ ($n= 16$) for the medium length category, and $-.678$ ($n=32$) for the extended category. A one-way ANOVA of the three group effect sizes failed to find significant differences associated with the different treatment categories.

The role of publication source was explored by examining the relationship between the effect sizes for the three sources of studies. The average state anxiety effect size for journal articles was $-.904$ ($n=15$), $-.606$ ($n= 18$) for dissertation source studies, and $-.772$ ($n= 4$) for book source studies. A comparison of the three group means failed to find a significant difference. Trait anxiety effect sizes were $-.795$ ($n= 32$) for journal source studies, $-.509$ ($n= 19$) for dissertation source studies, and $-.67$ ($n= 11$) for studies obtained from books. A one-way ANOVA comparing the three group effect sizes failed to find a significant difference.

An attempt to determine if specific types of techniques were associated with differential treatment effects was also undertaken for meditation treatments. Four major categories emerged from the examined literature: Transcendental Meditation, Clinically Standardized Meditation, Relaxation Response, and "all other" meditation techniques.

The state anxiety effect size for TM treatments was -1.243 ($n= 10$), $-.362$ ($n= 8$) for RR treatments, $-.428$ ($n= 2$) for CSM treatments, and $-.67$ ($n= 17$) for the "all other" meditation treatments. A one way ANOVA, found significant differences in

the group effect sizes. The Scheffe' procedure determined that TM had a significantly higher effect size when compared with RR treatments. However, no significant differences were found between TM and the "all other" meditation category. Trait anxiety effect sizes included $-.847$ ($n= 30$) for TM, $-.558$ ($n= 23$) for the "all other" meditation category, $-.508$ for RR treatments ($n= 4$), and $-.463$ for CSM treatments ($n= 5$). No significant differences between the group effect sizes were found.

The possible influence of contact between subjects and experimenter or instructor on effect sizes was explored in relation to meditation treatments. The state anxiety effect size for the low contact category was $-.497$ ($n= 9$), $-.871$ for the medium level category ($n= 20$), and $-.708$ ($n= 8$) for the high contact category. A comparison of the group effect sizes failed to find statistically significant differences. The trait anxiety effect size for the low contact category was $-.515$ ($n= 15$), $-.752$ ($n= 34$) for the medium contact category, and $-.68$ ($n= 12$) for the high contact category. A one-way ANOVA, comparing the group effect sizes, failed to find statistically significant differences.

Finally, the additional issue of differential impact of the two main treatment types (hypnosis and meditation) was explored. Hypnosis, as previously stated, achieved a group state anxiety effect size of $-.858$, while meditation produced a group effect size of $-.745$. An unpaired t-test of the group effect sizes

failed to find significant differences in these outcomes. The trait anxiety effect size for hypnosis was $-.347$, and $-.686$ for meditation. A comparison of these group effect sizes found the differences in outcomes to be statistically significant.

Conclusions

As previously stated, anxiety was defined in this study, as the affective state which is a reaction to a perceived state of threat to well being, either actual or imagined. It is characterized as involving affective discomfort, feelings of tension and uneasiness. A decision was made to examine both transitory and relatively stable aspects of anxiety. This was done for several reasons, first there is a long research tradition which has conceptualized and explored anxiety in this manner (Cattell & Scheier, 1976; Lazarus & Folkman, 1984), and this approach also seemed appropriate due to prominent use of the STAI-R (and other closely related measures of anxiety) in meditation and hypnosis experimental research.

This distinction suggests that anxiety may be viewed as both transitory and relatively stable. State anxiety has been described as a temporary reaction to threat, and trait anxiety as a disposition to manifest state anxiety in situations where the individual feels threatened. Spielberger (1972) suggested that threats may be divided into those felt toward the physical self and those perceived as aimed toward the ego or self. He

concluded that individuals with different personality types react fairly consistently to threats perceived to be aimed toward the physical self. However, Spielberger felt that individuals reacted to perceived ego threats in ways specific to certain personality types. He further suggested that elevated trait anxiety scores predict elevated state anxiety scores (when the individual is faced with perceived ego threats). In contrast, individuals with lower levels of trait anxiety, tend to have lower levels of state anxiety when faced with ego threats. On this basis, trait anxiety may be seen as a predisposition to have anxious reactions, and theoretically appears to be most diagnostic of self threats rather than physical threats. Trait anxiety has also been referred to as sort of an average of state anxiety reactions (Spielberger, 1983).

This conceptualization of anxiety also suggests that state anxiety should be reactive to relaxation interventions, where trait anxiety should be fairly resistant to similar treatments. Research with state anxiety has shown it to be reflective of situational changes in subjects (Spielberger, 1983), However trait anxiety, theoretically should be less reactive to interventions or situational changes, since it is defined as a character or personality trait. Post treatment measures of state anxiety would then reflect the individual's acute or situational level of anxiety. Post treatment measures of trait anxiety, then,

reflect any changes in the relatively stable tendency toward experiencing situations anxiously.

According to Spielberger, the two measures are somewhat linked, in that diminished trait anxiety should be linked to reduced state anxiety scores. However theoretically, reductions in state anxiety should not necessarily be related to significant reductions in trait anxiety (Spielberger, 1983). This issue is addressed, where possible, in the following discussion of the implications derived from the study data.

Perhaps the most interesting findings of this analysis are the measures of effect size for the major treatment techniques (hypnosis and meditation). In both cases (state anxiety effect sizes: hypnosis $-.858$ versus meditation $ES = -.745$) the treatments were shown to be effective in the reduction of measures of state anxiety. For hypnosis the results suggested that the average subject had lower state anxiety scores than 80% of control group members. The meditation effect size suggested that the average participant had lower state anxiety scores than 77% of control group members. These effect sizes (hypnosis versus meditation) were not shown to be significantly different, so each type of technique appears about equally effective in reducing state anxiety.

With regard to Cohen's (1977) guideline for evaluating effect sizes, each of these effect sizes easily exceeds the minimum of .50 which is described as a medium effect size. In

fact, the hypnosis effect size falls within Cohen's large effect size category (large effect sizes being $> .80$). The meditation effect size, at $-.745$, places it just below this category. In each case, the techniques appear to be associated with treatment effects which lead to significant reductions in acute anxiety. In keeping with Spielberger's hypothesis, this may also indicate that trait anxiety has been reduced. As a result, this is thought to produce a decline in situational reactions to stressors. However, the results may also simply mean that hypnosis and meditation techniques assist patients in coping with acute anxiety reactions.

Results regarding trait anxiety suggested that meditation is more effective in reducing this type of anxiety. Meditation techniques resulted in a trait anxiety effect size of $-.686$, while hypnosis studies produced an average effect size of $-.347$. A statistical comparison of the effect sizes, determined that the difference was significant. These results imply that meditation techniques are more effective in influencing measures of trait anxiety, making more of an impact upon dispositional anxiety. A comparison of the meditation state and trait anxiety effect sizes indicated a fairly consistent impact upon measures of anxiety. This may be seen as somewhat supportive of Spielberger's notion that the level of trait anxiety should impact the level of state anxiety.

Examination of the hypnosis state and trait anxiety effect sizes, however, suggests that there is a significant differential between the technique's impact on acute and characteristic anxiety. Hypnosis then, according to this analysis, appears to be best suited to the treatment of situational anxiety. The difference in results, between the hypnosis trait and state effect sizes, may also be seen as supporting the Spielberger hypothesis that there is less of a relationship between reductions of state anxiety and reductions in trait anxiety. This data also suggests the possibility that hypnosis may be more specific, in terms of treatment effect, to state anxiety.

The examination of effect sizes for specific types of techniques also produced some interesting results. The sub-type hypnosis technique, autogenics (included along with guided imagery as search terms in order to increase the number of hypnosis studies), was shown to be associated with lower state anxiety effect sizes (autogenics= $-.409$) when compared with all other general types of hypnosis techniques ("all other" hypnosis techniques= $-.96$). Autogenic therapy is form of self-hypnosis which has been described by subjects in some studies as uninteresting. It is also possible the lower effect size reflects the diminished therapist-patient contact, or may be seen as being supportive of some negative subjective reports regarding autogenic therapy. The autogenic trait anxiety effect size was $-.086$, compared with $-.443$ for the

other hypnosis treatments. At this level, the autogenic effect size is very marginal, suggesting that autogenics was not associated with large reductions in trait anxiety. This outcome seems consistent with autogenic theory which stresses the goal of therapeutic relaxation to treat stress related symptoms.

The meditation literature contained four primary types of meditative techniques. Transcendental Meditation produced a -1.243 state anxiety effect, which may be interpreted as indicating that approximately 89% of control group members obtained higher state anxiety scores than the average subject in TM treatment groups. In comparison, other treatments were associated with the following effect sizes: the Relaxation Response -.362, Clinically Standardized Meditation -.428, and "all other" meditation category -.67. As a result, TM appears to be the most effective technique (in terms of computed effect sizes), in reducing measures of state anxiety. A cautionary note should be introduced, due to the small number of state anxiety effect sizes available for some of the treatments (CSM= 2).

The trait anxiety effect size for TM was -.847, which again was larger than the other meditation trait anxiety effect sizes. This outcome may be interpreted as suggesting that approximately 80% of the control group members obtained trait anxiety scores which were higher than the average TM group member's trait anxiety score. These results also tend to suggest that TM is fairly effective in reducing both state and

trait anxiety. The comparison of the technique treatment effect sizes failed to find statistically significant differences, however, a trend emerged which suggested that TM was somewhat more effective in terms of reducing measures of trait anxiety. Once again, the small number of other treatments available (RR= 4, CSM= 5) suggests the need for caution in generalizing too freely from results concerning these less employed techniques.

Data comparing TM versus the other types of meditation techniques, suggested that TM was superior to RR treatments and somewhat more effective than the "all other" category in reducing state anxiety, and was somewhat more effective in reducing trait anxiety. One possible reason for this result is the highly standardized instruction method employed in teaching the technique. Additionally, since the method retains some of the mystical trappings of eastern esoteric spiritual methods, some of the superior results may be associated with the TM techniques' presentation. Finally, it is also possible that by retaining more of the traditional system of instruction, TM has stayed closer to the over-all aim of meditation. These aims usually include: a systematic restructuring of the practitioner's style of life, a move toward a more accepting mode of perception, and an expectation of general improvement in quality of life. Critics of more piece-meal applications of meditation techniques have suggested that meditation is not really aimed toward the treatment of specific psychological

symptoms (Alpert, 1982; Russell, 1986). As a result, these commentators suggest that evaluations of the effectiveness of meditation techniques should not be tied to a single psychometric estimate of a psychological construct (for example anxiety, depression, or level of psychopathology).

Logically, and to a certain extent based upon empirical findings, it has been suggested that longer periods of practice are associated with increased treatment effects. Data from this analysis, which compared the larger categories of treatment length (medium= 9, extended= 12) found that hypnosis state anxiety effect sizes did not seem to increase as a result of extended periods of practice. The same trend appeared to hold for trait anxiety effect sizes.

These results, in combination with the findings relative to the general impact of hypnosis upon state and trait anxiety, suggest that hypnosis appears to be more effective in reducing state as opposed to trait anxiety, and does not seem to increase in treatment effect as a result of longer amounts of practice. Theoretically this is consistent with the general elements of hypnotic treatment (relaxation, centered attention, and openness to suggestions) which seem more associated with impacting upon acute anxiety. In addition, hypnosis is typically more frequently employed as a method for addressing specific patient symptoms (anxiety, habit control, weight reduction, pain management, etc.).

Meditation studies however, produced a more balanced set of effect sizes, in terms of treatment length categories. In fact, for state anxiety effect sizes, there were no statistically significant differences between the group effect sizes on the basis of treatment length. This trend also held true for trait anxiety effect sizes. Data concerning this research question suggests that meditation techniques appear to be able to attain a significant treatment effect within a relatively short period of time, and additional practice appears to be associated with maintenance of this effect, rather than with significant increases or decreases in effect.

One interpretation is that meditation techniques have a ceiling (or a floor in this case) of treatment effect, beyond which they are generally unable to further influence anxiety reduction. An alternative interpretation might follow Spielberger's (1983) notion, by pointing out that meditation is almost equally effective in influencing measures of both trait and state anxiety. Since trait anxiety is theoretically less influenced by interventions like meditation, it would seem likely that there would be some limit as to how much trait anxiety measures could be decreased. Again, connected to this theoretical view, is the notion that the level of state anxiety is tied to the individual's level of trait anxiety. Hypothetically, as the impact on trait anxiety is maximized, so too would the impact of the technique upon state anxiety.

Hypnosis studies produced categorical state effect sizes which suggested some benefit was associated with medium versus low levels of patient to instructor/experimenter contact. Trait anxiety effect sizes, for hypnosis treatments, supported this trend. This data, supports the notion that some modest contact is associated with improved treatment effect and may provide some support for the transference or placebo cure hypothesis. However, an alternative explanation would simply be that additional contact is required in order to adequately employ or teach the technique.

Data from meditation studies suggests that level of contact between patients and instructors or experimenters appears to have less of an impact upon computed effect sizes. Comparisons of the state anxiety effect sizes by level of contact category, failed to find statistically significant differences, although a trend emerged in favor of the medium contact category. The trait anxiety effect sizes also followed this general pattern and suggested some non-significant advantage for the medium contact category. This outcome implies that meditation treatment (largely a self-treatment beyond the initial instruction period) effect sizes are not significantly influenced by level of contact. Theoretically this seems consistent, in that following an adequate amount of instruction, the technique appears to result in a fairly consistent treatment effects across different lengths of practice. Meditation

techniques then, do not seem to be overly dependent upon the amount of participant-instructor contact. In the case of meditation, the possible role of transference or placebo associated with instructor seems to be minimized.

Hypnosis state and trait effect sizes did differ in terms of publication source (dissertations versus journals) and in so doing appear to support the notion that journals and meta-analysis based upon journal research, are biased toward positive treatment outcomes. However, this may also be an artifact of the over-representation of autogenic treatments (which produced lower effect sizes) in the dissertation studies. Due to this, the journal bias toward statistical significance cannot be fully supported by these results.

Meditation studies were not shown to differ significantly in terms of computed state anxiety effect sizes, on the basis of data source. This trend also emerged in an examination of the trait anxiety effect sizes by source category. As a result, the journal bias hypothesis, cannot be fully support by the data derived from the meditation literature, since significant differences did not emerge on the basis of publication source. This data may either suggest that both major sources of studies are biased in favor of studies reporting statistically significant results, or be seen as data disputing the journal bias hypothesis.

Recommendations

This meta-analysis resulted in the examination of a large group of meditation and hypnosis studies which were available from the Texas A&M University library or through inter-library loan agreements (either at no charge to the author, or at a cost of \$5.00 or less per requested item) and included studies published up through the spring of 1990. Despite these efforts, many dissertation sources were unavailable, due to the limitations of inter-library loan agreements or because of excessive cost. These constraints suggest the benefit of a funded study which would be more capable of paying borrowing fees and also suggests the advantages of a cooperative study which would pool the resources of many libraries and research facilities. In spite of the financial and borrowing limitations of this study, it is my hypothesis that results are representative of the population of anxiety related studies involving hypnosis and meditation.

In reference to the data analysis, several suggestions for future research are obvious. First, in order to explore the possibility that hypnosis and meditation techniques may influence other psychological measures, I would suggest additional meta-analytic studies focused upon such constructs as: self actualization, depression, locus of control, and measures of personality such as introversion-extraversion. Second, this study suggested the need for additional empirical research

investigating specific types of hypnosis techniques (Rational Stage Directed Hypnosis (Boutin & Tosi, 1983), Ericksonian Hypnosis (Crasilneck & Hall, 1985), Guided Imagery (Achterberg, 1985), Hilgardian techniques (Kihlstrom, 1985), or Frommian Psychodynamic techniques (Fromm, 1981) in order to clarify the possible differential effects of various hypnotic treatment methods. Third, since both techniques have been shown to be effective in the treatment of anxiety (to varying degrees), some additional empirical investigation appears necessary in the area of identifying factors which predict the types of clients most appropriate for the different techniques. A likely avenue for this research would be subjective measures of treatment preference and correlational explorations to identify possible relationships between patient characteristics and treatment outcomes. Fourth, this investigation indicated the difficulty often found in clearly identifying the type of hypnosis technique employed. Due to this, it is further suggested that future investigators in this field attempt to more effectively specify the methods employed, and possible association the employed techniques have to existing theoretical and clinical schools of hypnosis. Fifth, I, like many others who have attempted to aggregate large amounts of research data in a meta-analysis, discovered the frustrations involved in examining research which failed to report group means, standard deviations, or levels of statistical significance.

These frustrations lead me to suggest that at a minimum, the basic statistical data be included in all reports of research including: dissertations, journals, monographs, and other scholarly publications.

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APPENDIX I
GUIDELINES FOR CONVERTING TEST STATISTICS TO EFFECT SIZES

In cases where the required data was not provided to compute an effect size, the following methods were available for obtaining a conservative estimate of the population effect size. These methods were obtained from Wolf (1986) and Glass (1977).

Statistic Available	Formula used to convert into test statistic	
t	$E.S. = \frac{2t}{\sqrt{df}}$	
f	$E.S. = \frac{2F}{\sqrt{df \text{ (error)}}}$	only for comparing two group means
r	$E.S. = \frac{2r}{\sqrt{1-r^2}}$	

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