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ANXIETY, DRUG CONSUMPTION, AND PERSONALITY CORRELATES OF
YOGA AND PROGRESSIVE MUSCLE RELAXATION

The University of Arizona

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ANXIETY, DRUG CONSUMPTION, AND PERSONALITY
CORRELATES OF YOGA AND PROGRESSIVE
MUSCLE RELAXATION

by
Eric Mitchell Johnson

A Dissertation Submitted to the Faculty of the
DEPARTMENT OF PSYCHOLOGY
In Partial Fulfillment of the Requirements
For the Degree of
DOCTOR OF PHILOSOPHY
In the Graduate College
THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
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As members of the Final Examination Committee, we certify that we have read
the dissertation prepared by Eric Mitchell Johnson

entitled Anxiety, Drug Consumption, and Personality Development

Correlates of Yoga and Progressive Muscle Relaxation

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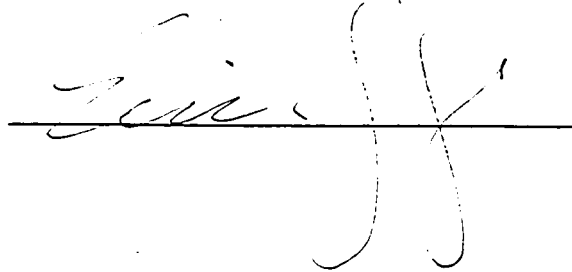
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SIGNED: _____

A handwritten signature, likely "L. J. Smith", is written over a horizontal line. The signature is in cursive and extends slightly above and below the line.

This dissertation is dedicated to the three women in my life, Lisa, Brooke, and Ariel; to my parents, Bill and Bonnie Akins; and Sydney and Connie Dunitz, who have provided so many opportunities for me to continue learning.

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ABSTRACT

Within the last 15 years a large number of empirical investigations have explored the psychotherapeutic applications of meditative techniques. This research expands upon previous efforts in this area by comparing Kundalini Yoga with Progressive Muscle Relaxation, an attention-placebo control, and a no-treatment control on measures of anxiety (STAI Trait Form), personality development (Locus of Control Scale), and drug consumption.

A total of 47 undergraduate student volunteers were randomly assigned to the four treatment conditions. Following a 2-week baseline phase to determine pretreatment drug consumption, subjects began a 6-week treatment phase during which time they attended two classes each week. Throughout the treatment phase subjects maintained detailed drug consumption diaries. Following this treatment phase, all subjects were readministered the aforementioned tests and questionnaires.

Without exception, the research failed to find any significant treatment effects attributable to the practice of Kundalini Yoga. Moreover, none of the experimental treatment groups studied here displayed treatment gains over and above a no-treatment control group. There are at least two ways to account for this lack of significant

differences. On the one hand, one could assert that the treatment groups were somehow impotent and incapable of effecting change any better than the nonspecific treatment factors working for the no-treatment group; or on the other hand, one could assert that the treatment groups were indeed therapeutic, but not significantly due to too brief of an intervention phase, and/or due to the highly variable treatment response of a nonpredisposed subject pool.

CHAPTER 1

INTRODUCTION

In recent years there has been a growing interest in developing, studying, and applying self-control techniques for a variety of clinical problems and personal-development needs. Many of these techniques have evolved out of western laboratory and field studies as an extension of behavioral and social learning theories. A sampling of these techniques includes biofeedback, progressive relaxation training, and covert self-control. An additional set of techniques has its origins in "eastern" traditions and is associated with esoteric psychologies. To date the greatest interest in eastern methods of self-control has focused on Transcendental Meditation (TM) and to a lesser extent on other techniques derived from Yoga and Zen.

As a self-control technique meditation has been most thoroughly studied in terms of psychotherapeutic applications. These applications have been primarily concerned with stress and anxiety management, personality development, and with decreasing drug consumption.

The intent of this paper is to outline the potential benefits that the techniques of yoga and meditation could offer the field of human services and to define the general

characteristics of meditation. This definition includes: a typology of meditative experiences, schools of meditation, the psychophysiological correlates of meditation, the therapeutic applications of meditation and yoga, and the possible mechanisms mediating therapeutic effects. Following this definition, some guidelines and suggestions for future research in the field will be offered. These guidelines and suggestions will be incorporated into a research study to refine present understanding of yoga/meditation techniques and to expand the field of study to include Kundalini Yoga. Kundalini Yoga is a highly elaborate form of yoga consisting of both physical exercises and meditative techniques. Although Kundalini Yoga and Transcendental Meditation have common origins only Transcendental Meditation has received such empirical attention.

Potential Benefits of Yoga/Meditation as Self-control Techniques

Based upon current research in the behavioral sciences a new perspective on people's ability to monitor and modify their own behavior is emerging (Shapiro & Zifferblatt, 1976). A key tenet of this perspective is that people have the ability for greater self-regulatory control than was previously imagined. Meditation, yoga, and other relaxation techniques are additional tools that can be added to the evolving self-control armamentarium. Potentially these techniques can be employed as a means of

general adaptation to daily events and stress or for more specialized problems of living such as drug abuse. Expanding our current understanding of these techniques could lead to their eventual dissemination to groups of people who would not otherwise use more conventional psychological services such as counseling and psychotherapy. Although it remains to be clearly demonstrated what, if any, their best applications will be, they offer a variety of practical benefits.

A principal benefit is the simplicity with which these techniques can be taught and practiced. Although some involve arduous physical exertion, such as some of the yoga exercises, many of the techniques entail simply sitting quietly and repeating a sound or phrase. Since no materials are involved these techniques are relatively inexpensive, and, aside from possible teaching fees, entail little cost. These techniques lend themselves to group instruction and can also be quickly self administered (Marcus, 1975).

There is also the possibility that some of these techniques can soon complement other behavioral techniques already in practice (Shapiro & Zifferblatt, 1976). For example many, of the meditative techniques stress non-evaluative mindfulness of one's own behavior. This kind of nonhostile self-observation is a key element of many

psychotherapeutic strategies and could be employed to enhance other work within a therapeutic context. Many of these techniques also promote greater attentiveness to both internal and external cues which could generalize to other target behaviors such as weight watching or anxiety management.

In the treatment of drug abuse and addictive behaviors yoga/meditation offers a nonpharmacological means for an individual to produce physiological and psychological changes under his or her own control (Bourne, 1975). This is in marked contrast to the recent tradition of using pharmacological substances as a technique for coping with problems. Each of the three areas of psychotherapeutic application for yoga/meditation to be reviewed in this paper are commonly treated with pharmacological substances.

Yoga/meditation techniques also offer an alternative to the many counseling and educational programs presently employed to combat drug abuse. Since drug consumption per se is not treated there is no built-in conflict with drug ideology (Benson & Wallace, 1972). These techniques can be adapted to consumers of many different drugs and since treatment is not based upon a pathology model, the consumer is offered a new social role without being stigmatized (Bourne, 1975; Marcus, 1975).

The Defining Characteristics of Meditation

A Typology of Meditative Techniques

The concept of meditation refers to a set of diverse techniques which have evolved in a variety of different contexts with the specific intent of producing a state of consciousness distinct from the normal states of waking, sleeping, and dreaming. For thousands of years such altered states have been considered beneficial as a means of rest and relaxation and to gain knowledge and self-understanding not usually accessible during normal consciousness. To experience such altered states practitioners have believed it is necessary to turn away from normal psychological processes that are active, outward oriented, and analytic and toward a more receptive, often inner-oriented, and nonanalytic stance. Turning away from normal processes refers to the inhibition of thought and language functions which keep an individual entrapped within an egocentric conception of life. By inhibiting the normal analytic-intellectual functions a second intuitive mode of experience will presumably become available (Ornstein, 1977).

Typologies of meditative techniques have been developed by both Goleman (1972) and Ornstein (1977). Goleman's typology is a threefold generic typology based upon the writing of Buddha which undercuts distinctions

stemming from ideology. In Goleman's scheme techniques are organized into one of three classes: concentration, insight, or integrated, which combines features of both concentration and insight. Ornstein's typology is twofold and recognizes concentration and opening-up forms. Both typologies are quite consistent in their treatment of concentrative techniques, but differ in their treatment of insight and opening up.

Each of the different classes suggested by Goleman (1972) and Ornstein (1977) is composed of techniques sharing a common means or style of inducing an altered state. Practically all of the empirical studies done to date have utilized concentrative techniques. These techniques are unified by their use of a meditative object.

According to Goleman (1972) these techniques are designed to merge the mind of the meditator with the object of meditation. Attention to external objects and events is inhibited to the extent that the meditator is totally absorbed in the object of meditation (union). The object can vary considerably from a word, sound, visual stimulus, image, or physical movement. As the meditator focuses attention on the chosen object a variety of distractions must also be dealt with. In the beginning, and less so with practice, there is the tendency to lose the focus of the meditation and to be distracted by other sources of internal or external stimulation. The

meditator's goal is to nonjudgmentally turn attention back to the object of attention and ignore the distraction.

In summary, concentration meditation consists of:

1. the selection of a meditation object,
2. the restriction of awareness to this single, invariable source of stimulation for a period of time,
3. the reflexive return of attention to the meditation object following any distraction, and
4. absorption in or union with the meditation object.

The second type of meditation technique, referred to as insight and opening up, does not seek to isolate the meditator from the experience of daily life but to involve daily events in the training of consciousness. Through the total awareness of each daily activity, while engaged in the activity, the internal dialogue lessens until the mind becomes still and quiet. This quieting of the mind allows the meditator to become intimately familiar with the mechanics of the mind and provides an opportunity to see how the mind's activity prevents the meditator from having direct experience. As the internal dialogue lessens with practice the practitioner comes to understand how our continual analysis of experience is unnecessary and at times harmful. Insight meditation assists the practitioner in having this direct experience without the impediments of

an internal dialogue. This has been called mindfulness or no mind.

Some meditation systems combine both concentrative and insight techniques and devote time to both. Often concentrative techniques are a prelude to mindfulness or insight.

Schools of Meditation

After acknowledging the common elements shared by many meditation techniques it is important to appreciate the many differences which separate these techniques. The most important differences originate in the context within which these techniques evolved. This context defines a host of extratechnical factors which complicate the process of precisely defining these techniques as independent variables for analysis (Woolfolk, 1975). These extratechnical factors include some admixture of philosophical commitment, religious doctrine, and social influence. It is unclear at this time whether similar techniques associated with different schools of meditation produce different outcomes of clinical significance or lead to functionally equivalent outcomes (Goleman, 1971).

The schools of meditation to have received the most empirical attention are Zen and Yoga. Many other schools have developed or utilize meditative techniques, but have received little attention, in all likelihood due to the

small number of practitioners or the lack of standardized practices. Examples of the latter include Sufism and Christian Mysticism.

Within the separate domains of Zen and Yoga there are many different subdivisions each with distinct meditative techniques (Mills & Campbell, 1974). Within Zen there are at least five subdivisions, such as "Bompu," "Gedo," "Shojo," "Diajo," and "Saijojo." Although each uses distinct techniques they are unified by the common goal of emancipating the meditator from the dualism of objectivity and subjectivity, and mind and body. This emancipation is known as satori, and leads to a state in which the meditator is totally aware of reality both outside and inside.

Like Zen, Yoga has a variety of subdivisions such as "Mantra," "Laya," "Bhakti," "Raja," and "Hatha" Yoga. The unifying concept in Yoga is the belief, unlike Zen, that the sensory world is illusory and transcendence through meditation enables one to have knowledge of the absolute. This knowledge is manifest in the state referred to as samadhi. Whereas, much of the research to be discussed is based upon techniques derived from Yoga, it is important to understand this tradition more fully before reviewing the literature.

Yoga

The term "yoga" is derived from the Sanskrit root yuj, meaning "to join" or "unite." The elements to be joined have been defined as diversely as consciousness and mind (Jain & Jain, 1973) and as the individual soul and the universal soul (Ramamurthi, 1967). Although Yoga has been reportedly practiced for millenia many credit Patanjali as being the first to formalize and systematically describe Yoga during the middle of the second century B.C. (Jain & Jain, 1973). Pantajali's system is also know as Raj-Yoga and is a complete code of both conduct and practices.

During the last 20 years Yoga has attracted widespread attention in the west as yoga teachers have been very successful at disseminating their skills and attracting followers. One of the most successful programs has been Transcendental Meditation. Transcendental Meditation is a streamlined form of Mantram Yoga adapted from Pantajali by Maharishi Mahesh Yogi and brought to the United States in the 1960s. Transcendental Meditation is much less demanding than its Hindu precursors and requires little activity or change in life style aside from two 20-minute meditation periods when a practitioner inaudibly recites his or her Sanskrit mantram. The mantram has been chosen from one of many mantra developed for this purpose. The ease with which TM is taught and practiced has facilitated its acceptance

by thousands of practitioners who have been a readily available source of research subjects.

Maharishi Mahesh Yogi (1966) described TM as a process to transcend the experience of thought to arrive at the source of thought. The source of thought and the subtler levels of thought which are experienced as one progresses toward pure consciousness are not ordinarily experienced or appreciated. Once at the source of thought the practitioner experiences pure consciousness which entails being awake inside, alert, but not conscious of any particular object or thought.

Kundalini Yoga was introduced to the west in the late 1960s by Yogi Bajan. In 1969, Yogi Bajan established the Healthy, Happy, and Holy Organization (3HO) which presently consists of approximately 150 ashrams. The ashrams are residential centers set up for religious practice and yoga exercises. The residents of these ashrams are devoted to the style of conduct and yoga taught by Yogi Bajan (Khalsa, 1978b). Residents in turn actively disseminate these teachings through public classes and community projects.

The practice of Kundalini Yoga involves a variety of physical and meditative practices (Khalsa, 1978a, -b). These practices can be divided into five main steps or components (Vahai et al., 1972). These steps include:

1. asana--the practice of certain selected postures for relaxation of the voluntary musculature;
2. pranayama--breathing practices for voluntary control of respiration;
3. pratyahara--restraint of the senses by voluntary withdrawal from the external environment;
4. dharana--concentrative meditation with a selected object of meditation;
5. dhyana--total absorption in the object of meditation leading to union with the object.

Some accounts of Yoga describe the first three steps as a preliminary active phase to prepare the practitioner for full contemplation during the final two stages of meditation (Deikman, 1966; Goleman, 1971).

According to Yogi Bajan, Kundalini is a source of "etheric" energy which lies dormant until aroused through yoga. By arousing the Kundalini, and raising it through the imaginary chakras, which are seven points along the spine associated with different qualities and powers, the practitioner merges the central nervous system with the endocrine system (Khalsa, 1978b). By raising the Kundalini, important physical reparation, and psychological and spiritual regeneration are believed to occur. Excellent reviews of Kundalini Yoga are available which describe these beliefs in more detail (Colton, 1978).

Psychophysiological Correlates of Meditation

Psychophysiological investigations were some of the earliest empirical research conducted on meditative techniques and yogic practices and were instrumental in providing the study of yoga/meditation with credibility. The reliable demonstration of the psychophysiological effects of meditation also prompted additional investigation into clinical applications.

Psychophysiological studies have been conducted with a variety of meditative techniques taken from the different Zen and Yoga schools. The most thorough and consistent study has been conducted with Transcendental Meditation. A series of studies conducted with Transcendental Meditation practitioners, who acted as their own controls, compared physiological data collected during meditation to data collected while just sitting quietly and resting. During meditation in contrast to resting there were changes in respiration, skin resistance, blood lactate, and the EEG. The respiratory changes consist of decreased oxygen consumption, CO_2 elimination, respiratory rate and minute volume with no change in respiratory quotient. Blood lactate, which is often considered an index of stress, also decreases as does heart rate. There is a marked increase in skin resistance (GSR), and the EEG shows an increase in intensity of slow alpha waves and occasional theta-wave

activity (Benson, Beary, & Carol, 1974; Wallace, 1970; Wallace, Benson, & Wilson, 1971; Wallace & Benson, 1972).

These physiologic results clearly distinguish the meditative state from those produced during sleep, hypnosis, and autosuggestion (Wallace et al., 1971).

This kind of response is in direct contrast to the fight or flight response which is indicative of sympathetic nervous system activation (Benson et al., 1974). Instead, the data are consistent with parasympathetic activation and has been referred to as a wakeful hypometabolic physiologic state (Wallace et al., 1971). The physiological changes described in these studies have been nicknamed the "Relaxation Response" (Benson et al., 1974).

Recently, Beary, Benson, and Kemchuk (1974) have demonstrated that similar physiologic changes occur through the repetition of a single word ("one") independent of any meditative trappings.

Results similar to those found in TM have been obtained with meditators using Ananda Marga Yoga techniques (Elson, Hauri, & Cunis, 1977). Eleven meditators were instructed to meditate for 40 minutes while 11 controls were instructed to remain wakefully relaxed for the same amount of time. In contrast to controls, the meditators showed stable alpha and theta EEG activity, increases in basal skin resistance, and decreases in respiratory

rate. Some of the physiological changes observed during meditation continued into the post-meditation resting periods.

Whereas the studies reviewed so far characterize meditative states in terms of a relaxation model a more recent study shows evidence of autonomic activation (Corby et al., 1978). The design of this study is unusual in comparison to most other studies. In this study the meditators were very proficient and meditated for substantial periods of time each day, with an average of 4.4 years experience, averaging 3.4 hours of meditation per day. Proficiency in this form of Tantric Meditation was characterized by physiological activation according to EEG and autonomic criteria. The activation appears to be associated with proficiency instead of the techniques per se since the inexperienced control subjects tended to relax rather than become activated.

This section on psychophysiological correlates also illustrates the potential pitfalls inherent in analyzing yoga and meditation techniques solely along a single dimension, such as EEG parameters (Khalsa, 1976; Ornstein, 1977). Although such parameters may be important it is essential to not reduce a complex and multifaceted event to a single measurement and assume the event has been completely characterized. It is conceivable that such parameters are not

significant in and of themselves and may not even correlate well with practice benefits.

These findings also highlight the need for a more sophisticated understanding of the independent variables under study. Without such refinement the inference of causal relationships is tenuous (Woolfolk, 1975).

Psychotherapeutic Applications

Early interest in the psychotherapeutic applications of yoga and meditation was prompted by the enthusiasm of its followers, many of whom also conducted much of the early empirical investigation into its properties. Transcendental Meditation, for example, has been actively studied by the followers of Maharishi Mahesh Yogi at Maharishi International University. With few exceptions this research has been very favorable to TM.

After an initial period of enthusiasm and favorable results, additional investigations were performed by researchers who were not always proponents of yoga and meditation. These studies were often unfavorable and prompted skeptical reviews of the early research. In a thorough review of the meditation literature as it existed in 1975, Smith (1975, p. 558) concluded:

It has been widely argued that meditation has psychotherapeutic potential. Research on meditation has yielded three sets of findings: (a) experienced meditators who are willing to participate without pay in meditation research appear happier and healthier than nonmeditators; (b) beginning

meditators who practice meditation for 4-10 weeks show more improvement on a variety of tests than nonmeditators tested at the same time; and (c) persons who are randomly assigned to learn and practice meditation show more improvement over 4-10 weeks than control subjects assigned to some form of alternate treatment. However, this is not conclusive evidence that meditation is therapeutic. The therapeutic benefits found could be the result of expectation of relief or of simply sitting on a regular basis.

The purpose of this section is to review the empirical research which has investigated the psychotherapeutic applications of meditation and yoga. Broadly defined, psychotherapeutic applications refer to a cluster of clinical and personal growth issues for which meditation and yoga have been employed as an adjunctive or principal treatment. The psychotherapeutic applications to be considered include stress and anxiety management, personality development, and decreasing drug consumption.

Meditation Applications to Problems of Stress and Anxiety

Anxiety reduction has been the most frequently investigated variable in meditation research. Since 1936 well over 100 scholarly books and journal articles have appeared on the topic (Smith, 1976). The study of anxiety has been very problematic due to the complex interaction of cognitive and physiological variables (Vattano, 1978). To date there remains little agreement on the definition of anxiety and the best measurements to employ.

In the studies to be reviewed here anxiety has been largely defined by self-report measures. A few investigations have also included behavioral and physiological measures, but otherwise no concurrent validity for the self-report measures has been used (Shapiro & Giber, 1978). The prevailing assumption seems to be that self-report measures parallel physiological measures.

With only a few exceptions the self-report measure of choice has been the State-Trait Anxiety Inventory (STAI) A-Trait Scale developed by Speilberger, Gorsuch, and Lushene (1970). In their view, trait anxiety (A-trait) designates individual differences in anxiety proneness. This characteristic involves a relatively stable tendency to respond to threatening situations with an A-State reaction. State anxiety is conceptualized as a transitory emotional condition characterized by feelings of tension and apprehension and by activation of the autonomic nervous system. This state occurs in situations that people perceive as threatening.

Physiological measures which have been used to measure anxiety include spontaneous galvanic skin response (GSR) frequency, skin conductance, and heart rate (Boswell & Murray, 1979).

Several early case reports indicated that meditation might be useful to combat severe anxiety. These studies are the only reports based upon a clinical population

and lack an experimental design. Boudreau (1972) treated a case of profuse perspiration and anxiety with a combination of relaxation and yoga, and a case of claustrophobia with Transcendental Meditation. Both treatments were successful. Similarly, Girodo (1974) successfully used a yoga meditation technique in the treatment of anxiety neurosis with symptom reduction evident after 8 weeks.

Subsequent studies which have employed an experimental design have also shown Transcendental Meditation to be beneficial in decreasing anxiety. Hjelle (1974) compared 15 experienced meditators to 21 novice meditators on the Bending Anxiety Scale and found the experienced meditators significantly less anxious. Similar results were obtained by Davidson, Goleman, and Schwartz (1976) in a study comparing controls interested in meditation to meditators with varying degrees of experience on the STAI trait form. Experience ranged from beginners who had meditated for 1 month or less, to short-term meditators who regularly practiced for more than 2 years. As predicted, degree of experience was related to scores on the STAI trait form. Although subjects interested in meditation had the highest scores, there were significant decrements in these scores for each succeeding level of experience.

A major weakness of these studies is the assumption that decrements in anxiety are a linear function of experience. It is highly conceivable though that these groups

differed on a variety of predispositional factors before beginning meditation. Since the design of these studies is cross sectional this cannot be ruled out. It is also plausible that even if each of these groups were equivalent on predispositional factors at the time they expressed interest in meditation, the composition of these groups would vary over time as a function of attrition (Otis, 1974). With increasing experience and attrition the group would be distilled to those who were highly committed and ostensibly more motivated to change their behavior. Thus a comparison of highly experienced meditators to those less experienced would not simply be a function of changes attributable to meditation. One way around this is to test a sample of meditators before learning meditation and then after practicing meditation for a period of weeks or months.

Using such a design, Ferguson and Gowan (1976) administered a pretest battery including the STAI trait form and Cattell Anxiety Scale (IPAT), to a group of 31 subjects interested in meditation 3 days before beginning their meditation lessons and 19 control subjects not practicing meditation. Following regular meditation practice by the experimental subjects, the test battery was readministered 6.5 weeks later to both groups. On both anxiety measures the experimental group showed significant decreases in anxiety.

Unfortunately, studies that compare changes experienced by meditators and nonmeditators are faulted because the two populations may not be comparable at the outset. Meditators by their decision to learn meditation show some motivation for change not evidenced by nonmeditators. Such motivation may contribute to positive change and reductions in pathology regardless of the treatment they choose and independent of the treatment's reputed effects.

The most rigorous studies have attempted to control for the problem of initial group differences by randomly assigning subjects to meditation and alternative treatments and testing before and after several weeks of treatment.

Dillbeck (1977) attempted to control for initial group differences and the effects of sitting quietly by randomly assigning 33 subjects to a relaxation group and a TM group. After a 2-week experimental interval, the relaxation subjects began TM. Dillbeck reported that as hypothesized, in the comparison between the relaxation and meditation subjects, as well as between conditions for the relaxation-meditation group, TM was significantly more effective in reducing anxiety as measured by the STAI trait form.

Several problems weaken this interpretation. Foremost is the fact that all the subjects in this study were from a sample of students who had signified their interest in the TM technique by attending an introductory lecture on Transcendental Meditation. Considering how highly motivated

the group was, this is not the best group one could use to discern whether or not TM has any therapeutic potential. Although it was not measured, in all likelihood the two groups had very different expectations for change. This explanation becomes more credible based upon Dillbeck's disclosure that after 2 weeks the relaxation group asked to resume their training in TM. Considering that the relaxation group was probably quite disappointed by not being assigned to the TM group, it is unlikely that there was ever a credible comparison between treatments.

Several other studies using random assignment have fared considerably better. Smith (1975) attempted to overcome the shortcomings of previous studies by random assignment of subjects and through the development of a highly credible and well thought out "placebo" treatment, referred to as Periodic Somatic Inactivity, to control for nonspecific treatment effects. In Smith's study, students volunteered to obtain free treatment for reducing anxiety. One hundred thirty-nine volunteers were randomly assigned to either Transcendental Meditation, PSI, the placebo treatment designed to be equivalent to TM in terms of both expectations for change and the quiet sitting as in meditation, or no treatment. Using the STAI trait form both treatment groups showed significant decreases in trait anxiety after 6 months of practicing the experimental techniques. However, the TM subjects showed no more improvement than those

exposed to the placebo treatment. This finding was replicated in a second experiment comparing a TM-like meditation technique with an "antimeditation" technique involving the active generation of positive thoughts. Smith (1976) concluded that the active therapeutic ingredient of meditation was not the Sanskrit mantra, but some combination of just sitting quietly and the expectation that the technique one is practicing is therapeutic.

Although Smith is to be credited with conducting one of the most methodologically sound studies in the meditation literature, several shortcomings should be noted. The most serious shortcoming is the high drop-out rate in the first study--59% for Transcendental Meditation and 53% for the control treatment. The implications of this high drop-out rate are not clear and their interpretation is not assisted by Smith's failure to ascertain whether or not his treatments were considered comparably credible by participants.

In a study similar to Smith's, Zuroff and Schwarz (1978) also provided for random assignment of subjects and included a control group, muscle relaxation, as a comparison for the effectiveness of TM. Dependent measures included a behavioral measure and two self-report measures of trait anxiety. The behavioral measure was in the form of a verbal response to a social situation scored for anxiety indicators. An expectancy questionnaire to assess the credibility of each treatment was also included. Sixty-one

subjects were randomly assigned to receive training in TM, training in muscle relaxation, or no treatment following recruitment for "an experiment concerning transcendental meditation and a muscle relaxation technique."

The interpretation of results from this study is somewhat obscured by inconsistent findings with the different measures of trait anxiety and differences in treatment group credibility. Whereas the behavioral measure of anxiety and one of the self-report measures of anxiety failed to demonstrate a difference between the two treatments, a third self-report measure, which assessed the degree of anxiety reported in response to different imaginary situations, provided evidence of a treatment effect for TM. Although this suggests a treatment benefit for TM, this conclusion is questioned by the discovery on the expectancy questionnaire that the TM treatment was perceived as more credible than muscle relaxation. Considering the fact that almost all subjects in the final sample stated that they had volunteered hoping to be assigned to the TM group, these results provide only equivocal support for the therapeutic efficacy of TM.

More recently, Boswell and Murray (1979) randomly assigned 80 subjects to four treatment groups: mantra meditation, an antimeditation control, a progressive relaxation control, or a no-treatment control. Subjects in this study were administered the STAI trait form before beginning

meditation and again 2 weeks later during an outcome session. The outcome session also included three physiological measures of autonomic arousal (spontaneous galvanic skin response frequency, skin conductance, and heart rate), which were taken before and after performing the various experimental techniques, then again after a stress manipulation. The stress manipulation involved administering a college level IQ test followed by negative feedback. Immediately following the manipulation and the automatic measures the STAI state form was administered.

With respect to the main hypothesis, there were no significant decrements in trait anxiety for any of the treatment conditions. On the measures of autonomic arousal there was an overall trend for all groups of decrease, but no group exhibited superiority when compared to other treatment conditions. Similarly, results from the stress manipulation failed to show any treatment difference on either the measures of autonomic arousal or state anxiety.

Although this study casts doubt on the unique effectiveness of meditation as a method of reducing anxiety, the results are hard to evaluate since the data are not presented numerically. With such a short treatment intervention one would question whether any intervention would prove to be effective. In addition, since expectancy of benefit was not assessed there is no way to know if the treatment groups were comparably credible.

One other study, by Goleman and Schwartz (1976), also tested the efficacy of meditation as an intervention to reduce stress reactions in a laboratory threat situation. The study assessed the stress response of 30 experienced meditators and 30 controls after seeing a film depicting physical injury as a consequence of industrial hazard. Stress response was assessed with several measures of autonomic arousal, self-report measures of stress response, and personality scales. Results from this study showed that meditators and members of both groups that practiced a meditative condition habituated to the stressors impact more quickly and experienced less subjective anxiety.

The major problem with this study, as with the study by Davidson et al. (1976), is one of initial group differences. Since the study compared experienced with inexperienced meditators we do not know if the changes are due to meditation or to self-selection of meditators in the meditation group.

Meditation Applications to Enhance Personality Development

Considerable attention has been paid to the possibility that meditation can have a salutary effect upon psychological functioning. Most of these studies have investigated the influence of meditation upon self-actualization or some measure of psychological health and its correlates.

As a measure of self-actualization the most widely used assessment instrument has been Shostrom's (1966) Personality Orientation Inventory (POI). This inventory was designed as a comprehensive measure of values and behavior construed to be of importance in the development of self-actualization, the tendency to develop one's talents and capacities. The inventory consists of 150 two-choice, paired-opposite value statements which are scored in terms of two major scales, time competence and inner-directed, and 10 secondary subscales. A similar scale, the Northridge Development Scale, has been used on one occasion (Ferguson & Gowan, 1976).

Measures of psychological health have included the MMPI (Glueck & Strobel, 1975), Rotter's Incomplete Sentence Test (Zuroff & Schwarz, 1978), Rotter's Internal-External Locus of Control Scale (Marlatt & Marques, 1977), the 16PF and the Tennessee Self-Concept Scale (Smith, 1976). The concept of locus of control is used to differentiate those individuals who believe that rewards are the result of their own behavior (internal orientation) from those who believe that rewards are the result of external sources over which they possess little control (external orientation) (Rotter, 1966).

As with the studies investigating meditation applications to anxiety the early studies investigating applications to enhance physiological functioning were uniformly

positive. Three such studies compared changes experienced by meditators after 6-10 weeks of meditation to those experienced by nonmeditators (Ferguson & Gowan, 1976; Nidich et al., 1973; Seeman, Nidich & Banta, 1972). All three of these studies showed significant increases on measures of self-actualization after practicing meditation. Hellje (1974) has also shown that experienced meditators are significantly more internally controlled than beginning meditators on Rotter's Locus of Control Scale.

In an attempt to discern whether the differences in self-actualization and locus of control are a function of one's interest in meditation, Stek and Bass (1973) compared three groups which varied in terms of their interest in TM. This interest ranged from no interest, to slight interest, to interest enough to enroll in TM classes. An additional unselected control group was added and all were compared on the POI and Locus of Control Scale. Results indicated that level of interest in meditation was not related to scores on the POI or Locus of Control Scale.

With the exception of the study by Stek and Bass (1973), these studies have serious methodological flaws. As noted earlier, comparisons of meditators and nonmeditators are faulted because the two populations may not be comparable since the meditators display some motivation for self-change. Similarly, comparisons of experienced and inexperienced meditators are of questionable value since

there is no way to control for predispositional factors and meditation drop-outs which could bias results for the experienced meditators.

Subsequent studies have included the design features of random assignment of subjects, placebo-attention control groups, and compared meditation to other treatments such as progressive relaxation. These studies in contrast to those just mentioned have yielded uniformly negative results and have not shown meditation to be of value in inducing general personality change. On such measures as the 16PF, Tennessee Self-Concept Scale (Smith, 1976), Rotter's Incomplete Sentence Test, which is a measure of maladjustment (Zuroff & Schwarz, 1978), and the Locus of Control Scale (Marlatt & Marques, 1977; Zuroff & Schwarz, 1978), meditation was no more effective than comparable control treatments in inducing change.

Meditation Applications to Decrease Drug Consumption

There have been at least nine reports in the literature, and many more unpublished (Marcus, 1975), investigating the impact of meditation upon drug consumption. In these studies drugs are broadly defined to encompass a variety of substances with varying degrees of physiological and psychological effects. The most widely studied drugs include alcohol, cigarette (tobacco), marijuana, hallucinogens, stimulants, barbiturates, and other illicit drugs. Some of

these reports are anecdotal, many are retrospective surveys, and only a few are prospective, longitudinal studies.

One of the earliest reports to note that practicing meditation can change drug consumption is an anecdotal report by Benson (1969). During a meditation study to control arterial blood pressure, Benson serendipitously discovered that 19 of his 20 subjects stopped abusing drugs since practicing TM. The subjects reported substantial decreases in their consumption of marijuana, barbiturates, LSD, and amphetamines.

Although no therapeutic claims can be made from such an anecdotal report, the report did have great heuristic value and prompted additional surveys.

One of the earliest and largest has a follow-up survey conducted by Benson and Wallace (1972). Benson and Wallace administered a detailed drug-consumption questionnaire to approximately 1,950 subjects who had been practicing meditation for 3 months or more and who were attending a month-long TM teacher training course. Of these, 1,862 completed the questionnaire. The questionnaire assessed use of marijuana, narcotics, amphetamines, barbiturates, hard liquor, and cigarettes for each of five separate time periods: (1) 6 months before starting meditation; (2) 0 to 3 months before starting meditation; (3) 4 to 9 months after starting; (4) 10 to 21 months after starting; and (5) 22 months or more after starting. Although no

formal statistical analysis of the data was done the majority of respondents reported sizeable decreases in the consumption of all these substances. As experience with meditation increased there were progressive decreases in consumption until after 21 months of TM most subjects had completely stopped using drugs. Of those who continued using drugs following TM, 55.9% had been irregular in meditation and 24.8% had stopped meditation for a week or more.

Shafii, Lavelly, and Jaffe (1974, 1975) noted a number of difficulties with the Benson and Wallace (1972) study. They pointed out that the study did not have a matched control group, administered the questionnaire while subjects were in contact with each other, and used subjects that were not a representative sample of meditators, since those surveyed had meditated an average of 20 months and were training to be teachers. In an effort to correct these deficiencies, Shafii et al. (1974, 1975) performed a similar retrospective investigation to study consumption of marijuana and alcohol following initiation to TM.

In their two reports Shafii et al. (1974, 1975) contacted 126 meditators out of a potential pool of 525 persons initiated into TM from the Ann Arbor and Ypsilanti, Michigan area. The method of attaining matched control subjects required the experimental subject to recruit his or her own matched control based upon overall perceived similarity. Using this approach 90 control subjects were

found. Meditation subjects were asked to determine their frequency of marijuana and alcohol consumption during seven different time periods. These time periods ranged from 12 to 7 months before starting meditation to 25 to 36 months after starting meditation. Similar time frames were developed for control subjects. Meditators were also divided into five subgroups according to the length of time they had been practicing TM. These five subgroups ranged from 1 to 3 months, to 25 to 36 months or longer.

According to the authors, results from this survey indicate that the practice of meditation is associated with significant decreases in the consumption of marijuana and alcohol in comparison to the control group. The longer a person has practiced meditation, the higher the probability he or she would discontinue usage. Looking at consumptive data 3 months after beginning meditation there were quantitative decreases in marijuana consumption ranging from a low of 46% for Group I (1 to 3 months practice) to 77% for Group V (25-39 months or more practice). Similarly, with wine and beer consumption, all of the meditation groups reported statistically significant decreases ranging from 25 to 33% in the first 3 months of meditation compared to the 1-3 month prequestionnaire period for control subjects. With hard liquor, although the mean frequency of consumption decreased significantly for all meditators, only Groups IV

and V (13-24 and 25-39 months of practice, respectively) showed a significant quantitative decrease in consumption.

One finding which deserves special mention is the difference in percentage of decrease or discontinuation of marijuana between Subgroups I, II, and III on the one hand, and Subgroups IV and V on the other (Shafii et al., 1974). The authors pointed out two possibilities to account for this finding. Through their telephone contacts the authors found that approximately 30% of those contacted had stopped meditating. Assuming this rate to be comparable for all the groups over time, by a process of elimination those in Subgroups IV and V tended to take meditation more seriously from the start and would not be as representative of the more diverse populations in Subgroups I, II, and III who have not meditated as long and suffered as high a rate of attrition. In addition, respondents in Subgroups IV and V are reporting on consumptive habits 1-3 years earlier. It is possible that their positive experience could influence recall and contribute to an exaggerated report of the decrease of discontinuation at the beginning of their TM experience.

Another retrospective study, prompted by the Benson and Wallace (1972) study, was conducted by Monahan (1977) to analyze the impact of meditation practice on the consumption of three broad categories of substances used: socially approved substances, prescribed psychoactive medications, and illegal drugs. The list of drugs included caffeine,

nicotine, soft and hard alcoholic beverages; prescribed sleeping pills, tranquilizers, antidepressants, and analgesics; marijuana, hallucinogens, stimulants, sedatives, and opiates.

Using a methodology similar to that of Shafii et al. (1974, 1975), a random sample of names on the mailing list of the Philadelphia World Plan Center of the International Meditation Society received a research packet containing a questionnaire regarding drug consumption. Of the original 1,183 packets delivered, 264 or 22.3% of the questionnaires were returned completed. Experimental subjects were asked to procure their own matched control yielding a control group of 158. All participants were asked to determine average substance usage patterns "now" and, for the TM group, "3 months before learning TM," with a comparable time difference from the control subjects.

Although the data for participants who had meditated for varying lengths of time were group together, it is not possible to differentiate consumption patterns for different subgroups. Before learning the TM technique, average weekly use and the percentages of users in both TM and control samples were similar except that meditators were receiving more prescribed tranquilizers and "prescriptions" in general. Meditating subjects showed a greater decrease than controls in average weekly use of every substance category except illegal sedatives. Also, it was found that meditators as a group decreased use of every

substance except prescribed analgesics. Control subjects increased the use of most socially approved and prescription drugs. For every substance category, a greater percentage of meditators than controls reported decreased usage levels and a smaller percentage increased use of each substance.

In addition to these surveys two other questionnaire studies, both unpublished and reported by Marcus (1975), tend to corroborate these findings. These findings suggest that the regular practice of TM leads to decreases in drug consumption. One of these studies was conducted by the Stanford Research Institute and the other by the International Meditation Society.

The major weakness of all these retrospective studies is that they relied upon data resembling solicited testimonials. Since much of the data were collected from experienced meditators and only one study considered data by meditators who have stopped meditation (Monahan, 1977), the sample of those who volunteered was perhaps not representative of those who learned to meditate (Smith, 1975). This subject selection bias results in a sample that is much more highly motivated to change its behavior (Shapiro & Giber, 1978).

Another sort of sample bias may occur prior to the time prospective meditators receive instruction in TM (Marcus, 1975). Since prospective meditators are required to abstain from drug use for a 2-week period, many users

who are more dependent or unwilling to stop for a time are eliminated from the study pool.

Equally serious problems arise through the use of retrospective questionnaires. Considering that respondents are asked to recall daily drug use patterns as far back as 2 years, several problems can occur (Shapiro & Giber, 1978): (1) subject's self-report may inadvertently inaccurate due to problems of self-observation; (2) subject's memory of events so long ago may be faulty; and (3) in an attempt to fully cooperate, subjects may respond in the manner they think is expected of them, i.e., TM leads to decreased drug consumption. This final problem is often referred to as demand characteristics (Orne, 1962). This is one explanation for the finding by Shafii et al. (1974) that meditators retrospectively reported using twice as much marijuana as nonmeditators.

A final problem with these studies is their choice of, or complete lack of, a control group. Even though in the later studies meditators provided their own matched control, this does not effectively control for the variance due to the meditator's motivation and/or expectations.

Because of the methodological pitfalls inherent in a retrospective study, other studies have employed a longitudinal design. Of the six longitudinal studies of TM and drug consumption identified in this review, three

are unpublished accounts cited by Marcus (1975). Aside from noting that the unpublished results were uniformly favorable to TM, little else will be said due to the brevity of these reports and their serious methodological shortcomings, such as the failure to use credible control treatments. Of the remaining three studies, all three entailed random assignment of subjects and an attention "placebo" control group.

Following up on the Benson and Wallace (1972) survey results showing significant decreases in smoking, Ottens (1975) attempted to expand upon these findings by monitoring the cigarette consumption of smoker subjects randomly assigned to either TM, a self-control group consisting of weekly informal discussions regarding reasons and methods to stop smoking, or a no-treatment group. All subjects monitored the number of cigarettes smoked for a 5-day baseline period and then daily for the 10 weeks of the treatment period. Baseline data did not significantly differ from each group. Participants were averaging 22-23 cigarettes per day and had been smoking an average of 4.4 years.

Results from this study indicate that although there was a significant decrease in cigarette consumption for the combined TM and self-control group means, it was not possible to conclude one treatment was more effective than another.

One study which stands out for its methodological sophistication compared the effectiveness of TM to several other treatments in reducing the consumption of alcohol in heavy-drinking college students. Based upon a drinking habits survey, Marlatt and Marques (1977) invited heavy social drinkers, averaging at least 1.5 drinks per day, to participate in an exploratory study of the effects of practicing relaxation techniques on drinking alcoholic beverages. Heavy drinkers were chosen instead of problem drinkers or alcoholics to determine if meditation or the comparison procedures would lead to a change in alcohol consumption in individuals who had expressed no particular desire to cut down or stop their drinking. The authors reasoned that if there were decreases in drinking in unmotivated subjects, then the use of the technique as a potential treatment would appear even more feasible.

A total of 44 qualified heavy drinkers agreed to participate and were randomly assigned to either:

- (1) meditation, (2) progressive relaxation, (3) bibliotherapy, an attention-placebo control, and (4) a no-treatment control. The progressive relaxation training consisted of standard muscle relaxation techniques pioneered by Jacobson (1938). The attention-placebo group was included to control for nonspecific effects of relaxation training, such as those due to contact with the experimenters, demand characteristics, expectations of

subjects, and daily periods of rest. The attention-placebo group format consisted of a relaxation procedure, called bibliotherapy, and involved having the subjects engage in quiet, restful reading activities twice a day. All subjects filled out consumption diaries, indicating the type of alcohol consumed, ("proof" or percent alcohol) and the amount consumed, for a 2-week baseline period, and a 6-week treatment period. The consumption diary data was transformed into standard units of consumption (ml of ethanol), and a weekly score recorded as the subject's mean daily consumption.

Changes in alcohol consumption were determined by comparing the mean daily consumption during the 2-week baseline period, with that during the last 2 weeks of the treatment period. Whereas there were no significant differences between the four groups prior to the treatment intervention all three relaxation groups were drinking significantly less alcohol than the control group at post-test, with an average decrease of 16.6 ml ethanol per day. There were, however, no significant differences between the three relaxation groups. Thus, subjects who were practicing a relaxation technique showed decreased alcohol consumption whether they practiced meditation, progressive relaxation, or the attention-placebo technique of bibliotherapy.

In attempting to account for what was mediating the consumption effects of the three relaxation techniques, the authors speculated on some commonly shared "active ingredients." One such possibility, which was shared by all three treatments, was sitting quietly for 20 minutes twice a day. It may also have been that the relaxation sessions displaced some drinking activity or disrupted established behavioral chains involved in drinking. A final suggestion was that the techniques did produce a relaxed state which led to decreased drinking.

A final longitudinal study that investigated the effects of meditation practice on drug consumption has already been mentioned under applications of meditation to anxiety reduction. Zuroff and Schwartz (1978) randomly assigned 60 subjects to either meditation, muscle relaxation, or a no-treatment control for a 9-week treatment period. Subjects stated frequencies of drunkenness and marijuana use "in the recent past" were collected at pre-treatment and posttreatment. No significant effects were found for either frequency of drunkenness or marijuana use.

Yoga Applications

The majority of studies focusing on yoga, which includes both physical exercises and meditation, are unpublished accounts with unspecified methodologies (Khalsa, 1978). As with meditation (Benson, 1969), early

interest in yoga investigated its applications to health-related problems such as hypertension (Patel, 1973), or a fuller understanding of psychophysiological correlates (Khalsa, 1976). Several other studies have employed yoga as a treatment for psychiatric disturbance and to enhance psychological health.

Vahia and his colleagues, in several reports (Vahia et al., 1972; Vahia et al., 1973), have presented data suggesting that yoga is an effective treatment for psychoneurotic disorders. Ninety-five psychoneurotic patients who had been resistant to conventional therapy were randomly assigned to one of two treatment groups. One of these groups was given a complete psychophysiological therapy based upon yoga, consisting of both physical postures and meditative practices, while the second group was given partial therapy consisting of exercises resembling yoga exercises and no meditation. Both groups practiced 1 hour each day for 4-6 weeks and were given support, reassurances, and placebo tablets. The dependent measures included: (1) MMPI and Rorschach tests given pre- and posttreatment; (2) the Taylor Manifest Anxiety Scale given pre- and posttreatment and every week of the study; and (3) blind clinical assessments given pre- and posttreatment and every week of the study based on target symptom relief and work efficiency on the job.

On the basis of clinical assessment 73% of the subjects in the total therapy treatment showed at least 50% improvement while only 42% in the partial therapy treatment showed such improvement. Results from the self-report measurements also showed significant gains for the total treatment group versus the partial. On the Taylor Manifest Anxiety Scale, the total therapy group displayed greater overall reduction and a consistent reduction in each of the 6 weeks of the study compared to the partial therapy group. Similarly, the MMPI showed a greater overall improvement for the total therapy group.

Even though this study incorporated random assignment of subjects and an attention-placebo control group the results can only be considered as suggestive since there are design features that may have rendered the control treatment less credible than the full treatment. This is suggested by the fact that the same instructor taught both groups. Since the partial treatment did not involve true yoga, but "exercises resembling yoga exercises," one wonders about the theoretical rationale presented for the treatment and the instructors belief in the effectiveness of the exercises. It is highly plausible that the two treatments were not perceived as comparably credible by either the instructor or the subjects.

The importance of this point is underscored by McReynolds et al. (1973), who found that a placebo

treatment accompanied by a highly credible yet contrived treatment rationale and presented by a therapist blind to its placebo nature is more effective than an attention placebo not accompanied by a theoretical rationale and taught by a therapist aware of its placebo nature.

The only other longitudinal study of yoga's effectiveness in promoting psychological development was conducted by Udupa, Singh, and Yadav (1973). In this study 12 normal volunteers practiced Hatha Yoga for 6 months and took a variety of psychological tests before beginning yoga and then 3 and 6 months later.

On measures of intelligence, memory, neuroticism, and fatigability the volunteers showed significant improvement. The uncontrolled nature of this report prevent any further conclusions.

Summary of Psychotherapeutic Applications

Over the last 10 years meditation and yoga have received a lot of attention and numerous experimental studies have attempted to establish their psychotherapeutic utility. Early investigations suggested that meditation is a successful intervention to reduce anxiety and manage stress, promote psychological well being, and reduce consumption of a variety of drugs, including marijuana and alcohol. Yoga on the other hand has been shown to be successful in enhancing the psychological

functioning of psychiatric patients and normal volunteers. More recent investigations utilizing more sophisticated experimental designs have not shown meditation to be any more effective at influencing the above dependent variables than comparable control treatments, such as progressive relaxation and attention placebo treatments.

Possible Mechanisms Mediating Therapeutic Effects

Because most of the attention in the yoga/meditation literature was focused upon establishing therapeutic efficacy, relatively little attention has been devoted to understanding the basic mechanisms responsible for these effects. The purpose of this section is to briefly sketch out current efforts to develop a theoretical rationale linking the techniques of yoga/meditation with established and reputed effects. Considering the fledgling status of these theories, this review will be primarily descriptive rather than critical.

Due to the wide variety of physiological and psychological benefits claimed for yoga/meditation, theorists have needed to account for both phenomena. Although most theoretical speculations posit some physiological underpinnings, professional orientations have influenced which phenomenon is most emphasized. Other theorists have maintained a strictly behavioral position and suggest that

benefits are due to expectations and the act of sitting quietly (Smith, 1976).

The two theories, accounting for therapeutic benefit, that have received the most attention are the Relaxation Model, emphasizing physiological variables, and the Perceptual Theory of Meditation, emphasizing the restriction of awareness and the withdrawal from thought. A third theory is discussed to account for decreased drug consumption following yoga/meditation.

The Relaxation Model

The most popular account for the effectiveness of yoga/meditation is that it helps an individual to relax. As reviewed earlier, there is general agreement that these techniques do enhance relaxation. This relaxation has been referred to as "the relaxation response" (Benson et al., 1974), and a "hypometabolic state" (Wallace et al., 1971). The somatic components of relaxation are portrayed as the converse of flight and fight with decreased sympathetic nervous system activity and the promotion of vegetative or parasympathetic activity. Although this issue is not addressed in depth there is the implicit assumption that the promotion of relaxation inhibits normal stress and related fatigue. With less fatigue there is greater psychological resistance and adaptation (Vattano, 1978).

Recently a variety of techniques have been shown to elicit the relaxation response (Beary et al., 1974).

These techniques include both simple practices, and complex rituals. The diversity of techniques which elicit this response have prompted investigators to propose an integrated hypothalamic response resulting in a decrease in sympathetic activity. Although these changes have been produced by many techniques they have not been produced by sitting quietly with the eyes either open or closed.

A corollary of the relaxation hypothesis has been proposed by Goleman (1971) to account for therapeutic effects. According to Goleman, once an individual is relaxed and autonomic functions are controlled through meditation, the practitioner is able to witness new thoughts and experiences which would otherwise be accompanied by anxiety. Meditation in this scheme is seen as a "natural global desensitization," leading to the same changes which occur through desensitization, only more thoroughly. Since anxiety is reciprocally inhibited the assumption is that the individual's attention will not be so selective and there will be greater opportunity for personal growth through environmental and interpersonal awareness (Goleman, 1971). Similar views have been proposed by both Otis (1974) and Shapiro and Zifferblatt (1976). This hypothesis has yet to be tested experimentally, and it remains to be established if a given practitioner attains a state of relaxation sufficient to deal with unpleasant experiences that arise during meditation; and whether these

thoughts are of significance in the individual's life (Shapiro & Giber, 1978).

The Perceptual Theory of Meditation

Ornstein (1977) proposed that the key element in the diverse practices subsumed under yoga/meditation is the active restriction of awareness to a single, unchanging process and the withdrawal from ordinary thought. According to Ornstein, it is as if cycling the same subroutine through the central nervous system serves to lessen the practitioner's awareness of the external world leading to greater awareness of internal processes and experience. Consistent with the work of Beary et al. (1974), Ornstein noted that the particular sensory modality and meditative object are of little consequence--the common element is the active restriction of awareness to a single process.

Deikman (1966) has referred to the changes produced by a monotonous focus as deautomization. According to Deikman's formulation, just as motor behavior in the infant becomes well rehearsed, and eventually automatic, so, too, do psychological functions. But, as the individual diverts attention from usual channels of ordinary psychological functioning, the processes of differentiation cease. This allows the meditator an opportunity to experience surrounding people, things, and events in new ways. Thus, "deautomization may be conceptualized as the undoing of

automization, presumably by reinvesting actions and precepts with attention."

This perceptual theory of meditation, finds some support in the experimental literature. Cohen (1957) exposed experimental subjects to a homogeneous visual field of low illumination (ganzfeld) with the result that 5 of 16 subjects reported a total cessation of visual experience. This finding was replicated (Cohen, 1958), along with the additional finding that this phenomena was associated with bursts of alpha activity and that the more alpha experienced by the subject the greater the likelihood of visual cessation.

Similar findings have been reported by Lehmann, Beeler, and Fender (1967), who mounted a miniature projector on the contact lens of experimental subjects to project a "stabilized" image. After several seconds of viewing subjects reported disappearance of the image. During periods of visibility the authors reported that electrocortical activity was low-voltage beta as contrasted with predominant alpha after a fading out of the image.

These studies support the contention that restriction and constancy of sensory input may be an important ingredient in meditative techniques. These studies have further significance since they demonstrate the simultaneous production of both psychological and physiological phenomena.

Gleuck and Strobel (1975) also attempted to give a unified account of the psychological and physiological benefits of yoga/meditation and postulate that there is coaction due to a dampening of limbic activity. This dampening is accomplished by introducing a driving mechanism, such as a mantram, with a dominant frequency of 6-7 Hz. Due to connections between thalamic structures and cortical structures, Glueck and Strobel contended this could produce a dampening of cortical activity as well. This is evidenced by the disappearance of the usual range of frequencies and amplitude coming from the cortex with the imposition of resting or idling rhythms as shown by appearance of very dense high-amplitude, alpha-wave production. Similarly, changes in the autonomic nervous system would be due to this same dampening since ANS functioning is dependent upon midbrain excitation.

In addition to these two accounts of mediating mechanisms a third theoretical account seems possible. Considering that recent research has failed to show any significant differences between meditative techniques and control groups equated for credibility the techniques may not be responsible for the reputed effects. Instead, social influence and predispositional variables could be the most salient features mediating treatment effects. Since this possibility has important methodological

implications these points will be expanded upon in another section of this paper.

Special Theoretical Issues in Drug Consumption

Accounting for the therapeutic effects of yoga/meditation with the problems of excessive drug consumption and addictive behavior involves special theoretical consideration due to the indirect relationship between the two. Although some investigators contend that meditators are able to directly influence brain processes to relieve addiction or satisfy drug craving (Bourne, 1975), most contend that changes in drug consumption are an indirect result of more general personality development (Benson & Wallace, 1972). More recent research and theoretical speculation suggests that yoga/meditation may be effective in decreasing drug consumption by alleviating tension and/or negative affect which can often prompt drug consumption.

At the present time there is no single unified theory to account for the relationship between drug consumption and tension and negative affect. There are however suggestions that drug consumption is related to such dysphoric phenomena.

Through the technique of Goodman's log linear method, Paton, Kessler, and Kandel (1977) analyzed longitudinal data to clarify the relationship between

depressive mood and illicit drug use among 8,206 adolescents in secondary schools. Their data suggests that many adolescents begin to use marijuana in order to relieve depression. When marijuana use fails as a coping mechanism, they turn to other drugs with stronger effects. These drugs are continued over time with a lessening of depressive mood.

Negative affect also plays a prominent role in the development and maintenance of cigarette smoking. In a series of studies conducted to test the validity of self-report data on a questionnaire concerning Tompkins' typology of smoking, Ikard and Tomkins (1973) found the incidence of smoking to be significantly related to the experience of negative affect. Negative affect smoking entails smoking to avoid the negative feelings accompanying such events as loss, rejection, or anger.

The best statement regarding the relationship between alcohol consumption and stress is summed up in the tension-reduction hypothesis (Marlatt, 1976). Congruent with Hullian drive-reduction theory the tension-reduction hypothesis states that alcohol serves to reduce tension, and that the relief reinforces the drinking behavior. A corollary of this hypothesis states that the experience of tension or stress will increase the probability of drinking. Marlatt (1976) cites research to support

the notion that alcohol consumption is related to exposure to stressful situations.

It would be very simplistic to assume an invariant and direct causal relationship between tension and/or negative affect and drug consumption. Methodologically a host of problems complicate testing such a formulation, and some large assumptions must be made. For example, even if drugs do reduce tension and negative affect one cannot conclude that they are consumed because of this property. In addition, drugs are taken for many reasons other than to alleviate tension and negative affect, e.g., for creative exploration, rebellion against authority, and social conformity (Winslow, Hawkins, & Strachan, 1973).

In spite of these detractions there is the common element in the studies just cited that drugs are often consumed in the face of tension and negative affect. There is the strong likelihood that drugs are used as a coping mechanism, whether the drug is used as an antidepressant, an anxiolytic, or a general mood elevator. The key ingredient in this kind of drug consumption would seem to be the individual's ability to control a portion of his or her own experience through the self-administration of a drug. Often times this control is experienced through fantasy and themes of personal power.

Recognizing the relationship between control and alcohol consumption Marlatt (Marlatt & Marques, 1977) has theorized that meditation may provide an alternate coping mechanism to deal with stress. Citing the personality development literature reviewed earlier in this paper, Marlatt contended that meditation could lead to a greater sense of perceived self-control and inner directedness as measured by such tests as Rotter's Internal-External Locus of Control Scale and Shostrom's Personal Orientation Inventory. One possible consequence of such perceived self-control is that drug consumption will decrease as the practitioner's confidence and facility in alternative means of self-control are available.

Guidelines and Suggested Topics for Future Research

Credibility of Treatment Groups

A frequent issue arising out of reviews of the yoga/meditation literature is the need for control treatments and the therapists who administer them to be perceived as credible and authentic (McReynolds et al., 1973; Smith, 1975). Several elements have been identified to help promote such credibility, among these are the development of an elaborate and complex treatment and a comprehensive theoretical rationale. The significance of credibility becomes clearer when considering expectation of relief.

There is considerable evidence that even bogus treatments which promote expectation of benefit or relief are much more effective than treatments that are ordinarily respected and accepted, but do not promote such expectation (Borkovec, 1972; Rosen, 1976). Expectation of relief is enhanced not only by those elements which promote credibility, but also by claims of effectiveness, therapist enthusiasm and conviction, and signs that the treatment is working (Smith, 1976).

Expectation of relief has recently been assessed experimentally through the use of an expectancy questionnaire administered after training in TM and Progressive Relaxation, and then again after treatment (Zuroff & Schwarz, 1978). Results from this study showed that over time expectancy decreased for both groups, but was higher overall for the TM group. These findings were important in interpreting the greater benefit reported by the TM group since the groups were probably not comparably matched on this dimension.

Demand Characteristics

To assess possible demand characteristics one must ascertain what the subject thought the purpose of the study was and what the experimenters were hoping to find. This type of information is sorely lacking in the yoga/meditation literature. Orne (1962) has suggested that this can

be studied by checking the degree to which the subjects perception of the experiment correlates with his or her results in terms of the experimental variable.

Subjects and Recruitment

Subjects. As noted, the interpretation of results from many studies of yoga/meditation has been complicated by the choice of subjects. The use of subjects who are interested in or experienced in the practice of meditation contaminates the effect of the technique with multiple additional factors. These factors can include the social influence of other followers, the philosophical and religious beliefs associated with an organization, or the positive expectancy of change. While such factors are important ingredients to promote change they are less desirable for exploratory studies trying to establish therapeutic efficacy independent of such extratechnical factors.

One way to safeguard against these problems is to use naive subjects and randomly assign them to the different treatment groups.

Recruitment. Many studies have influenced their subject pool by advertising for volunteers for "an experiment concerning transcendental meditation . . ." (Zuroff & Schwarz, 1978, p. 265). Although such a solicitation

may appeal to a sample that is representative of individuals who might actually try such a technique outside of a research study this kind of solicitation also promotes the expectation that a subject will experience meditation. This creates problems, as it did for Zuroff and Schwarz (1978), when most of the experimental subjects volunteer hoping to be assigned to the meditation group and are disappointed when assigned to an alternate control group.

This problem can be partially avoided by collectively referring to the experimental techniques as relaxation techniques within the context of a general program for health promotion and personal development (Benson & Wallace, 1972; Weimar, 1973). Considering how frequently anxiety has been studied and the legitimate benefits which accrue from controlling anxiety, a program focusing on self-control techniques for stress and anxiety management would convey an essential element of the research, and protect the identity of the techniques. A similar method of introducing meditation to naive subjects interested in anxiety management was employed by Smith (1976).

Additional concerns arise when studying applications of yoga/meditation toward drug consumption. Studies which have utilized TM have included a 15-day drug-free period. As noted, this could be a deterrent to individuals not motivated to change or who are heavily dependent upon drugs. Restriction of subject pool to those willing to

abstain from drugs may create a selection pressure for individuals predisposed to alter their consumptive habits. It is also possible that an abstinence period could promote continued abstinence irrespective of treatment efficacy. One way around this problem is to avoid mandatory abstinence and select subjects who are not predisposed to change their habits. This was done by Marlatt and Marques (1977), who studied the impact of meditation on heavy social drinkers who had expressed no interest in changing their drinking habits. An additional tactic to avoid the compounding problem of motivation would be to not conspicuously target drug consumption as the dependent variable. Instead, drug consumption could be studied within the context of a non-specific health promotion program as another variable relevant to the self-control of stress and anxiety.

In light of these considerations it is important to work with subjects naive to the nature of the study with respect to the independent variable of yoga/meditation, and non-predisposed to alter their drug consumptive habits. Both of these objectives can be accomplished by soliciting for subjects to participate in a non-specific health promotion and personal development study concerned with self-control techniques to manage stress and anxiety. Whereas such a solicitation technique will probably appeal to individuals who might not be representative of those who

would seek out meditation on their own such a solicitation technique might also appeal to a more heterogeneous sample and allow for greater generalization of findings if yoga/meditation does produce changes on the dependent measures employed.

Suggested Topics for Future Research

In an effort to find out "does it work," empirical investigations of yoga/meditation seem destined to repeat the sins of a generation of psychotherapy outcome research by asking such amorphous questions. These questions are asked at the expense of questions seeking to identify what treatment is effective with whom under a given set of circumstances (Smith, 1976). Several pertinent questions presently face investigators studying applications of yoga/meditation. These questions include whether or not different techniques produce different responses which are clinically meaningful; and, what are the characteristics of individuals benefiting from meditative techniques versus those who drop out.

Treatment-response Specificity. A common assumption in the yoga/meditation literature is that different meditative techniques have similar mechanics and produce comparable outcomes (Mills & Campbell, 1974). Most investigators have been content to grossly characterize meditation as a state of deep physiological relaxation

with little attention to detail and response specificity. Recently though, Corby et al. (1978) demonstrated that a range of physiological responses can be evoked depending upon the proficiency of the meditator. In their study proficient meditators displayed autonomic activation in contrast to the usual autonomic relaxation. It is interesting to speculate whether these differences in autonomic arousal could have clinical implications.

One study which indirectly addressed this issue was conducted with different relaxation techniques. In this study Parker, Gilbert, and Thoreson (1978) compared the effect of progressive relaxation training, meditation training, and quiet resting on measures of state anxiety and autonomic arousal. Thirty alcoholic subjects from a Veterans Administration substance abuse program were randomly assigned to one of these groups for three weeks. Whereas all three treatments significantly reduced state anxiety, only progressive relaxation reduced blood pressure. Significantly though, meditation training induced blood pressure decreases at an earlier point in the 3-week training period and affected decreases in systolic blood pressure that progressive relaxation training did not. These results suggest that there is considerable specificity of response to relaxation techniques.

If there are demonstrably different physiological responses with different yoga/meditation techniques, it is

also possible that different techniques may be best suited for different psychotherapeutic applications as well. It is conceivable that one technique might promote greater anxiety reduction while another promotes greater intra-personal insight. Questions of this nature might best be addressed through studies with clinical populations.

Characteristics of Continuers and Dropouts.

a single empirical study has attempted to characterize subjects who benefit from the practice of meditation. Smith (1976), in a study comparing the anxiety reducing properties of TM and a pseudotreatment, Periodic Somatic Inactivity (PSI), found that there was virtually no overlap in the set of variables correlated with outcome and continuation for the different treatments. Smith concluded that differing treatment rationales rendered the treatments appealing, credible, and effective for different types of individuals. Based upon responses to the 16PF Questionnaire (Cattell, Eber, & Tatsuoka, 1970), individuals who continue and benefit from TM score high on schizothymia and autia which are associated with introversion and an interest in "art, theory, basic beliefs," and "spiritual matters." Those who continue with and benefit from the pseudotreatment, PSI, score high on shrewdness. Shrewdness is associated with an exact calculating mind and a tendency to be emotionally detached, ambitious, and esthetically fastidious. These differences are consistent

differences in the treatment rationale: TM was presented as a spiritual philosophy and relied heavily on visual "artistic" metaphors, while the PSI rationale was highly intricate and mechanistic.

Significantly less data were available to characterize subjects who do not benefit from TM and dropout. Based upon self-report measures, Otis (1974) found that subjects discontinuing meditation have a negative self-image. Similar results were found by Smith (1978), who found TM discontinuers to be more disturbed and less self-critical.

Unfortunately, there is no way to utilize what little is known about continuers and dropouts to maximize the probability of treatment success. This is an important issue sorely in need of investigation. The seriousness of the problem is suggested by several studies reporting meditation drop-out rates of 30-50% (Otis, 1974; Smith, 1976). Additional studies have failed dismally after attempting to introduce meditation to unmotivated, nonpredisposed subjects such as high school students (reported by Bourne, 1975) or a group of heroin users (Anderson, 1977).

Other problems arise when attempting to maintain therapeutic gains following the successful practice of meditation. In a study with heavy social drinkers who had successfully decreased drinking behavior, Marlatt and

Marques (1977) found that original drinking patterns were resumed and regular practice discontinued immediately following the study's termination.

Future research should be sensitive to the need for more information about the characteristics of subjects benefiting from and continuing with the practice of meditation versus those who dropout. However the search for mediating variables is not assisted by the present empirical literature. Extensive psychological batteries have met with limited successs (Smith, 1976), and could probably be abandoned, at little expense, in favor of a detailed personality inventory.

Yoga, Anxiety, and Drug Consumption

Study Overview

To study the potential therapeutic application of yoga/meditation and to better understand the characteristics of people who might benefit from such techniques, an additional study was conducted. This study compared the effects of Yoga and Progressive Muscle Relaxation, with controls for attention placebo and no treatment, on measures of anxiety, personality development, and drug consumption. Every effort was made to match the three experimental treatment groups in as many ways as possible and an expectancy questionnaire was used to assess non-specific expectation of relief both before and after

treatment. In addition to the pretreatment assessment of anxiety, personality development and drug consumption a detailed personality inventory was administered to help relate personality traits with treatment outcome. Following a 2-week baseline phase to determine pretreatment drug consumption subjects were randomly assigned to one of three experimental treatment groups or to a fourth no-treatment group for a 6-week treatment phase. Throughout the treatment phase subjects maintained detailed drug consumption diaries. Subjects in the experimental groups also rated the quality of relaxation at the end of each practice session. All subjects were naive and nonpredisposed to change their drug consumption habits. Following this treatment phase all subjects were readministered the aforementioned tests and questionnaires, with the exception of the personality inventory, along with a scale to assess relaxation benefits and several brief, open-ended, essay questions to detect demand characteristics.

Treatment Groups

Yoga. This group took classes in Kundalini Yoga twice weekly. These classes were held several times each day at the Maha Deva ashram which is located within easy walking distance of The University of Arizona. Yoga classes consisted of physical exercises, breathing exercises and meditative techniques as outlined in manuals

published by the Kundalini Research Institute (Khalsa, 1978, -b). Classes were taught by Ashram staff on a rotating basis. All staff have had experience in teaching Kundalini Yoga and practice on a daily basis.

Progressive Muscle Relaxation. This group took classes in Progressive Muscle Relaxation (PMR) twice weekly. These classes were held in the Psychology Clinic at The University of Arizona and were taught by a Masters level graduate student in psychology. Classes consisted of a series of guided exercises aimed at achieving deep relaxation following tension-release cycles in 16 muscle groups. Standardized instructions for teaching PMR, as well as a credible treatment rationale, were adapted from Bernstein and Borkovec (1973).

Progressive Muscle Relaxation offered a good control for the effectiveness of Yoga since previous research has demonstrated that PMR produces changes comparable to meditation on measures of drug consumption and psychological functioning (Marlatt & Marques, 1977). In addition, PMR produces physiological changes comparable to Yoga and meditation techniques (Benson et al., 1974; Beary et al., 1974; Paul, 1969).

Attention-Placebo Control. This group, referred to as Psycho-physiological Relaxation (PPR), was included to control for the nonspecific effects of treatment, such

SCHEMATIC OF GENERAL EXPERIMENTAL DESIGN					
	16PF STAI Locus of Control Drug Survey	Drug Diary	Expectancy Questionnaire	Quality of Relaxation Record Drug Diary	Expectancy Questionnaire STAI Locus of Control Followup Question
YOGA	X	X	X	X	X
PMR	X	X	X	X	X
PPR	X	X	X	X	X
NO-TX	X	X		(drug diary only)	(except followup & expectancy question)
	Pre-test	Baseline 2-weeks	Intro. Lecture	Treatment Period 6-weeks	Followup Posttest

Figure 1. Overview of study

as those due to: (1) contact with an instructor during training; (2) demand characteristics; (3) subject's expectations of change; and (4) regular periods of sitting devoted to self-change. The technique used was similar to that developed by Smith (1976), who used a pseudo-treatment referred to as Periodic Somatic Inactivity. PPR was presented as a very complex treatment intended to be credible as a relaxation technique and to parallel the "active treatments" in as many superficial ways as possible. To develop such an Attention-placebo group several diverse elements were brought together. For a credible rationale Goleman's (1971) notion of the "psychophysiological principle" was adapted to explain how the mind and the body are in constant interaction and capable of beneficially influencing each other during states of relaxation. To develop the technique of PPR Smith's (1976) attention-placebo strategy of having subjects generate positive thoughts and images was wed to Maupin's (1965, 1969) discussion of experimental meditation. Experimental meditation often makes use of a focus, such as music, to help induce restful, relaxed states. In essence, then, students were asked to generate positive thoughts and images while listening to quiet and melodic music. Students were encouraged to not concentrate on any single thought, but to allow their minds to wander freely from one positive thought to the next. When

subjects found this difficult to do or were preoccupied by negative thoughts they were told to not analyze the experience but to simply accept it and begin the relaxation techniques again.

Subjects in this group took classes twice weekly. The group was taught by the author who expected the treatment to be effective in producing change on the dependent measures for some of the subjects in the group.

Attention-placebo groups such as PPR are important controls since a number of other studies have found them to be at least as effective as the "active" treatments investigated (Marlatt & Marques, 1977; McReynolds et al., 1973; Smith, 1976).

No-treatment Control (NO-TX). This group participated in all assessment procedures, with the exception of relaxation ratings and the expectancy questionnaire, as well as weekly diaries of drug consumption. Subjects in this group were informed that the treatment groups were full for the time being and that their continued participation was desired until additional relaxation classes were available in 6 weeks. Following the posttreatment assessment all members of this group were offered Yoga.

This condition was included to assess the effects of: (1) spontaneous changes in drug consumption and psychological functioning due to passage of time;

- (2) repeated administration of assessment procedures;
- (3) self-monitoring of drug consumption.

Hypotheses

The following hypotheses were investigated by the present study:

1. The three experimental treatments would be perceived as comparably credible as assessed by an expectancy questionnaire administered immediately after training and at the conclusion of the 6-week treatment phase.
2. Participation in one of the three experimental treatments would be significantly correlated with pretest-posttest outcome differences on measures of anxiety, personality development, and drug consumption.
3. Successful treatment outcome, as defined by pretest-posttest differences on the measure of anxiety just cited, would correlate significantly with personality factors measured by a detailed personality inventory and help define specific personality characteristics associated with treatment success.
4. Proposed decrements in drug consumption over the course of the study would correlate with (a) a more internal frame of reference, as determined by pretest-posttest decrements on the Locus of

Control Scale, and/or (b) mean weekly relaxation ratings (in the event that consumption decrements are mediated by the ability to produce greater relaxation).

5. Mean group ratings on the perceived benefit of practice scale will not differ significantly for the three experimental groups.

CHAPTER 2

METHODS

Subjects

Subjects were recruited from introductory psychology classes at The University of Arizona, Tucson, to participate in a study of self-control techniques to manage stress and anxiety. No mention of the study's additional foci of personality development and drug consumption was made, nor were specific self-control techniques identified. Each class was given a brief 5-minute presentation discussing the negative impact of stress and anxiety in personal and professional endeavors and the value of self-control. Students volunteering for the study were offered extra-credit points, which could be applied to their class grade, as well as detailed feedback about the study's findings following its conclusion.

A total of 103 subjects expressed interest in the study and completed some portion of the pretreatment orientation and assessment. Of these 103 subjects, 47 completed the entire study. Eleven subjects who completed the pretreatment orientation and assessment and were assigned to a group dropped out before the study's completion. An additional 10 subjects with previous meditation

and/or yoga experience completed the study. Previous experience was defined as any practice of a meditation technique or yoga exercise. Mean age was 20.

Procedure

Pretreatment Orientation and Assessment

Student volunteers were met individually by research assistants who described the study in detail, assured confidentiality, and administered a battery of tests and questionnaires. In addition to providing demographic data subjects filled out the 16PF Questionnaire (Cattell et al., 1970), Internal-External Locus of Control Scale (Rotter, 1966). STAI trait form (Spielberger et al., 1970), and a Drug Consumption Inventory (DCI) developed by the author. The DCI was designed to gather drug consumption information within the context of a questionnaire addressing a variety of life-style issues, such as diet, exercise, and sleeping habits. This questionnaire was modeled after the Community Wellness Survey of Project West Pinal conducted by the Addiction Studies Department at The University of Arizona. These life-style issues were consistent with the reputed focus of the study which was to manage stress and anxiety (a copy of the DCI is in Appendix A). The DCI also asked students to identify if they had had any previous experience with yoga, meditation, or Progressive Muscle Relaxation. All subjects

were assigned individual I.D. numbers based upon the six digits of their birth date.

The 16PF Questionnaire was administered pretest only. Smith's research (1976, 1978) suggests that this measure may be useful to identify mediating variables that correlate with outcome and continuation for each experimental technique. The STAI trait form was included to assess the degree to which reductions in trait anxiety were associated with the experimental techniques employed here. This measure has been widely employed in the empirical meditation literature and is the dependent measure of greatest significance in the present study (Shapiro & Giber, 1978; Smith, 1975). Rotter's Locus of Control Scale was included to test Marlatt's (1976) hypothesis that the development of an internal frame of reference may mediate reductions in anxiety and drug consumption.

Baseline and Treatment

Immediately after completion of the pretreatment assessment subjects were given instructions in use a weekly drug diary. This diary was developed by the author so that subjects could monitor their drug consumption on a daily basis throughout the study (a copy of the drug diary appears in Appendix A).

Each drug diary was composed of a list of 15 drugs, such as alcohol, caffeine, and marijuana, and

similar to the list of drugs subjects were queried about in the DCI. For each drug listed there were corresponding spaces for subjects to note their daily consumption of each substance. For most drugs mean daily consumption was computed in the form recorded, such as cups of coffee, or number of cigarettes. In the case of alcohol, though, the consumption of beer, liquor, and wine was converted to a single score expressed in grams per liter of alcohol, according to the formula worked out by Gibbins et al. (1974) (for example, one 12 oz. can of 3.5% beer = 9.8 g/L, whereas one 8 oz. glass of 11.5% wine = 21.57 g/L). Some simplifying assumptions were made in the case of several drug classes, such as caffeinated products, marijuana, and cocaine, because it was not practical to precisely determine quantity or potency of the drugs reported. Therefore, no effort was made to quantify these substances beyond such crude measures as cups of coffee or "lines" of cocaine. In the case of marijuana it was also necessary to employ conversions since some subjects recorded use in terms of "bowls" or "hits" and did not record use in terms of joints (for our purposes one "bowl" = .5 of a joint, whereas one "hit" = .2 of a joint). All other licit and illicit drugs were recorded in terms of pills.

After learning how to use the drug diary, subjects began a 2-week baseline phase to determine pretreatment

mean daily drug consumption. During this time subjects had contact with research assistants on a weekly basis to exchange drug diary forms. At the end of this baseline phase subjects were randomly assigned to one of four groups; Yoga, Progressive Muscle Relaxation, attention-placebo control, or no-treatment control. Each subject received a letter informing them of their group assignment and, with the exception of the NO-TX group, asking them to attend a 1-hour introductory lecture concerning their group. The NO-TX group was told that all groups were presently filled and that their continued participation was desired until additional groups opened in 6 weeks.

Only subjects who attended the introductory lecture were allowed to remain in the study. All introductory lectures consisted of a 20- to 30-minute discussion of the treatment's rationale and claims of effectiveness, a 15-minute practice session of the respective technique, and a 10- to 15-minute question and answer period. Each lecture was presented by the teacher responsible for the group. Every effort was made to match the lectures in terms of complexity of structure and personal benefits of such treatment in terms of reduced stress.

At the conclusion of the introductory lecture subjects were shown how to record their class attendance by signing a class roster and by having special I.D. cards initialed. Subjects were also shown how to fill out

relaxation records which were to be filled out immediately following each class for the duration of the study. Relaxation records consisted of a 7-point scale to indicate the degree of relaxation. The scale extended from "very tense" (-3) to "very relaxed" (+3). Subjects were told to consider the "0" point on the scale equal to the level of relaxation normally experienced while just sitting quietly. In addition, subjects filled out an expectancy questionnaire, similar to the one developed by Zuroff and Schwarz (1978). This questionnaire (refer to Appendix A) was designed by the author to assess non-specific treatment effects which occur independently from the practice of a technique. The expectancy questionnaire included 25 potential benefits that subjects rated on an 11-point scale (0%-100%, in 10% intervals) for the likelihood that regular practice would lead to that benefit. These ratings were then summed up to yield a total expectancy score. The items were drawn from four general areas of potential benefit: in the subject's emotional lives, achievements, interpersonal relations, and health.

Treatment and Posttest

During the 6-week treatment phase subjects attended two classes each week. Following each class subjects signed an attendance roster, had their I.D. cards initialled by their teacher, and determined their

perceived level of relaxation on the 7-point scale already described. Subjects continued to fill out the weekly drug diary and dropped off completed forms in the Psychology Clinic of The University of Arizona. Subjects who failed to attend class or turn in the weekly drug diary were contacted by a research assistant and encouraged to remain in the study and comply with the study's format. Research assistants also regularly attended the different classes to verify that classes were being taught properly and that instructors were not inadvertently discussing issues relevant to the experimental design of the study.

Following the 6-week treatment phase subjects received letters informing them of the study's conclusion and asking them to attend a posttest session. As a part of the posttest session subjects were asked to complete the STAI trait form, Locus of Control Scale and expectancy questionnaire to determine if any change on these measures could be correlated with participation in a treatment group. In addition, subjects were asked to complete a scale to assess the meaningfulness of any relaxation benefits, and a brief essay to assess demand characteristics of the study. To assess perceived benefit subjects were asked to rate, on a 5-point scale, how much benefit they had gained in each of eight areas: academic performance, interpersonal relations, health, condition of body and nervous system, drug usage, energy and vitality, overall happiness,

anxiety level, and self-esteem (refer to Appendix A). The first, third, and fifth points on the scale were labeled "not at all," "a moderate amount," and "a great deal," respectively. Mean ratings for each group were computed by summing across the categories and dividing by group size. A measure of perceived benefit is important to verify that any changes on the dependent measures were of personal value as well as statistically significant. The eight areas chosen were consistent with the reputed focus of the study. Subjects in the NO-TX group did not fill out the perceived benefit scale or the expectancy questionnaire.

To assess possible demand characteristics each subject was asked to indicate what he/she thought was the purpose of the study, and what results the experimenter was hoping to find. On the basis of their response to these items, subjects were divided into three levels of awareness: (1) "aware" subjects, who indicated that the experimenter was looking for decrements on the STAI trait form, Locus of Control Scale, or drug consumption diary; (2) "partially aware" subjects who stated that the experimenter was hoping to find effects of relaxation on one of the above dependent variables, but did not indicate the expected direction of these effects; and (3) "unaware" subjects, who did not know the purpose of the study or simply reiterated the experimenter's stated purpose of the

study, which was to examine the impact of relaxation techniques on stress.

CHAPTER 3

RESULTS

A total of 47 subjects completed the entire study. The distribution of these subjects among the study's four treatment groups, as well as subjects who prematurely terminated or had previous experience is presented in Table 1. Subjects in the Yoga group attended an average of 12 classes over the 6-week treatment phase, while subjects in the PMR and PPR attended an average of 10 and 11 classes, respectively. Overall, there was a 16% attrition rate with a maximum of 25% attrition for the NO-TX group (4), and a minimum of 10% for the PMR group (2). The total number of premature drop-outs totalled 11. Each group also had 1 to 4 subjects with previous meditation or yoga experience, for a total of 10 subjects with previous experience. Data for subjects with previous experience and for subjects who prematurely terminated will be presented separately later in this chapter.

Table 2 presents the pretest and posttest means and standard deviations of the expectancy questionnaire, Locus of Control Scale, and STAI trait form for each Group. The NO-TX group does not have expectancy values since this group was not in an experimental treatment condition.

Table 1. Distribution of subjects among the study's four groups, as well as subjects who prematurely dropped out or had previous experience. -- Subjects lost before assignment did not complete pretreatment assessment and voluntarily discontinued.

Total Inquiries	<u>Ss Lost</u> Before Group Assignment	Total N Assigned	Yoga	PMR	PPR	NO-TX	ALL
103	35	68	17	19	16	16	68
		Ss Completing Study	12	14	10	11	47
		Premature Drop outs	3	2	2	4	11
		Previous Experience	2	3	4	1	10

Table 2. Pretest and posttest means and standard deviations for Yoga, PMR, PPR, and NO-TX groups on measures of Expectancy, Locus of Control, and STAI Trait Form

Statistics	Group			
	Yoga (n=12)	PMR (n=14)	PPR (n=10)	NO-TX (n=11)
<u>Expectancy</u>				
Pretest				
M	90.83	218.50	97.55	
SD	50.30	161.06	62.12	
Posttest				
M	83.33	239.21	119.00	
SD	55.41	276.24	30.69	
<u>Locus of Control</u>				
Pretest				
M	9.75	10.36	10.80	10.82
SD	4.63	3.03	5.71	2.93
Posttest				
M	7.83	9.57	10.30	9.73
SD	4.15	4.59	5.44	3.13
<u>STAI Trait Form</u>				
Pretest				
M	42.58	44.07	43.90	39.45
SD	10.40	8.09	7.43	9.09
Posttest				
M	37.92	37.86	38.50	40.91
SD	9.67	7.65	9.25	6.42

An Analysis of Variance for Repeated Measures revealed a significant group effect on the expectancy measure ($F(2,32) = 8.13, p = .001$). This suggests that the groups may not have been comparable in terms of nonspecific treatment effects.

Post-hoc analyses of pretest expectancy means revealed that the PMR mean was significantly higher than the Yoga mean ($t(24) = 2.63, p = .01$), as well as the PPR mean ($t(22) = 2.27, p = .02$). Post-hoc comparisons of posttest expectancy means revealed that both PMR ($t(24) = -1.92, p = .05$) and PPR ($t(19) = -1.73, p = .05$) were significantly higher than Yoga.

Analysis of Variance for Repeated Measures also revealed significant treatment effects on the STAI trait form ($F(1,43) = 8.59, p = .005$), and the Locus of Control Scale ($F(1,42) = 4.77, p = .03$). Neither analysis revealed a significant interaction effect. Pretest and posttest means for STAI and Locus of Control are presented in Figures 2 and 3, respectively. Contrary to what these figures suggest, there were no significant differences between any of the group means at pretest or posttest on the STAI or Locus of Control Scale. Since none of the treatment means differed from the no-treatment mean there will be no discussion of individual treatment means and their possible meaning. Interestingly though, pretest-post test differences on the STAI are in the direction

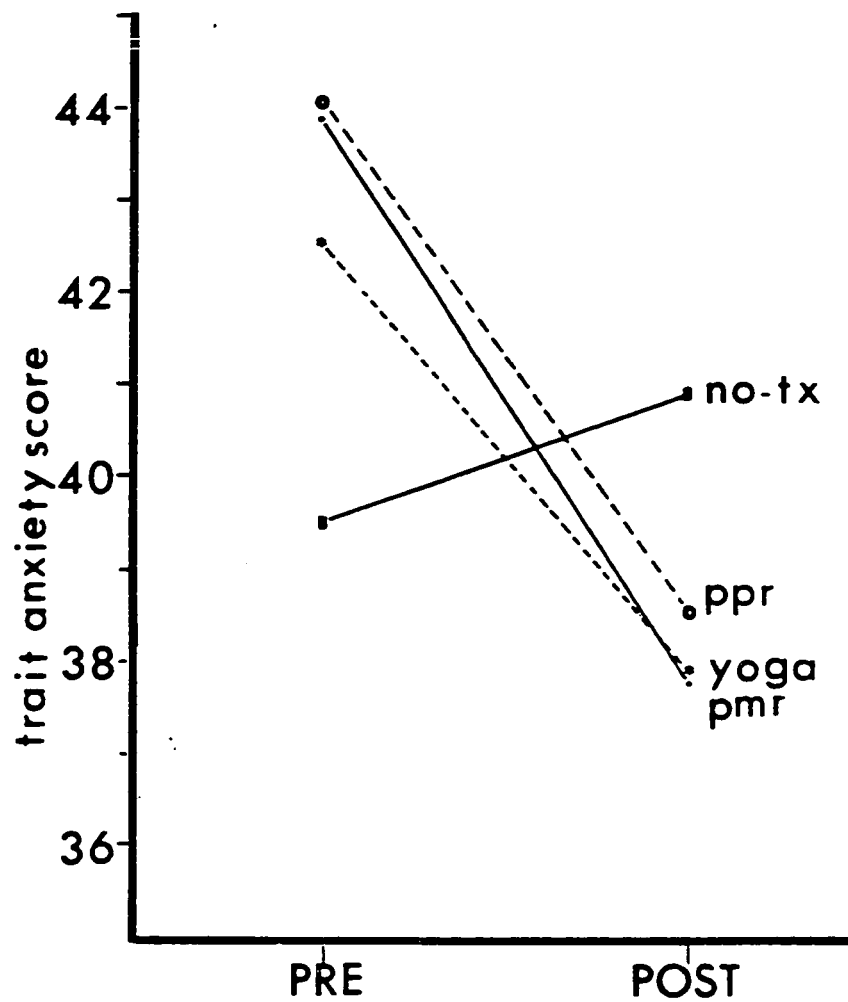


Figure 2. Pretest and posttest scores for experimental and control groups on the A-Trait Scale of the Spielberger STAI. -- lower scores indicate a lower level of trait anxiety.

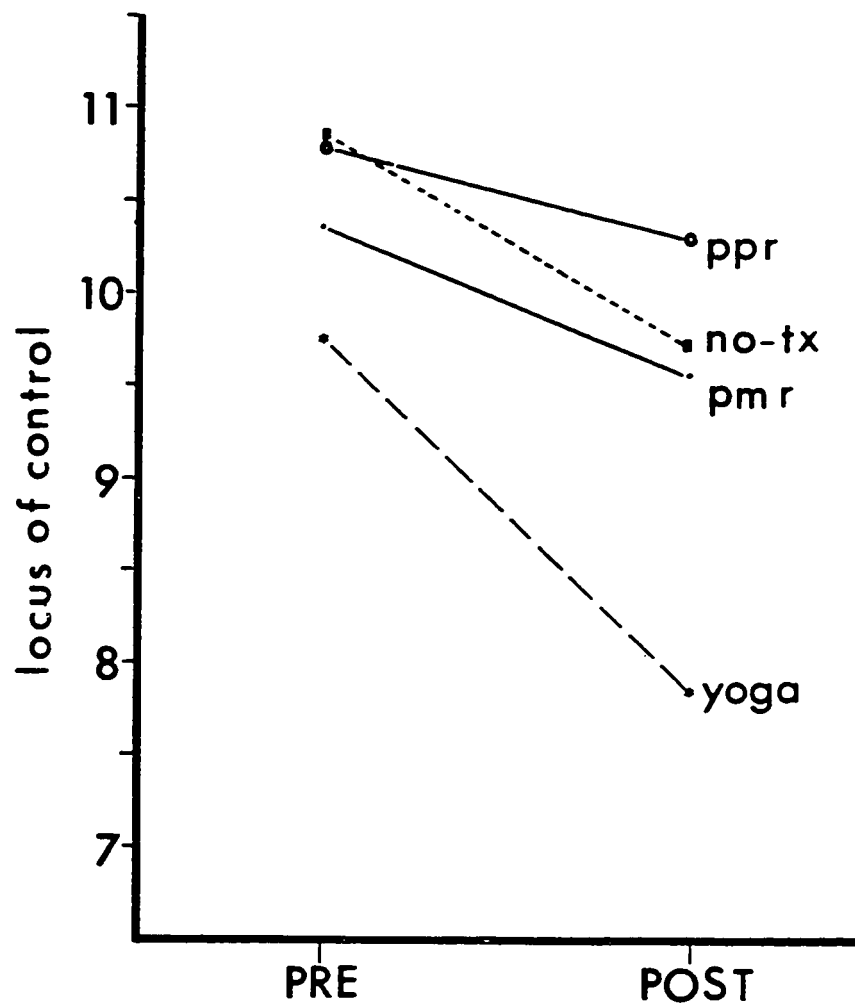


Figure 3. Pretest and posttest scores for experimental and control groups on Rotter's Internal-External Locus of Control Scale. -- Lower scores indicate a more internal locus of control.

anticipated. Collapsing across the experimental groups the average pretest-posttest decrease in 5.43, compared to a 1.45 increase for the NO-TX group. Within group comparisons of each group's pretest and posttest mean were significant only for the PMR group on the STAI trait form ($t(13) = 2.88, p = .01$).

Table 3 presents the mean daily consumption values for the seven most commonly reported drugs. "Pre" mean daily consumption levels refers to consumption during the baseline phase (average number of days of baseline = 11 days), whereas "post" mean daily consumption levels refers to consumption levels during the last 2 weeks of the treatment. Although the data analysis utilized all 6 weeks of data from the treatment phase only the last 2 weeks are presented.

With the exception of antidepressants, all of the drugs in the drug diary were consumed by at least one subject at some time during the study. The seven drugs presented in Table 3 were the most commonly consumed drugs and drugs for which an Analysis of Variance for Repeated Measures was possible. There were no significant changes in the mean daily consumption of these seven drugs. All other drugs in the drug diary had too few subjects reporting their consumption to permit statistical analysis. Considering this lack of significance no further analyses with the drug consumption data will be performed.

Table 3. Mean daily drug consumption during baseline ('Pre') and during the final two weeks of treatment ('Post')

Substance	Group	n	%N	'Pre'	'Post'
Alcohol (grams/liter)	Yoga	9	75	11.98	15.99
	PMR	4	28	3.20	0.31
	PPR	5	50	14.70	10.97
	NO-TX	8	73	18.01	18.40
	ALL	26	55	13.01	13.35
Analgesics	Yoga	4	33	0.38	0.00
	PMR	3	21	0.07	0.09
	PPR	1	10	0.71	0.00
	NO-TX	5	45	0.09	0.03
	ALL	13	28	0.22	0.03
Cigarettes	Yoga	4	33	8.94	8.41
	PMR	0	0	0.00	0.00
	PPR	2	20	5.14	3.03
	NO-TX	5	45	2.59	1.06
	ALL	11	23	5.36	4.09
Coffee (cups)	Yoga	9	75	0.59	0.46
	PMR	4	28	0.55	0.82
	PPR	6	60	0.82	1.02
	NO-TX	3	27	1.12	0.55
	ALL	21	45	0.72	0.69
Cola (12 oz. can)	Yoga	8	67	0.66	0.83
	PMR	7	50	0.95	0.50
	PPR	5	50	0.98	1.19
	NO-TX	7	64	1.33	0.57
	ALL	27	45	0.97	0.74
Tea (cups)	Yoga	7	58	1.31	0.47
	PMR	8	57	0.67	0.60
	PPR	6	60	0.42	0.18
	NO-TX	8	73	0.57	0.34
	ALL	29	62	0.74	0.41
Marijuana (joints)	Yoga	2	17	1.12	0.39
	PMR	1	7	1.00	0.49
	PPR	2	20	0.21	0.07
	NO-TX	6	54	0.87	0.14
	ALL	11	23	0.81	0.27

Personality variables associated with successful relaxation practice were determined by correlating the pretest 16PF Questionnaire personality factors with treatment outcome. Treatment outcome is defined as the difference between pretest and posttest STAI scores. The following treatment outcome-personality factor correlations were obtained: Yoga outcome correlated with High Intelligence (Factor B: $r = .618$, $p = .02$); PMR outcome correlated with Guilt Proneness (Factor O: $r = .664$, $p = .01$) and High Ergic Tension (Factor Q_4 ; $r = .749$, $p = .001$); and PPR outcome correlated with Ego Weakness (Factor C: $r = -.670$, $p = .02$) and Parmia (Factor H: $r = .725$, $p = .01$).

Table 4 presents the pretest and posttest means and standard deviations for the expectancy questionnaire, Locus of Control Scale, and STAI trait form of subjects who prematurely dropped out or had previous experience practicing yoga and/or meditation. Data for drop outs is presented along with the means and standard deviations of all other subjects completing the study. There were no significant differences between these two groups on any of the dependent measures. Similarly, data for subjects with previous experience is presented along with the pretest means and standard deviations of all other subjects without previous experience. There were no significant differences between these two groups either.

Table 4. Pretest means and standard deviations for drop outs vs. continuers, and subjects with previous yoga/meditation experience vs. inexperienced subjects on measures of Expectancy, Locus of Control, and STAI Trait Form

Statistic	Group		
	Drop out (n=11)	Continuer (n=57)	Previous Experience (n=10) Inexperienced (n=47)
Expectancy			
M	165.45	107.35	100.20
SD	323.48	115.18	68.59
Locus of Control			
M	10.18	10.28	9.2
SD	3.82	4.05	4.37
STAI Trait Form			
M	40.45	42.32	41.10
SD	14.38	9.40	8.70
			108.87
			175.71
			10.51
			3.99
			42.57
			8.74

Table 5 presents the mean weekly quality of relaxation scores for the three experimental groups over the 6-week treatment phase. The NO-TX group did not record quality of relaxation scores. An Analysis of Variance for Repeated Measures did not detect any significant differences between groups or over time. A trend analysis did reveal a significant linear trend ($F(1,33) = 5.94, p = .02$). Mean scores for each group displayed a similar pattern over the 6 weeks. Following Week 1 mean scores declined during Weeks 2 and 3, with the overall lowest score usually occurring during Week 3. Following Week 3 scores increased to their maximum value during Week 5 or 6.

Table 5. Mean weekly quality of relaxation scores over the 6-week treatment phase and mean relaxation benefit scores

Week	Group			
	Yoga	PMR	PPR	ALL
1	1.21	1.28	1.12	1.21
2	1.04	1.39	1.15	1.21
3	1.08	1.23	0.90	1.09
4	1.48	1.61	1.53	1.55
5	1.46	1.71	1.85	1.45
6	1.35	1.83	1.50	1.58
Relaxa- tion Benefit	24.25	21.64	28.00	

Mean relaxation benefit scores are presented in Table 5. Relaxation benefit was assessed at follow-up and was designed to be a measure of perceived benefit from practicing a relaxation technique.

Responses to the essay questions to determine demand characteristics indicate that two subjects could be classified as being "aware" of at least one of the study's hypotheses, and two more were "partially aware." There was one "aware" subject in both the Yoga and PPR groups. These subjects speculated that one of the study's hypotheses was that drug consumption decrements would result in greater relaxation. Both "partially aware" subjects came from the NO-TX group. One of these subjects indicated that drug consumption probably has some affect upon stress, and the other subject indicated that an external frame of reference probably has some affect upon stress. All remaining subjects were "unaware" of the experimenter's hypotheses. Table 6 summarizes the data presented in this chapter.

Table 6. Data summary. -- All significant outcomes are indicated by probability values. NS = not significant.

Measure	Anova for Repeated Measures			Post Hoc Analysis			Miscellaneous
	Group	Treatment	Interaction	Between Groups	Within Group	Comparison	
				Comparison	Comparison		
Expectancy	.001	NS	NS	<u>Pretest</u> PMR Yoga .05 PMR PPR .02			
				<u>Posttest</u> PMR Yoga .05 PPR Yoga .05			
STAI	NS	.005	NS	NS	PMR .05		
LOCUS	NS	.03	NS	NS	NS		
Drug Consumption	NS	NS	NS				
16PF-STAI Treatment Outcome Correlations						Yoga: Factor B, .02 PMR: Factor O, .01 Factor Q4, .001 PPR: Factor C, .02 Factor H, .01	
Premature Dropouts vs. Continuers						NS	
Previous Experience vs. No Experience						NS	
Quality of Relaxation	NS	NS	NS				
Relaxation Benefit						Linear Trend, .02	
						NS	

CHAPTER 4

DISCUSSION

Within the last 15 years a large number of empirical investigations have explored the psychotherapeutic applications of meditative techniques. Whereas early research was optimistic and favorable to meditation more recent research has been skeptical and has failed to distinguish the efficacy of meditative techniques relative to other relaxation techniques, such as muscle relaxation, or attention-placebo control groups. This research expands upon previous efforts in this area by comparing Kundalini Yoga with Progressive Muscle Relaxation and an Attention-Placebo Control on measures of anxiety, personality development and drug consumption. Without exception this research failed to find any significant treatment effects attributable to the practice of Kundalini Yoga. Moreover, none of the experimental treatment groups studied here displayed treatment gains over and above a no-treatment control group.

There are at least two ways to account for this lack of significant differences. On the one hand, one could assert that the treatment groups were somehow impotent and incapable of effecting change any better than the nonspecific treatment factors working for the no-treatment group;

or, on the other hand, one could assert that the treatment groups were indeed therapeutic, but not significantly so due to too brief of an intervention phase, and/or due to the highly variable treatment response of a nonpredisposed subject pool. This latter possibility suggests the need to more precisely define the characteristics of those subjects who would benefit from such techniques.

Before exploring these issues, though, one important disclaimer must be made. Immediately following the posttreatment assessment, it came to the author's attention that drug consumption and attendance data for several subjects in the PPR group had been falsified by the research assistant responsible for that group. Although the assistant claims to have corrected all falsified data following its discovery, and no other tampered data could be found by the author, the reader should bear this problem in mind when reading this report.

One of the first questions to arise in interpreting the data is whether or not the treatment groups were somehow impotent or ineffectual from the start. The answer to this question is somewhat equivocal. According to Smith (1976), effective treatments combine at least several of the following conditions:

1. the treatment is taught by a person who believes it is effective;
2. the treatment is complex and highly structured;

3. claims of effectiveness and a plausible and comprehensive theoretical rationale are supplied; and
4. the person receiving the treatment receives what he/she believes to be signs that the treatment is working for him/her.

While every effort was made to insure that conditions 1, 2, and 3 were met, it is unclear how successful we were. With regards to condition 2 there is better support for the contention that these treatments were at least modestly effective.

To assess how effectively conditions 1, 2, and 3 were met, we can turn to the expectancy questionnaire data. The expectancy questionnaire was administered following the introductory lecture (pretreatment) when subjects had only a superficial familiarity with their group, and then at posttest following 6-weeks of practice. At the first administration subjects' impressions of their group are most likely determined by the instructor's enthusiasm and presentation style, the rationale of the technique and whatever independent information they may have about the technique. At posttest these initial impressions can be contrasted with the "hands-on experience" of the treatment phase to determine if the treatment remains credible.

According to the expectancy questionnaire means, the groups were probably not comparable in terms of these nonspecific treatment effects. The Yoga group appears to

have had the least credibility of the three groups as defined by:

1. a significantly lower pretreatment mean in relation to PMR,
2. a significantly lower posttreatment mean in relation to PMR and PPR, and
3. a decrease in expectancy from pretreatment to posttreatment not displayed by PMR and PPR.

This is surprising in light of what would seem to be some initial nonspecific treatment advantages for Yoga, such as highly dedicated and proficient teachers, a comprehensive life style that models self-control and restraint, and the Ashram milieu. It is equally plausible though that these initial "advantages" worked against the treatment credibility of the Yoga group due to novelty of the teachings, life style, and setting, which are at considerable variance with contemporary culture. For at least some of the students these were important stumbling blocks. Anecdotally, several of the students in the Yoga group expressed their discomfort about the theistic overtones of some classes and the physical rigor of the Yoga practices. The significance of treatment credibility has already been underscored by Borkovec (1972) and Rosen (1976). Without such treatment credibility even treatments which are ordinarily respected and accepted are not effective, while bogus treatments engendering such credibility are.

Progressive Muscle Relaxation and Psycho-physiological Relaxation appear to have not had the credibility problems encountered by Yoga. Although PMR was rated as more credible than PPR at pretest, both groups displayed increases on the expectancy measure at posttest and were not statistically distinguishable from each other at that time. The increase in expectancy suggests that subjects' pretest expectation of relief was substantiated through practice and that they were confident that continued practice would be effective in combating stress. A word of caution is in order, though, in interpreting the expectancy questionnaire data so literally. Considering that there are no reference standards against which to compare the obtained expectancy means it is difficult to assess their meaning aside from their relative standing.

Progressive Muscle Relaxation's ability to engender an expectation of relief is consistent with previous studies reported in the literature (Bernstein & Borkovec, 1973). This is understandable considering the PMR had an important treatment advantage with the standardized instructions and treatment rationale provided by Bernstein and Borkovec (1973). Although there are indications that a physiological approach, such as PMR's, sounds credible to people in our culture (Peele, 1981), it is unlikely that this was sufficient in and of itself since PPR was also patterned after such an approach. The critical difference between the two

was that even though they both talked in physiological terms only PMR targeted the body as the vehicle for relaxation. This provided physically tangible evidence of relaxation soon after beginning practice. Psycho Physiological Relaxation, on the other hand, talked in physiological terms, but relied more on cognitive diversions to make quiet periods of sitting more palatable. Based upon the posttest expectancy measure, and anecdotal reports within the group, this was effective in promoting relaxation, but required a longer demonstration period than PMR for group members to experience benefits.

Another way of interpreting the lack of significance in this study is to suggest that the experimental treatment groups were no more effective at producing change than the nonspecific factors operating for the no-treatment group. One could postulate that any differences on the dependent measures are simply due to the passage of time, repeated test administration, and chance factors. Passage of time could be significant in this case due to the population. Since most of the subjects in this study were college freshmen and sophomores pretest scores could reflect initial semester anxiety and concern about such things as being separated from one's family and beginning new courses at the college level. Repeated test administration is also of potential significance. The features in common to all four groups were the pretest and posttest assessments and

the daily monitoring of drug consumption. It is conceivable that for some subjects in the no-treatment group this created the impression that they were addressing personal needs and contributing to personal change. While it is true that the no-treatment group did not report any significant treatment changes this proposed climate of personal change, or anticipated change, could have had enough of an effect to obscure any statistical analyses that might otherwise have distinguished the experimental and no-treatment groups.

Although there is no definitive way to rule out the possibility that the experimental groups were impotent or no more effective than the nonspecific factors operating for the no-treatment group, a more plausible explanation is that the treatment groups were therapeutic, but not significantly so, due to too short of a treatment phase, and/or due to the highly variable treatment response of a nonpredisposed subject pool.

Several factors suggest that subjects were receiving signs that the treatments were working for them. To begin with, STAI trait form treatment gains were all in the direction predicted, with experimental groups showing trait anxiety decrements while the NO-TX group increased slightly. It is important to note that the pretreatment STAI means for subjects in the study are comparable to values reported in the meditation literature, and that the pretest-posttest differences reported here exceed those reported in some

studies. An analysis of STAI treatment outcome is also assisted by looking at the "box scores" in Table 7. These "box scores" were determined by classifying subjects according to whether or not they showed treatment score decrements (-), or else treatment score increments along with subjects not changing (\pm). A visual inspection of these "box scores" reveals that experimental subjects were much more likely to experience trait anxiety decrements than no-treatment subjects.

The quality of relaxation ratings were also in the expected direction. The overall trend was for subjects to report increasingly greater levels of relaxation over the course of treatment. This fits with a common-sense

Table 7. STAI Trait Form treatment outcome "box scores."
-- Subjects classified according to whether or not they showed treatment score decrements from pretreatment to posttreatment (-), or else treatment score increments along with subjects not changing (\pm).

Group	(-)	%N	(\pm)	%N
Yoga	8	67	4	33
PMR	10	71	4	29
PPR	7	70	3	30
NO-TX	3	27	8	73

expectation that as subjects became more facile with their respective techniques they experienced greater levels of relaxation. This also suggests that subjects were sensitive to change in their relaxation experience and found practice to be more rewarding. This suggestion is corroborated by the posttest measure of relaxation benefit. This measure indicates that overall members of the experimental groups found that practice had helped them a "moderate amount" on the eight areas targeted. In all likelihood a fitting epitaph for these treatment groups is that they were moderately effective.

If the experimental treatment groups were in fact therapeutic, why were there no significant outcome differences in relation to the no-treatment group? One possibility is that the treatment phase was too short. Previous research documenting significant treatment outcome has used treatment phases varying from 6 weeks to 6 months. With few exceptions studies with short treatment phases (6-9 weeks) that demonstrated a significant outcome have utilized predisposed subjects that were motivated from the outset to change targeted behaviors. Studies utilizing nonpredisposed subjects tended to obtain significant results when a very long treatment phase was used, such as Smith's (1976) 6-month study, but had insignificant or mixed results with shorter treatment phases.

The fact that so many of the studies demonstrating a significant treatment outcome utilized predisposed subjects suggests that this study's nonpredisposed subject pool may be an important factor in accounting for the obtained treatment outcome results. Subjects for this study were not selected on some a priori basis, such as interest in meditation, previous experience with some technique, or a given level of drug consumption. Whereas this method of selection was important to avoid confounding treatment outcome with motivation and a predisposition to change it may also have loaded the deck against the study by supplying volunteers with no vested interest in any of the treatment groups or in changing a targeted behavior. In addition, this method of subject selection did not allow for an adequate test of the impact of the treatment groups on drug consumption. Overall, the drug consumption data is too scanty for such a test. Although the percentage of subjects reporting alcohol consumption was comparable to national levels, drugs such as marijuana, by comparison, were very underrepresented (Garfield & Garfield, 1973; Gergen, Gergen, & Morse, 1972; Martino & Truss, 1973). Limited drug consumption could have been due in part to the kind of volunteers attracted to the study. Since the study was billed as "stress-management research," it is possible that the kind of subjects who volunteered were interested in self-care and not as likely to be frequent or heavy drug

consumers. It is also quite likely that these limited drug consumption levels are a product of underreporting, since many of the drugs included in the weekly diaries are illegal.

The fact that results from this study with nonpre-disposed subjects is at variance with so many other studies that utilized predisposed subjects allows us to address an important issue in the yoga/meditation literature. An assumption that is commonly made by proponents of yoga and meditation is that such techniques have widespread utility and that benefits are experienced to some degree by everyone who practices them. As amply demonstrated in this study the response to these techniques varies dramatically. In some respects this study parallels efforts to indiscriminately apply health promotion techniques to a large population. There is little doubt that some percentage of the recipients would experience benefits. The issue though is one of cost effectiveness since many subjects, and possibly even most, will not benefit. An implicit assumption of such a statement, and one addressed by this study's findings, is that the technique, unto itself, is not the sole critical variable. Instead, it is important to look closely at the relationship between the treatment technique and the potential practitioner to devine some way of determining who will and will not benefit from a given technique. As noted, one way to begin developing this kind of an understanding is

to correlate treatment outcome with a detailed personality inventory. Admittedly, such a procedure does not enable us to turn around and begin successfully matching people with a particular technique. What this does enable us to do though is to begin formulating some ideas on what are good treatment-practitioner match ups. Ideally, this information could one day be refined enough so that projected match ups will maximize the likelihood of treatment success. In this study this was done by correlating STAI pretreatment-posttreatment differences with the 16PF Questionnaire.

Examining the overall pattern of these results it appears that there is virtually no overlap among the variables correlated with treatment outcome for the different groups. This finding can be interpreted by considering that each of the groups utilized a different treatment rationale and practiced distinctly different techniques. It seems plausible that these differences resulted in the treatments being credible, appealing, and effective for different types of individuals. The ability to correlate STAI treatment outcome with personality variables also helps to extract some meaningful data from the STAI which might otherwise be overlooked due to the lack of a significant group interaction effect.

The value of this kind of analysis is suggested by the correlations for PMR subjects. Outcome for this group was significantly correlated with Guilt Proneness (Factor

0), and High Ergic Tension (Factor Q_4). Clinically, these two factors distinguish neurotics from normals, and are two of the three most highly loaded factors in general anxiety. The picture which emerges of such individuals, according to Cattell et al. (1970), is of someone who feels that he/she is "unstable, reports overfatigue from exciting situations, is unable to sleep through worrying, feels inadequate to meet the rough demands of life," and "is easily downheartened and remorseful." Oftentimes such individuals feel "irrationally worried, tense, anxious, and in turmoil." Given this kind of a characterization it is not difficult to understand how such individuals might benefit from Progressive Muscle Relaxation. Jacobson (1931) originally developed the series of isometric exercises following his observations that people who were tense and anxious were in a chronic state of muscular tension. Jacobson believed that by relaxing the body an individual would be less anxious and better able to cope with daily events. In addition to Jacobson's work support for these claims has come from Benson et al. (1974) and Steinmark and Borkovec (1974). These investigators have claimed that progressive relaxation is associated with parasympathetic arousal, sympathetic deactivation, increased alpha-wave production, and is effective for the problem of insomnia.

Outcome for the attention-placebo group, PPR, was correlated with Ego Weakness (Factor C) and Parmia (Factor

H). Along with Guilt Proneness and High Ergic Tension, Ego Weakness is highly correlated with general anxiety. Such individuals are "easily annoyed by things and people, dissatisfied with the world situation, their family, and health, and feel unable to cope with life." According to Cattell et al. (1970), these individuals show generalized neurotic responses in the form of phobias, psychosomatic disturbances, and hysterical and obsessional behavior. Psycho-physiological Relaxation, with its emphasis upon the generation of positive thoughts and images, would appear to be well suited to such individuals. This technique's emphasis upon positive thinking coupled with the instruction to ignore or disregard distracting and negative thoughts may have allowed such individuals a brief respite from dissatisfaction and annoyance, and thereby contribute to an overall reduction in general anxiety. The relationship of Parmia (Factor H) to treatment outcome is less clear. These individuals are characterized as "adventurous," and "responsive," with "emotional and artistic interest." Possibly these characteristics would aide people in benefiting from a novel and unusual form of relaxation which relies upon positive thinking and soothing, melodic music as the "active ingredients." The role of the background music in this study would tie in nicely with "emotional and artistic interests," since the kind of music employed in the group varied and would often times lead to

discussions about different kinds of music and the impact of this variety upon relaxation.

Treatment outcome for the Yoga group was correlated with High Intelligence (Factor B). Conceptually, this Factor has the least apparent relationship to outcome. Individuals with high scores on High Intelligence are characterized as being "insightful," "fast-learning," and "intellectually adaptable." Possibly, these characteristics would be beneficial in quickly learning the yoga exercises. Many of the yoga postures practiced in class required subjects to synchronize physical and breathing exercises while inaudibly repeating a mantram that was different for inhalation and exhalation. It is an understatement to say that novitiates are often confused! It seems reasonable to suspect that subjects who could quickly learn and adapt to such novel exercises would stand a better chance of benefiting from practice.

In addition to characterizing individuals who continue with relaxation techniques and benefit from them it is also important to study individuals who drop out and do not benefit. Although no effort was made to study subjects that were not benefiting, drop outs were studied. Unlike Smith's (1978) research, drop outs in the present study were not more anxious. Drop outs in the present study did not differ from continuers on any of the dependent measures employed. Anecdotal reports from some of the drop

outs were that school pressures and lack of interest in regular practice precipitated discontinuation.

A fortuitous finding of the study was that subjects with previous yoga/meditation experience did not differ from inexperienced subjects on any of the dependent measures. In all fairness, many of these subjects designated as having previous experience could be characterized as having had "previous interest" in yoga/meditative techniques, such as reading a book and practicing meditation on their own several times. But, the fact that almost 15% of all subjects participating in the study have had some previous exposure suggests the widespread acceptance of these techniques.

APPENDIX A

RESEARCH TOOLS

INTERVIEWER _____ TIME: BEGIN _____

DATE _____ END _____

Briefly describe study. Insure confidentiality. Have student sign subject's consent form, and generate an I.D. no.

I.D. NUMBER _____

Section A

1. How often do you exercise or take part in active sports, (e.g. running, jogging, swimming, bicycling)?
 - a. every day
 - b. 3-6 times a week
 - c. 1-2 times a week
 - d. 1-3 times a month
 - e. less than once a month
2. When you exercise or take part in an active sport, how long do you usually keep at it?
 - a. 1 hour or more
 - b. 30 minutes to 1 hour
 - c. 15-30 minutes
 - d. less than 15 minutes
3. Do you usually eat breakfast?
 - a. yes
 - b. no
4. How many meals do you usually eat a day?
 - a. 1
 - b. 2
 - c. 3
 - d. more than 3
5. How often do you eat red meat each week? _____
6. How often do you eat fruits or yellow or green vegetables? _____
7. How often do you eat between meals? _____
8. How often do you eat salty snacks? _____
9. How often do you eat desserts or sweets? _____
10. How do you use salt on your food?
 - a. I usually salt before I taste my food
 - b. I taste food first, and salt if it needs it
 - c. I use very little salt
11. How do you know when you are under stress? Stress is feeling strained, tense, or pressured for a long time.

SECTION B

I.D. NUMBER _____

MALE _____
FEMALE _____

RACE _____

AGE _____

MARITAL STATUS _____

EDUCATION LEVEL _____

1. Please describe any physical disability you may have.

2. Is there anything which would make it impossible or inappropriate for you to exercise as a part of this study (eg. isometric exercises which involve tension and relaxation of muscle groups)?

I: for question 3 do not supply alternatives until they have answered, then ask items with*

3. What methods have you employed to relax?
- | | |
|----------------|---------------------------------|
| a. exercise | *f. muscle relaxation exercises |
| b. reading | g. eating |
| c. drugs | h. sitting quietly |
| *d. yoga | i. other |
| *e. meditation | |

4. Please rate the following times (1-6) in terms of your preference, or convenience, to attend your relaxation group.

- | | |
|---------|--------|
| a. 8am | d. 3pm |
| b. 9am | e. 4pm |
| c. 10am | f. 5pm |

SECTION C

I: complete after interview.

1. How do you feel about your contact with this person?

2. Do you feel that the answers from this person have been reliable?

- | | | |
|--------|-------|----------|
| a. yes | b. no | c. maybe |
|--------|-------|----------|

3. Was there anything unusual about their behavior?
If yes - what?

12. On the average, how much sleep do you get each night?
a. 4-5 hours c. 7 hours
b. 6 hours d. 8 hours or more
13. How would you rate the quality of your sleep?
a. excellent b. satisfactory c. poor
14. Do you wake-up during the night?
a. yes, when? _____ b. no
15. Do you have difficulty falling asleep?
a. yes, how long does it take you? _____
b. no
16. How would you rate your general health?
a. excellent b. satisfactory c. poor
17. Is there anything that you know of that would make your health even better?
a. lose/gain weight f. relax more
b. exercise more g. go to my doctor
c. change eating habits h. gain more control over my life
d. quit or cut down smoking i. nothing
e. quit or cut down drinking
18. In general, are you content with your life?
a. always d. not too often
b. most of the time e. no
c. occasionally

RELAXATION SURVEY

Please rate each of the following behaviors and events in terms of your belief that continued practice of the relaxation technique you have been practicing will have either an adverse or beneficial effect upon the behavior or event under consideration.

By marking values to the left of 0% you can indicate your belief that continued practice of the relaxation technique is likely to have an adverse effect for the behavior or event under consideration. By marking values to the right of 0% you can indicate your belief that continued practice of the technique is likely to have a beneficial effect for the behavior under consideration.

On this scale marking '0%' indicates no possibility of either benefit or adverse effect from continued practice, '50%' indicates a moderate possibility of either benefit or adverse effect from continued practice, and '100%' indicates that the benefit or adverse effect will unquestionably follow from continued practice.

I.D. NUMBER _____ GROUP _____

	LIKELIHOOD OF ADVERSE EFFECT											LIKELIHOOD OF BENEFICIAL EFFECT										
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
FEELINGS OF ANXIETY																						
ABILITY TO HAVE SATISFYING RELATIONSHIPS																						
WORK CAPACITY																						
BODY POSTURE																						
CONTROL OF FEELINGS																						
ABLE TO BE UNDERSTOOD BY OTHERS																						
GETTING THINGS ACCOMPLISHED																						
QUALITY OF SLEEP																						
FEELINGS OF ANGER																						
COMPREHENSION OF COURSEWORK																						
FEELING FATIGUED																						
DEPRESSED FEELINGS																						
ABILITY TO BE INTIMATE																						
QUALITY OF WORK																						
RESISTANCE TO ILLNESS																						
ABILITY TO FEEL COMFORTABLE WITH SELF																						
ABILITY TO SEEK OUT NEW RELATIONSHIPS																						
ABILITY TO SET REALISTIC GOALS																						
EAT NUTRITIOUS FOODS																						
CRITICALNESS WITH SELF AND OTHERS																						
ARGUMENTATIVENESS																						
FINISH COURSE WORK ON TIME																						
HEART FUNCTIONING																						
FEEL IN HARMONY WITH LIFE																						

SM=

TRRS=

WEEKLY RELAXATION RECORD

In an effort to better understand the self-management of stress and tension we would like you to monitor (1) the quality of your relaxation following practice, and, (2) some life-style variables which may play a role in self-management.

Please keep this record as up to date as possible.

At the end of each week please turn in your completed record and obtain a new one in the Psychology Clinic. If you have any questions about how to fill out your record please ask one of the research assistants in the Psychology Clinic.

Please be sure to fill in your I.D. number and the group you belong to on each sheet.

RELAXATION RECORD

I.D. NUMBER _____ GROUP _____

Please indicate, as soon after practicing your relaxation technique as possible, the day, time, and quality of relaxation you achieved.

Consider the '0' point on the scale to be a level of relaxation you would normally experience after sitting quietly.

	DATE	TIME	very tense -3	-2	-1	normal 0	-1	-2	very relaxed -3
1.									
2.									
3.									
4.									
5.									

TIPS _____

WARNERS _____

STRESS-MANAGEMENT RESEARCH: CONCLUSION

Thanks for your participation in our study over the past several months. To help us fully understand the impact of your practicing a self-control relaxation technique we would like you to fill out several short questionnaires. Please be sure to fill in your I.D. number and the group you were in on each questionnaire. In addition, please turn in your I.D. card with this packet when you are finished and indicate if you are from an introductory class in the space below.

If you would like to receive a brief write-up of this study's results please address the envelope at the back of this packet with an address that you can be reached at early next year (when preliminary results are available).

Thanks for your participation and we hope the study had some personal value for you.

Intro. course no.

teacher

disc. section

I.D. NUMBER _____

GROUP _____

Briefly, what did you think was the purpose of this study?

Briefly, what did you think were the experimenter's hypotheses? (ie. what do you think he was hoping to find)

Please rate on the following scale how much benefit you have derived from the practice of your relaxation technique for each category on the left

	not at all		a moderate amount		a great deal
	1	2	3	4	5
academic performance					
interpersonal relations					
health					
condition of body and nervous system					
decreased drug use					
increased energy and vitality					
overall happiness					
decreased anxiety					
self-esteem					

TBS _____

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