THE EFFECTS OF SHORT-TERM MEDITATION ON ANXIETY,
LOCUS OF CONTROL, AND SELF-ACTUALIZATION

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by
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ABSTRACT
THE EFFECTS OF SHORT-TERM MEDITATION ON ANXIETY,
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by
Neil Aaronson
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Recent studies have suggested that the regular practice of a form of meditation known as Transcendental Meditation has a positive effect upon the psychological functioning of the individual. Unfortunately, these studies have not controlled for both motivational factors, and placebo/expectation of relief effect, and therefore these findings must be viewed as equivocal.

This study examined the short term effects of a self-taught meditation technique developed by Benson (1974) on anxiety, locus of control, and self-actualization. An experimental design which controlled for motivational factors and placebo/expectation of relief effect was used.

Using a post-test only control group design, 132 subjects were matched on sex and age, and randomly assigned to one of six groups: (a) an Experimental Group which practiced
the full Benson technique for a six week period; (b) one of three Placebo-Treatment Groups which practiced a modified form of the Benson technique which excluded one major instructional component; (c) a High Expectation Group which, in addition to practicing the full Benson technique, received information aimed at increasing the expectation of positive psychological change as the result of regular meditation; or (d) a waiting-list Control Group.

Following the six week experimental period the subjects were administered the IFAT Anxiety Scale, the State-Trait Anxiety Inventory (A-Trait Scale only), Rotter's Internal-External Locus of Control Scale, and Shostrom's Personal Orientation Inventory. Only the two major scales of the POI, Time Competence/Incompetence and Inner-Directed/Other-Directed, were analyzed.

The results indicated that (a) short-term meditators were significantly less anxious, and more time-competent than were non-meditators; (b) the instructional components of the meditation technique which deal with the use of a mantra, and the progressive relaxation of the muscle system were central to the meditation process; (c) the instructional component dealing with the maintenance of a passive attitude during the meditation did not contribute significantly to the observed positive changes in psychological functioning; and (d) the introduction of a high expectation set resulted in the negation of the positive psychological
changes otherwise derived from the regular practice of the meditation technique.
Chapter 1
INTRODUCTION

Statement of Purpose

In recent years interest within both the public at large and the scientific community has increased greatly in regard to the practice of various forms of meditation. Since 1970, the number of journal articles reporting studies of the physiology and psychology of meditation, and in particular the form of meditation known as Transcendental Meditation (TM), has increased dramatically (Timmons & Kannelakos, 1974).

TM is purported to be an easily learned technique which does not require adherence to any specific religious belief or faith, intense concentration, or any type of rigorous physical or mental control (Mahesh, 1966). The simplicity of the technique, which contrasts strongly with some of the more complex Eastern meditative postures, may well account for the general popularity of TM. It has been reported (Ferguson & Gowan, 1974) that over 450,000 people have received training in TM within the United States.

Several factors have contributed to the popularity of
TM as a focus for research in the area of meditation: (a) because TM requires no special aptitude or skill (Denniston & McWilliams, 1975) there is a large and readily available subject pool for investigation, and (b) whereas many other meditative techniques vary as to instruction and practice, TM provides a relatively uniform and systematic method which allows for standardization of research methodology. To date, numerous studies have suggested that the regular practice of TM (i.e., twice daily for 15-20 minutes) produces positive effects upon the physiology and psychology of the individual (Ferguson & Gowan, 1974; Hjelle, 1974; Marzetta, Benson & Wallace, 1972; Orme-Johnson, 1973; Seeman, Nidich & Banta, 1972; Wallace, 1970, 1972; Benson & Wilson, 1971; Walrath & Hamilton, 1975).

Whereas proponents of TM claim that theirs is a unique meditative process (Bloomfield, Cain, Jaffe & Kory, 1975) Dr. Herbert Benson, Associate Professor of Medicine at Harvard Medical School, and one of the principle researchers in the study of the physiology of TM, has suggested that TM is only one of a number of techniques which elicits what he has termed the "relaxation response", a hypometabolic physiologic state characterized by a significant decrease in oxygen consumption, carbon dioxide elimination, blood lactate, respiration, and an increase in skin resistance and intensity of slow alpha waves (Benson, 1974, 1975). Drawing from extensive clinical investigations of TM, stress research,
and historical religious writings concerning meditation, Benson has developed a self-taught meditation technique which contains what he hypothesizes to be the four major elements necessary for the elicitation of the "relaxation response": a quiet environment; a mental device; a passive attitude; and a comfortable position (Benson, 1974).

Although a study by Beary, Benson, and Klemchuk (1974) has demonstrated that this meditation technique produces physiological changes comparable to those found in the TM research, no studies have yet investigated the psychological effects of the regular practice of the technique.

The purpose of the present study was to investigate some of the psychological effects of the regular practice of the meditation technique developed by Benson.

**Physiology of Meditation**

Although numerous early studies of Zen and yoga meditation proved valuable from a heuristic standpoint, several methodological problems limited their empirical usefulness. Since most of this research was conducted using highly skilled practitioners of complex meditative disciplines as subjects, the population available for study was very limited, and often times inaccessible, thus hampering attempts at replication. Also, the lack of control over the independent variable (i.e., the meditation technique) severely limited the generalizability of findings. Differences existed both in the specific techniques investigated, and the
relative degree of skill of any particular subject.

The first study of the physiology of meditation which was able to control for these variables, and provide systematic data was conducted by Wallace (1970). Using practitioners of TM as subjects, Wallace measured numerous autonomic physiological functions. The results indicated that the physiological state elicited during meditation differed significantly from the control periods of sitting quietly, and was characterized by significant reductions in oxygen consumption (bar reduction approximated 20%), carbon dioxide elimination, rate and volume of respiration, a slowing of the heartbeat, a dramatic decrease in blood lactate level (25%), an increase in skin resistance, and an EEG pattern characterized by increased amplitude and regularity of slow alpha waves with occasional theta wave activity. The fall in blood lactate level was of particular interest from a psychological standpoint in that previous research demonstrated that patients with anxiety neurosis show a significant increase in blood lactate when placed in a stressful situation (Cohen & White, 1950; Jones & Mellersh, 1946; Linko, 1950) Holgram & Strom, 1959), and that an infusion of a lactate solution could produce anxiety attacks in patients, and anxiety symptoms in normal subjects (Pitts & McClure, 1967).

Based on these findings, Wallace (1970) concluded that the physiological state observed during the practice of TM
was significantly different from the physiological states of wakefulness, sleeping, and dreaming, and thus possibly constituted a fourth major state of consciousness.

A replication of Wallace's study (Wallace, Benson & Wilson, 1971) bore out the original findings, and proposed that the physiological changes which occur during the practice of TM characterize a "wakeful hypometabolic physiologic state". It was emphasized that the physiological changes which occur during TM are significantly different from those which occur during hypnosis. Further, the point was made that although operant conditioning procedures utilizing biofeedback can also alter various autonomic functions such as heart rate, blood pressure, and alpha-wave activity, the TM technique allows for simultaneous control of these functions. Whereas biofeedback generally focuses on one function at a time, and requires the use of elaborate equipment, TM deals with all of these at the same time.

In a study of the effects of TM on hypertension Benson, Rosner, and Marzetta (1970) found that hypertensive patients who regularly practiced the TM technique showed significant decreases in systolic and diastolic blood pressure, independent of medication effect, over baseline levels established over a five week period. Similar findings were reported by Blackwell, Bloomfield, Gartside, Robinson, Haneson, Magenheim, Nidich, and Zigler (1976).

Several other studies suggest that the regular practice
of TM may have therapeutic usefulness in the treatment of chronic headache and asthma. Benson, Klemchuk and Graham (1974) studied the effects of TM on patients suffering from migraine and cluster headaches. The results indicated a trend toward the reduction in the severity of symptoms, and it was suggested that the practice of TM may prove useful in the therapy of severe headache, and should be considered as a treatment when the more traditional forms of therapy are unsuccessful. In a preliminary study of the effects of TM in the treatment of asthma (Honsberger & Wilson, 1973) it was found that the regular practice of TM resulted in symptom reduction in asthmatic patients.

The "Relaxation Response"

The above studies of the physiology of TM indicate that the practice of this form of meditation produces an integrated, wakeful, hypometabolic state within the individual. Advocates of the TM program emphasize that, although easily learned, TM is a technique that must be taught by a qualified teacher (Denniston & McWilliams, 1975) and is "uniquely useful in reducing stress and unfolding a person's full measure of energy, intelligence and satisfaction...no technique of meditation is as effective as the TM technique in producing deep rest and consequent psychophysiological integration" (Bloomfield et al., 1975). The role of a qualified teacher is considered essential to insure that the learner has a "correct experience", and to provide the
learner with a specific Sanskrit mantra (repeated word or phrase) chosen on the basis of traditional Hindu procedures (Bloomfield et al., 1975). Advocates of TM further emphasize that it is not possible to choose a mantra for oneself, and that such a procedure could produce negative physiological and psychological effects (Bloomfield et al., 1975).

Benson, one of the major contributors to the physiological research on TM (Benson et al., 1973; Benson et al., 1974; Wallace & Benson, 1972; Wallace, Benson & Wilson, 1971) takes issue with these claims. He has proposed that TM is one of a number of relaxation techniques which are capable of eliciting the "relaxation response": "an integrated hypothalamic response which results in generalized increased sympathetic nervous system activity and perhaps also increased parasympathetic activity" (Benson, Beary & Carol, 1974); and, "a natural, innate protective mechanism against overstress which allows us to turn off harmful bodily effects" (Benson, 1975). Benson suggests that TM, Zen and yoga meditation, autogenic training, hypnosis with suggested deep relaxation, and sentic cycles are all procedures which are capable of evoking the "relaxation response" (Benson, 1974).

As a cardiologist, Benson has been primarily concerned with the physiological effects of stress, i.e., hypertension, and the development of therapeutic procedures to alleviate this condition. His proposal of the "relaxation response"
was drawn primarily from the earlier research of Cannon, Brod, and Hess. Cannon (1914) was one of the earliest investigators to identify the physiological response to stressful situations. He demonstrated that when an animal perceives a situation as threatening, it responds reflexively with a physiological reaction characterized by increases in oxygen consumption, blood pressure, and respiratory rate. He labelled this response the "emergency reaction", which has become known as the fight-or-flight response. Brod and his colleagues (1959) demonstrated that the physiological characteristics of the fight-or-flight response occurred similarly with human subjects when placed in a stressful situation. Hess (1957) found that the physiological changes which characterize this response could be induced in cats by stimulating a specific area of the hypothalamus which was labelled the ergotropic zone. Further, by stimulating the anterior portion of the hypothalamus he was able to induce an opposite physiologic response which was labelled the "trophotropic response" , characterized by a decrease in muscle tension, blood pressure, respiration, and pupil constriction (Hess, 1957). Benson (1975) considers the "relaxation response" to be the functional equivalent in man of the "trophotropic response" induced in cats by Hess.

Based on the above research findings, a review of the physiological effects of various relaxation techniques, and a survey of historical, religious, and spiritual writings
concerning meditation, Benson (1974, 1974) concluded that there are four essential components necessary for the elicitation of the "relaxation response":

(a) **a quiet environment** - one should choose a quiet, calm environment with as few distractions as possible. Sound, even background noise, may prevent the elicitation of the response. Choose a convenient, suitable place.

(b) **a mental device** - the meditator employs the constant stimulus of a single-syllable sound or word. The syllable is repeated silently or in a low, gentle tone. The purpose of the repetition is to free oneself from logical, externally oriented thought by focusing solely on the stimulus. Many different words and sounds have been used in traditional practices. Because of its simplicity and neutrality the use of the syllable "one" is suggested.

(c) **a passive attitude** - the purpose of the response is to help one rest and relax, and this requires a completely passive attitude. One should not scrutinize his performance or try to force the response, because this may well prevent the response from occurring. When distracting thoughts enter the mind, they should simply be disregarded.

(d) **a comfortable position** - the meditator should sit in as restful a position as possible. The purpose is to reduce muscular effort to a minimum. The head may be supported; the arms should be balanced or supported as well. The shoes may be removed, and the feet propped up several inches, if desired. Loosen all tight-fitting clothing.

(Benson, 1974, p. 54)

Based on these four components Benson has developed a specific meditation technique similar in many respects to that of TM, although with several major differences. First, it does not require the use of a specific mantra drawn from Sanskrit writings, and second, it does not require instruction by a qualified teacher, but rather can be a self-taught technique.

In a carefully controlled study (Beary, Benson &
Klemchuk, 1974) it was demonstrated that the practice of a simple meditation technique as developed by Benson could bring forth the same physiological changes observed in the TM research. Seventeen healthy subjects, none of whom were practicing any form of relaxation or meditation exercises, were provided with written instructions for the meditation technique, and were given a short period of time to practice the technique. Serving as their own controls, each subject was studied during five consecutive periods: 3 control periods during which the subjects sat quietly reading neutral material; one control period during which the subjects sat quietly with eyes closed; and one period during which the subjects practiced the meditation technique. The results indicated the practice of the meditation technique produced a significant decrease in oxygen consumption, CO₂ elimination, and respiration rate. Sitting quietly with eyes closed did not yield any significant differences from the control period baseline data.

**Psychological Effects of Meditation**

A number of studies utilizing a variety of self-report instruments have investigated the psychological effects of the regular practice of TM. Seeman, Nidich and Banta (1972) administered the Personal Orientation Inventory (POI) to a group of beginning meditators several days prior to receiving instruction in TM, and again after two months of regular meditation. A control group of non-meditators
was given the POI at the same time interval. The results showed that the mean difference of the meditation group was significantly greater than that of the control group on four of the twelve POI scales: Inner-Directed/Other-Directed, Self-Regard, Acceptance of Aggression ($p<.02$); and Spontaneity ($p<.001$). There were no significant differences on the remaining scales. Based on Shostrom's interpretation of the scale scores (Shostrom, 1966) these results indicated that short-term meditators were more inner-directed, more able to express feelings in spontaneous action, and more able to accept anger or aggression within one's self than were non-meditators.

A replication of this study was conducted by Nidich, Seeman, and Dreskin (1973) using the same testing procedures. As in the original study, no significant differences were found between the experimental and control groups on pre-test scores. The results showed that the mean difference for the meditation group was significantly higher than that of the control group on the following scales: Inner-Directed, Self-Actualizing Value, Spontaneity ($p<.01$); Time-Competence, Feeling Reactivity, Self-Acceptance, and Capacity for Intimate Contact ($p<.05$). These results confirmed the earlier finding that the regular practice of TM produces changes in the direction of greater self-actualization, as measured by the POI.

Miller (1973), using the same design as the above two
studies, found a significant difference in mean change scores between the experimental and control groups, in the expected direction, on the Inner-Directed, Time-Competence, Existentiality, Self-Acceptance, and Nature of Man, Constructive scales of the POI at the .01 level of confidence.

In a comparison of long-term practitioners of TM (\(\bar{x} = 22\) months) with beginning meditators, Hjelle (1974) used the POI, Rotter's Internal-Exernal Locus of Control Scale, and Bendig's version of the Taylor Manifest Anxiety Scales as measures of psychological functioning. The results indicated that long-term meditators were significantly less anxious, and had a more internal locus of control than did beginning meditators. Further, scores for long-term meditators were significantly higher on a number of the POI scales: Inner-Directed, Time-Competence, Spontaneity, Self-Regard \((p<.001)\); and Self-Actualizing Value and Feeling Reactivity \((p<.05)\); suggesting that long-term meditation has a beneficial effect on psychological health as measured in terms of the construct of self-actualization.

Ferguson and Gowan (1974) used the Cattell Anxiety Scale, the Spielberger State-Trait Anxiety Inventory, and the Northridge Developmental Scale (a test developed by Gowan for use in screening M.A. candidates in guidance and counseling which contains scales for self-actualization, aggression, depression and neuroticism) in a study comparing long-term meditators \((\bar{x} = 43\) months) with short-term
meditators (six weeks from the onset of the study) and a control group of non-meditators. The results indicated that the mean change scores of the short-term meditators were significantly greater than those of the control group on the Cattell Anxiety Scale ($p < .025$), and the Spielberger Anxiety Inventory ($p < .005$) in the direction of decreased anxiety. On the Northridge Developmental Scale short-term meditators showed a significantly greater change in the direction of improved psychological functioning than the control group on the Self-Actualization scale ($p < .025$), Depression scale ($p < .005$), and Neuroticism scale ($p < .01$). Differences between long-term and short-term meditators were significant on both anxiety measures, and all but the Aggression scale of the Northridge Developmental Scale. It was pointed out that there were significant differences between the short-term meditation group and the control group on pre-test scores for the Cattell Anxiety Scale and the Neuroticism scale of the Northridge Developmental Scale, indicating that the short-term meditators reported more anxiety and neurotic symptoms.

Schilling (1974) studied the effects of the regular practice of TM on personality as measured by the Personality Research Form. Three comparison groups were used in this study: an experimental group of short-term meditators who began meditation at the onset of the study; a control group of non-meditators; and a control group of non-meditators who
had shown initial interest in learning TM, but chose not to receive instruction. The pretest was given to all subjects several days before the experimental group subjects received instructions in TM, and again eight weeks later. The results indicated that the meditation group improved significantly more than either of the control groups on the following Personality Research Form subscales: Nurturance ($p<.025$); Dominance ($p<.01$); and Affiliation ($p<.025$). No significant differences were found on mean change scores between the two control groups. Based on these findings it was suggested that, as a result of regular short-term meditation, there is an increased tendency to be involved with others in a supportive, caring way, and to be assertive and influential in interpersonal and social interactions.

Benson and Wallace (1971), in a study of the relationship between drug use and the practice of TM, obtained questionnaire data from 1,862 meditators interested in becoming TM teachers. The survey indicated that, shortly after beginning the practice of meditation, there was a marked decrease in the use of a number of non-prescription drugs. Prior to beginning the practice of TM, 80% of the subjects used marijuana, and 48% used LSD or other hallucinogens. After six months of meditation 37% continued to use marijuana, and 11% used hallucinogens. After 22 months of meditation, marijuana use dropped to 12%, and the use of hallucinogens dropped to 10%. Similar trends were reported
for amphetamines, barbituates, alcohol, and tobacco. It should be pointed out that no controls were used, and that a strong pre-selection factor may have been operating in that initiation into the practice of TM requires a 15 day period of abstinence from any drugs. A further source of bias was present in that only those individuals who had continued the practice of TM for relatively long periods of time were surveyed. It is quite possible that among those individuals who discontinued the practice of TM drug use did not change significantly. Therefore, the rather remarkable statistics reported in this study, although suggestive of a relationship between the practice of TM and decreased drug use, are far from conclusive.

Although results from the studies of the psychological effects of TM have consistently pointed towards a change in the direction of improved psychological functioning with regular practice, several major lapses in methodological rigor prevent any firm conclusions from being drawn. First, differences in motivational factors between meditators and control group non-meditators have not been controlled for, and therefore the two populations may not be comparable. It is reasonable to suspect that meditators, by their decision to learn meditation, exhibit a desire for self-improvement which might not exist among non-meditators, and thus significant differences in degree of psychological improvement between the two groups might be anticipated, independent of
any treatment effect. As seems to be suggested by a number of researchers of TM (Nidich et al., 1973; Seeman et al., 1972; Stek & Bass, 1973) this motivational variable is not necessarily neutralized by demonstrating baseline equivalence on pretest measures between experimental and control groups.

Similarly, those studies which compare long-term meditators with short-term or beginning meditators do not control for pre-selection bias. That is, long-term meditators are necessarily those individuals who believe they have benefited from meditation, and represent only a select percentage of individuals who have attempted meditation. Without data on individuals who have discontinued the practice of meditation the results from such studies must be viewed as equivocal.

Another major uncontrolled variable in many of these studies is an expectation of relief/placebo effect. Extensive research in the fields of medicine, pharmacology, and psychology have demonstrated that factors other than the major treatment variable (e.g., medication, psychotherapeutic technique) may contribute significantly to observed changes in the individual (Dymond, 1954; Kelly, 1949, 1955; Lipkin, 1954; Rosenthal, Fode, Friedman & Viken, 1960; Rosenthal & Frank, 1956, 1962; Volgyesi, 1954). These findings may be summarized as follows:
The position is taken that since it has been repeatedly demonstrated that placebos significantly modify a patient's physiological functioning, the relief of any particular complaint by a given medication is not sufficient evidence for the specific effect of the medicine on the complaint unless it can be shown that the relief is not obtained as a placebo effect. Analogously, patients entering psychotherapy have varying degrees of belief in its efficacy, and this belief or set of expectations may be an important determinant of the results of therapy. One cannot attribute the therapeutic results to the specific type of psychotherapy involved, therefore, unless one has ruled out the operation of placebo effects. (Rosenthal & Frank, 1956, p. 301)

Numerous studies have demonstrated that the attitude or belief of the physician, therapist, or experimenter in regard to the effectiveness of a given treatment may be communicated to the patient or subject by means of verbal and non-verbal cues, and can have a significant impact on the treatment outcome (Rosenthal et al., 1959; Uhlenhuth, Canter, Neustadt & Payson, 1959). Further, several studies have shown that therapeutically oriented instructions which indicate that a favorable treatment outcome is likely, and selective positive reinforcement, produce significantly greater improvement than procedures containing neutral instructions, with the treatment variable held constant (Leitenberg, Agras, Barlow & Oliveau, 1969; Oliveau, Agras, Leitenberg, Moore & Wright, 1969).

Individuals who decide to learn the TM technique pay an initiation fee ranging from $35 to $125 (Denniston et al., 1975), and receive a pre-instruction orientation during
which research findings and other background material supporting the efficacy of the TM technique are presented. Also, TM is taught by long-term meditators who are highly committed to the TM movement. Their interactions with the student during the one-to-one instruction period, and subsequent follow-up meetings are seen as extremely important in the learning process (Bloomfield et al., 1975). The value of this teacher-student relationship has been stressed repeatedly in the TM literature, and is presented as a major reason why the technique cannot be self-taught (Bloomfield et al., 1975). Therefore, it would appear likely that the expectation of relief/placebo effect has been an important uncontrolled variable in studies comparing experimental meditation groups with non-meditating control groups.

Several research designs are available which control for the expectation of relief/placebo effect. Dymond (1954) found that a group of patients awaiting, but not participating in formal therapy appeared to have improved in adjustment about as much as those patients undergoing psychotherapy. The waiting-list control group design has been widely used in psychotherapy research as a means of controlling for placebo effect (Goldstein, 1962). A second research design which controls for placebo effect compares the treatment group with a placebo treatment group in which the treatment procedure is assumed to be benign. McReynolds, Barnes, Brooks and Rehagen (1973) have cautioned that the
placebo treatment must be roughly equivalent to the experimental treatment in terms of authenticity and credibility. In other words, the expectation of relief between the placebo treatment and experimental treatment should be equalized.

Research Hypotheses

The present study utilized both the waiting-list control group and the placebo treatment group designs, as well as an experimentally controlled high expectation group to investigate the following hypotheses:

(1) An experimental group of subjects instructed in the meditation technique as developed by Benson will show significantly greater improvement in psychological functioning as measured by four self-report instruments (the IPAT Anxiety Scale, the Spielberger State-Trait Anxiety Inventory, Rotter's Internal-External Locus of Control Scale, and Shostrom's Personal Orientation Inventory) than a waiting-list control group of non-meditators as a consequence of the meditation exercise over a six week period.

(2) The experimental group will show significantly greater improvement in psychological functioning over a six week period than three placebo-treatment groups in which subjects are instructed in a modified version of the meditation technique containing only partial instructions.

(3) The three placebo-treatment groups will show significantly
greater improvement in psychological functioning than
the control group.

(4) There will be no significant differences in improvement
in psychological functioning between the three placebo-
treatment groups.

(5) A high expectation group which, in addition to receiv-
ing instruction in the meditation technique, is pro-
vided with information aimed at increasing the expecta-
tion of positive psychological change as a result of
regular meditation, will show significantly greater
improvement in psychological functioning than the ex-
perimental group, the three placebo groups, and the
control group.
Chapter 2

METHOD

Subjects

The subjects were 132 university students who showed an interest in learning a new meditation technique, and had no previous experience with meditation or relaxation exercises. There were 50 males and 82 females. The subjects ranged in age from 17 to 56 with a mean age of 23.

Procedure

Using a post-test only control group design (Stanley & Cambell, 1963) the subjects were matched on sex and age, and then randomly assigned to one of the following groups:

(a) an Experimental Group in which the subjects were provided with instructions for the Benson meditation technique. The instructions for the technique were as follows, as provided by Benson (1975):

1. Sit quietly in a comfortable position.
2. Close your eyes.
3. Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.
4. Breathe through your nose. Become aware of your breathing. As you breathe out, say the word "ONE" silently to yourself. For example, breathe IN... OUT, "ONE"; IN...OUT, "ONE"; etc. Breathe easily and naturally.
5. Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed, and later with your eyes opened. Do not stand up for a few minutes.
6. Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a
passive attitude, and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "ONE". With practice, the response should come with little effort. Practice the technique twice a day, but not within 2 hours after any meal, since the digestive processes seem to interfere with the technique.

(b) a Placebo-Treatment Group 1 in which the subjects were provided with instructions for a modified form of the Benson technique which excluded any reference to progressively relaxing the muscles of the body; (c) a Placebo-Treatment Group 2 in which the subjects were provided with instructions for a modified form of the Benson technique in which any reference to the use of a mental device (i.e., the use of the word "ONE") was excluded; (d) a Placebo-Treatment Group 3 in which the subjects were provided with instructions for a modified version of the Benson technique which excluded any reference to maintaining a passive attitude; (e) a High Expectation Group in which the subjects, in addition to receiving instructions for the full Benson technique, were given an information sheet which stated the positive physiological and psychological benefits to be expected from the regular practice of the Benson technique. Both legitimate physiological research findings, and bogus psychological research findings were included as support for these claims; and (f) a Control Group in which the subjects were placed on a waiting list and were informed that they would receive instructions for the technique after a six week period. The specific instructions for each of the
groups are provided in Appendix A.

A graduate student in clinical psychology served as the experimenter. In order to randomize any experimenter effect, the experimenter met with the subjects in groups of four to five, thus presenting the material for each condition a minimum of four times. The experimenter met with each group once for approximately a 45 minute period. Following a brief introductory statement (see Appendix B) instruction sheets were distributed to the subjects which contained the set of instructions for the full Benson technique, or the appropriate modified version. The High Expectation Group received an alternative one-page "fact" sheet which provided information concerning the positive physiological and psychological benefits to be expected as a result of the regular practice of the meditation technique (see Appendix B).

After reading through the instructions, the subjects were asked to practice the technique for fifteen minutes. At the end of this period any questions that were raised were answered by the experimenter by referring back to either the introductory statement, or to the specific set of instructions. The subjects were given a sheet on which to record their daily practice of the technique. They were told that it was important to keep an accurate record of their practice of the technique, and that if they missed one of their regular practice periods they should not be unduly concerned; that they should simply practice the
technique at the next opportunity. These instructions were meant to emphasize both the importance of keeping an accurate record of the daily meditation, and the necessity of practicing the technique regularly.

The subjects were asked to sign up for a second meeting six weeks later at which time they would take a series of written tests. Of the initial 132 subjects, 113 returned for testing. The number of subjects remaining in each group was as follows: Experimental Group, n = 20; Placebo-Treatment Group 1, n = 17; Placebo-Treatment Group 2, n = 19; Placebo-Treatment Group 3, n = 19; High Expectation Group, n = 16; Control Group, n = 22. The differential drop-out rate among the treatment groups was not statistically significant, \( \chi^2(4) = 2.81, p > .05 \). The subjects were administered the IPAT Anxiety Scale Questionnaire, Rotter's Internal-External Locus of Control Scale, the Spielberger State-Trait Anxiety Inventory (A-Trait Scale only), and Shostrom's Personal Orientation Inventory, in that order. The Control Group subjects received instruction sheets in the Benson technique immediately following the testing session. Following the period of testing the subjects were given a debriefing sheet which explained the purpose of the study, and provided the full set of instructions for the Benson technique, as well as a reference for further information concerning the Benson method (see Appendix C).
Instruments

The IPAT Anxiety Scale, developed by Cattell (1963), is the product of extensive factor analytic research of the Sixteen Personality Factor Questionnaire. The items which comprise the scale were selected to represent those 16 PF dimensions whose content suggest psychiatric symptoms of anxiety (Cattell, 1963). The scale is primarily designed to measure "free floating" anxiety, defined as a form of anxiety in which "the individual experiences anxiety without being aware that he can rationally attach it to any object or recollection. Free anxiety is here considered irrational and maladaptive in the sense that it implies repression of the cognitive links which associate the anxiety with its real causes" (Cattell & Scheier, 1961). This is contrasted to "bound" anxiety which is a reaction to a specific situation, and may or may not be maladaptive (Cattell et al., 1961).

Although the IPAT Anxiety Scale yields five part scores as well as a total score, due to the lack of adequate reliability data on the part scores, it is recommended by Cattell that only the total score be used for interpretive purposes (Cattell, 1963).

Test-retest reliability over a one week period is reported as .93 (N = 87), and over a two week period as .87 (N = 277) (Cattell, 1963). Although retests over a two year period have yielded reliability coefficients ranging from
.47 to .71, Cattell (1963) emphasizes that this should be considered primarily a measure of fluctuations in anxiety itself as a state, rather than as a measure of test reliability. Estimates of split-half reliability range from .84 to .91 (Cattell, 1963).

Three studies using different statistical methods have estimated the construct validity to be from .85 to .90 for the total scale (Cattell et al., 1961).

Two studies of the concurrent validity of the IPAT Anxiety Scale (Cattell & Scheier, 1958, 1961) show correlations of .30 and .40 between the composite ratings of two psychiatrists of anxiety level of patients with IPAT Anxiety Scale scores. The researchers concluded that, due to low inter-clinician reliability (.29), values larger than .40 were difficult to obtain (Cattell, 1963). In a study comparing the Scale scores of a group of normal adults with a group of clinically diagnosed anxiety hysterics and anxiety neurotics the IPAT Anxiety Scale differentiated between groups at the .01 level (Cattell).

Two studies report correlations between the IPAT Anxiety Scale and the Taylor Manifest Anxiety Scale ranging from .75 to .85 (Cattell & Scheier, 1961; Bendig, 1959). Bendig (1959) reported the following relationships between the IPAT Anxiety Scale and other psychological self-report instruments: the Eysenck Neuroticism Scale, .77; the Eysenck Extroversion Scale, -.29; the Edwards Social Desirability
Scale, -.71; the MMPI Lie Scale, -.50. Cattell (1963) found a correlation of .36 between the IPAT Anxiety Scale and the IPAT Neuroticism Scale.

The Spielberger State-Trait Anxiety Inventory (STAI) is a 40 item self-report instrument designed to measure both state anxiety (first 20 items), and trait anxiety (second 20 items). State anxiety is conceptualized as a transitory emotional condition which varies in intensity and fluctuates over time. Conversely, trait anxiety is conceptualized as a relatively stable emotional condition involving anxiety proneness (Speilberger, 1970). The A-Trait Scale is purported to measure differences between individuals in the tendency to respond to situations perceived as threatening with elevations in state-anxiety intensity (Spielberger, 1970), and was the scale used in the current study. Instructions for the A-Trait Scale ask subjects to rate themselves on each item on a four point scale, based on how they generally feel.

Test-retest reliability for the STAI A-Trait Scale ranges from .76 to .86 for time periods ranging from one hour to 104 days (Spielberger, 1970).

Evidence of concurrent validity of the STAI A-Trait Scale is primarily based on correlations with other widely used inventories designed to measure anxiety level. In a sample of college females (N = 126) correlations of the STAI A-Trait Scale with the IPAT Anxiety Scale and the
Taylor Manifest Anxiety Scale were .75 and .80 respectively (Spielberger, 1968). In a sample of college males (N = 80) correlations between the same scales as above were .76 and .79 respectively (Spielberger, 1968). In a sample of psychiatric patients (N = 112) correlations of the STAI A-Trait Scale with the IPAT Anxiety Scale was .77, and with the Taylor Manifest Anxiety Scale (N = 66) .83 (Spielberger, 1968).

Spielberger (1970) reports that the STAI A-Trait Scale correlated positively (with rs ranging from .35 to .53, p < .01) with 10 of the 11 problem areas on the Mooney Problem Checklist using a sample of college psychology students (N = 77). Sachs and Diesenhaus (1969) obtained a significant negative correlation (r = -.25) between the A-Trait Scale and the Crowne-Marlowe Social Desirability Scale.

The Personal Orientation Inventory (POI), developed by Shostrom (1964, 1966) is designed to measure mental health rather than psychopathology. It is based on the concept of self-actualization as derived primarily from the research and theoretical formulations of a number of existential and humanistics writers (e.g., Rogers, Maslow, Perls, Reisman, May, Shostrom, etc.). The self-actualized individual is characterized as "one who utilizes his talents and capabilities more fully, uses time effectively, functions relatively autonomously, tends to live in the present, and tends to have a more benevolent outlook on life and on human nature"
The POI consists of 150 two-choice comparative value and behavioral statements worded in such a way as to clearly define an opposition. The items were selected from observed value judgement problems of clients at the Institute of Therapeutic Psychology, and from the writings of the authors mentioned above (Shostrom, 1964). The items are scored for two major scales: (1) Time-Competence/Time-Incompetence which assesses the degree to which an individual uses time effectively in the present, as well as incorporates the past and future into present goals, and (2) Inner-Directed/Other-Directed which measures the degree to which an individual achieves a balance between autonomous self-support and a sensitivity to the input of others. There are also ten subscales, each of which measures a conceptually important element of the self-actualization construct (Shostrom, 1966).

Although the 10 subscales of the POI may be scored independently, they have a number of overlapping items drawn primarily from the Inner-Directed/Other-Directed Scale, and therefore are not statistically independent. Buros (1971) suggests that the two major scales, which are free of item overlap, be used as the primary measures of self-actualization. For purposes of the current study, only the two major scales were evaluated.

Test-retest reliability coefficients over a one week period were .71 and .84 for the major scales of Time-
Competence and Inner-Directedness respectively (Shostrom, 1966). In a study of the reliability of the POI over approximately a one year period (Ilardi & May, 1967) test-retest correlations for the major scales of Time-Competence and Inner-Directedness were .55 and .71 respectively.

As there are no other instruments presently available designed to measure mental health as defined by the construct of self-actualization, evidence for concurrent validity is based on comparisons between POI scores and both clinical judgement, and measures of psychopathology.

Shostrom (1964) administered the POI to a group of clinically-rated self-actualized and non-self-actualized adults. The results indicated that the POI scores discriminated between the self-actualized and non-self-actualized groups on both major scales ($p<.01$). The POI was also successful in differentiating the above two groups from a group of "normal" adults drawn from the general population at the .01 level of confidence.

In a study which utilized clinical criterion groups Shostrom and Knapp (1966) found that an advanced psychotherapy group scored significantly higher ($p<.01$) on all of the POI scales than a group beginning therapy, and significantly lower than the beginning group on four of the ten MMPI clinical scales. It was concluded that, despite a number of positive correlations, the two instruments were measuring somewhat different areas of personal functioning.
(Shostrom & Knapp, 1966).

Fox, Knapp and Michael (1968) test the hypothesis that a sample of psychiatric in-patients would score significantly lower on the POI than a relatively self-actualized group, or a group of normal adults. The mean scores for the in-patient group were compared to the mean scores for the self-actualized, non-self-actualized, and normal groups established in the 1964 study by Shostrom. Significant differences were obtained on all of the POI scales between the hospitalized sample and the self-actualized and normal groups, in the expected direction ($p < .01$). Further significant differences were found between the hospitalized group and the non-self-actualized group on seven of the POI scales ($p < .05$).

Knapp (1965) tested the hypothesis that individuals who reported neurotic symptoms and behavioral tendencies would score significantly lower on the POI than would individuals who did not report such symptoms. Based on their scores on the neuroticism dimension of the Eysenck Personality Inventory, the subjects were assigned to either a "high neurotic" group or a "low neurotic" group. All of the POI scales differentiated between these groups at or beyond the .05 level.

McClain (1970) demonstrated that the POI could effectively differentiate levels of self-actualization among normal adults. The subjects were 30 guidance counselors in
training. The criterion used for comparison was a composite rating on self-actulization made by the staff clinicians who were extensively involved with the subjects. Correlations between the POI scores and composite ratings ranged from .23 to .69. The correlation with the Inner-Directed Scale was .69 \( (p < .01) \), and with the Time-Competence Scale was .40 \( (p < .05) \).

In a study of the effects of deliberate faking on POI profiles, Fould and Warehime (1971) administered the POI to a control group of 90 subjects under normal test conditions, and to an experimental group of 86 subjects who were instructed to respond as though they were applying for a job and wanted to make a good impression. It was found that attempts to "fake good" resulted in lower scores on 10 of the 12 POI scales. Mean score differences were significant at the .05 level on 8 scales.

Rotter's Internal-External Locus of Control (I-E) Scale is a self-report instrument designed to measure the extent to which people believe that reinforcements are contingent upon their own behavior (internal orientation), rather than the result of external forces over which they have little or no control, e.g., chance, luck, powerful others (external control). The scale is based on Rotter's social learning theory which hypothesizes that (1) when a reinforcement is not perceived as contingent on the individual's behavior then its occurrence will not increase an
expectancy of a behavior-reinforcement as much as when it is seen as contingent, and (2) expectancies generalize from a specific situation to other situations perceived as similar, and therefore a generalized expectancy develops for internal-external control (Rotter, 1954, 1955, 1960).

The I-E Scale consists of 29 forced-choice items of which six are "filler" items. The remaining 23 items offer a choice between internal and external belief statements.

Test-retest reliability reported by Rotter (1966) for several population samples and time periods ranging from one to two months was between .49 and .83. Hersch and Scheibe (1967) found test-retest reliability to range between .48 and .84 over a two month period. In a study of 86 psychiatric patients, Harrow and Ferrante (1969) reported a test-retest reliability of .75 over a six week period. Rotter (1966) reported internal consistency estimates of reliability in the range of .69 to .73. Taking into account that the scale items measure a broadly generalized characteristic over a number of different situations, these estimates appear to be reasonable.

Although Rotter (1966) reported that sex differences on the I-E Scale appeared to be minimal, several studies by Feather (1967, 1968) have found that females tend to have significantly higher external scores than males in a college sample.

Correlations with the Marlowe-Crowne Social
Desirability Scale (MC-SDS) originally obtained by Rotter (1966) ranged from -0.07 to -0.35. Rotter concluded that this range might have been considerably narrower except for the fact that one of the sample populations consisted of prisoners who were tested under questionable conditions. Later findings have not totally supported Rotter's original contention that the I-E Scale is free of a social desirability set. Whereas Tolor (1967) did not find a significant correlation between the I-E Scale and MC-SDS, Altrocchi, Palmer, Hellman and Davis (1968) reported a significant relationship between the two scales ($r = -0.34$, $p < 0.05$).

Numerous studies have been conducted in an attempt to establish the construct validity of the I-E Scale. Seeman and Evans (1962) found that tubercular patients who scored toward the internal end of the Scale knew more about their conditions, questioned the medical staff more, and expressed less satisfaction with the amount of feedback they were getting about their condition than did patients whose scores reflected an external locus of control.

Seeman (1963) found that reformatory inmates who scored as internals knew more about the workings of the reformatory, parole procedures, and other factors which might effect their future than did inmates who scored as externals.

Phares (1965) found that internals were significantly more successful in changing the attitudes of others than were externals. MacDonald (1970) reported that internals
practiced some form of birth control significantly more than did externals.

The above studies converge to support the construct validity of the locus of control dimension. As was expected, individuals who believe that they have personal control over reinforcements (internals) are more likely to attempt to control their environment and better their condition than are individuals who believe that reinforcement is contingent on luck, chance, or powerful others (externals).

Several studies have investigated the relationship between locus of control and other personality dimensions. Butterfield (1964) found that external control was positively related to debilitating anxiety ($r = .61, p < .01$) and negatively related to facilitating anxiety ($r = -.82, p < .01$) as measured by the Alpert-Haber Facilitating-Debilitating Test Anxiety Questionnaire.

For a large sample of college students ($N = 648$), Watson (1967) found a correlation of $.36$ ($p < .01$) between external control and manifest anxiety, $.25$ ($p < .01$) between external control and debilitating anxiety, and $-.08$ ($p < .05$) between external control and facilitating anxiety.

The results of a factor analytic study (Ray & Katahan, 1968) indicated that the Manifest Anxiety Scale and the I-E Scale assess conceptually different variables, and that correlations found between anxiety and locus of control are not due to an anxiety factor within the I-E Scale.
Chapter 3

RESULTS

Of the original 132 subjects, 113 returned for testing. Of these 113 subjects, 91 were from one of the five groups which had practiced some form of the meditation technique, and the remaining 22 were from the Control Group. Of the 91 subjects, 77 had practiced the meditation technique a minimum of 50% of the time (i.e., averaging at least once a day for the six week period) as determined from the daily practice calendars which the subjects had kept. Those subjects who practiced the meditation technique less than 50% of the time were considered non-meditators, and were excluded from the statistical analysis. Thus, 99 subjects were included in the statistical analysis.

The mean scores and standard deviations for the six groups on the IPAT Anxiety Scale, the State-Trait Anxiety Inventory (STAI A-Trait only), Rotter's Internal-External Locus of Control Scale, and the Time-Competence (Tc) and Internal (I) Scales of the Personal Orientation Inventory (POI) are presented in Table 1.

Pairwise discriminant analyses were performed on all combinations of groups in order to evaluate the five research hypotheses. The hypothesis that the Experimental Group would show significantly greater improvement in psychological functioning than the Control Group, as
Table 1
Mean Scores and Standard Deviations for Subjects on Five Dependent Variables

<table>
<thead>
<tr>
<th>Group</th>
<th>IPAT</th>
<th>STAI</th>
<th>Rotter's I-E</th>
<th>POI-Tc</th>
<th>POI-I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
<td>X</td>
</tr>
<tr>
<td>Experimental</td>
<td>29.7</td>
<td>12.5</td>
<td>35.2</td>
<td>7.9</td>
<td>9.4</td>
</tr>
<tr>
<td>Placebo-Treatment 1</td>
<td>31.5</td>
<td>13.8</td>
<td>33.2</td>
<td>7.0</td>
<td>9.2</td>
</tr>
<tr>
<td>Placebo-Treatment 2</td>
<td>33.4</td>
<td>11.8</td>
<td>40.3</td>
<td>8.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Placebo-Treatment 3</td>
<td>28.1</td>
<td>12.9</td>
<td>34.8</td>
<td>6.4</td>
<td>10.1</td>
</tr>
<tr>
<td>High Expectation</td>
<td>23.2</td>
<td>12.7</td>
<td>37.0</td>
<td>10.9</td>
<td>9.0</td>
</tr>
<tr>
<td>Control</td>
<td>32.6</td>
<td>11.2</td>
<td>42.3</td>
<td>8.5</td>
<td>8.8</td>
</tr>
</tbody>
</table>
measured by the five dependent variables was supported, 
\[ \chi^2(5) = 12.79, \ p < .05. \] A strength of association test indicated that approximately 33% of the score variance could be attributed to the meditation technique, canonical \( r = .578. \) As tested by univariate \( F, \) mean differences were statistically significant on the STAI, \( F(1,34) = 6.20, \ p < .05, \) and the Tc Scale of the POI, \( F(1,34) = 5.55, \ p < .05, \) indicating that these two variables were primary contributors to the multivariate significant differences between the two groups.

No significant univariate differences were found on the remaining three dependent variables. The correlation between the STAI and the POI-Tc Scale was not statistically significant, \( r = -.25, \) indicating that they were measuring two distinct variables.

A comparison of the post-experimental mean scores for the Experimental and Control Groups on the STAI with a normative sample of college students showed that the Experimental Group scored at the 40th percentile for college males, and the 46th percentile for college females, whereas the Control Group scored at the 68th percentile for college males, and the 73rd percentile for college females.

A comparison of the post-experimental mean scores for the Experimental and Control Groups on the POI-Tc Scale with a normative sample of college freshman indicated that the Experimental Group scored at the 70th percentile, and the Control Group scored at the 47th percentile.
The hypothesis that the Experimental Group would show significantly greater improvement in psychological functioning than the three Placebo-Treatment Groups was not supported. The discriminant analyses yielded the following results: the Experimental Group versus Placebo-Treatment Group 1, \( \chi^2(5) = 4.96, p > .05 \); the Experimental Group versus Placebo-Treatment Group 2, \( \chi^2(5) = 4.34, p > .05 \); the Experimental Group versus Placebo-Treatment Group 3, \( \chi^2(5) = 7.68, p > .05 \).

The hypothesis that the three Placebo-Treatment Groups would show significantly greater improvement in psychological functioning than the Control Group was partially supported. The discriminant analyses indicated that there were no significant differences between Placebo-Treatment Group 1 and the Control Group, \( \chi^2(5) = 5.63, p > .05 \), or between Placebo-Treatment Group 2 and the Control Group, \( \chi^2 = 9.91, p > .05 \). However, the discriminant analysis between Placebo-Treatment Group 3 and the Control Group did yield significant differences, \( \chi^2(5) = 16.45, p < .01 \). A strength of association test indicated that approximately 38% of the score variance could be attributed to the meditation technique, canonical \( r = .61 \). Mean differences as tested by univariate F were significant on the STAI, \( F(1,37) = 8.83, p < .01 \), and the POI-Tc Scale, \( F(1,37) = 8.90, p < .01 \), indicating that these two variables were again the primary contributors to the multivariate significant differences between the two groups.
The hypothesis that there would be no significant differences in improvement in psychological functioning between the three Placebo-Treatment Groups was supported. The discriminant analyses yielded the following results: Placebo-Treatment Groups 1 and 2, $\chi^2(5) = 7.94, p > .05$; Placebo-Treatment Groups 1 and 3, $\chi^2(5) = 8.44, p > .05$; Placebo-Treatment Groups 2 and 3, $\chi^2(5) = 4.97, p > .05$.

The hypothesis that the High Expectation Group would show significantly greater improvement in psychological functioning than the Experimental Group, the three Placebo-Treatment Groups, and the Control Group was not supported. The discriminant analyses indicated the following: High Expectation Group versus Experimental Group, $\chi^2(5) = 9.89, p > .05$; High Expectation Group versus Placebo-Treatment Group 1, $\chi^2(5) = 5.31, p > .05$; High Expectation Group versus Placebo-Treatment Group 2, $\chi^2(5) = 9.74, p > .05$; High Expectation Group versus Placebo-Treatment Group 3, $\chi^2 = 6.68, p > .05$; High Expectation Group versus Control Group, $\chi^2 = 5.67, p > .05$. 

Chapter 4
DISCUSSION

In recent years the number of studies investigating the psychological effects of meditation has increased greatly. The majority of studies has utilized Transcendental Meditation as the experimental group, primarily because it is a relatively standardized, and widely practiced form of meditation. Unfortunately, much of this research must be viewed as equivocal due to a serious lack of methodological rigor. Numerous studies (Ferguson & Gowan, 1972; Miller, 1973; Schilling, 1974; Seeman et al., 1972; Seeman et al., 1973) have not controlled for motivational factors or placebo/expectation of relief effect. Although the "waiting list" control group design effectively controls for motivational factors, it has not been used in the psychological research of TM. One plausible explanation for this methodological omission is that the TM organization, although apparently interested in validating its program through scientific inquiry, is probably equally concerned with the continual growth and expansion of the TM movement, leading to only partial compliance with design requirements. To deny, even temporarily, an individual's access to the TM instruction, which would be required if a "waiting list" control group were to be used, might not be acceptable to the TM organization in light of its desire to rapidly increase the number
of practitioners of TM. Similarly, since an integral part of the TM experience is several hours of introductory lectures which provide extensive information supporting the efficacy of the TM technique, a strong placebo/expectation of relief effect is involved in the learning process, and necessarily confounds the results of research on TM.

The development by Benson (1974) of a simple, self-taught meditation technique facilitates the carrying out of meditation research which will not be blocked for administrative or commercial reasons from control of both motivational and placebo/expectation of relief variables. In addition, because the Benson technique is clearly presented in a step by step manner, it is possible to begin to explore the major components involved in the meditation process.

The current study utilized the Benson technique in order to investigate the effects of regular, short-term meditation on anxiety, locus of control, and self-actualization. The hypothesis that the Experimental Group, which practiced the Benson meditation technique over a six week period, would show significantly greater improvement in psychological functioning, as measured by the five dependent variables, than a waiting-list Control Group was supported. The results indicated that the practice of the meditation technique had an overall positive effect on psychological functioning. That is, through the use of multivariate statistical analysis significant differences between the
Experimental Group and the Control Group, in the expected direction, were found on a combination of the five dependent variables. The practice of meditation was found to be particularly effective in reducing trait anxiety, and in increasing the time-competence dimension of the self-actualization construct.

Although the State-Trait Anxiety Inventory (STAI A-Trait Scale) and the IPAT Anxiety Scale are both purported to measure trait anxiety, and the correlation between the two measures is reported in one study as .75 (Spielberger, 1970), significant univariate differences between the Experimental Group and the Control Group were found only on the STAI. One possible explanation for this discrepancy may lie in the specific definitions of trait anxiety utilized in the development of the two instruments. Cattell and Scheier (1961), in developing the IPAT Anxiety Scale, defined trait anxiety as a "free floating" form of anxiety in which "the individual experiences anxiety without being aware that he can rationally attach it to any object or recollection." In developing the STAI, Spielberger (1966) defined trait anxiety as a relatively stable emotional condition involving anxiety proneness, that is, the tendency to respond to situations perceived as threatening with elevations in state anxiety. State anxiety is defined as a transitory emotional state characterized by feelings of apprehension and tension, and increased autonomic nervous system activity.
In a review of available self-report measures of anxiety, which included both the STAI and the IPAT Anxiety Scale, Levitt (1967) stated that the STAI "is the most carefully developed instrument, from both theoretical and methodological standpoints of those presented... The test construction procedures... are highly sophisticated and rigorous."

The Time-Competence Scale of the POI is designed to measure the extent to which an individual uses time effectively in the present, as well as incorporates the past and future into present goals. The time-competence dimension of self-actualization is considered by Shostrom (1966) to be of central importance in personal growth and interpersonal interactions.

No significant univariate differences were found between the Experimental Group and the Control Group on Rotter's Internal-External Locus of Control Scale, or the Internal Scale of the POI.

The hypothesis that the Experimental Group would show significantly greater improvement in psychological functioning as measured by the five dependent variables than the three Placebo-Treatment Groups was not supported. Each of the Placebo-Treatment Groups practiced a form of Benson's meditation technique which excluded one of the major instructional components: progressive relaxation of the muscle system; a mantra or repeated word or phrase (in this case the word "one"); or the maintenance of a passive attitude.
during the meditation. The results of the multivariate analysis indicated that the deletion of any one of these instructional components did not produce significant differences in levels of anxiety, locus of control or self-actualization from those of the Experimental Group.

The hypothesis that the three Placebo-Treatment Groups would show significantly greater improvement in psychological functioning as measured by the five dependent variables than the Control Group was partially supported. Neither Placebo-Treatment Group 1, in which the meditation instructions deleted any reference to progressively relaxing the muscle system, nor Placebo-Treatment Group 2, which excluded any reference to the use of a mantra, showed any significant multivariate differences from the Control Group on the five dependent variables. This would suggest that both progressive relaxation of the muscle system, and the use of a mantra are of central importance to the meditation process. The Placebo-Treatment Group 3, in which any reference to maintaining a passive attitude during the meditation was deleted, did show significantly greater improvement than the Control Group on a combination of the five dependent variables. Results of the univariate analysis indicated that the Placebo-Treatment Group 3 improved significantly more than the Control Group on the STAI and the Time-Competence Scale of the POI. This finding suggests that the instructions for the Benson meditation technique which involve the maintenance
of a passive attitude do not contribute significantly to the meditation process in regard to its effect on the variables measured.

The hypothesis that there would be no significant differences in improvement in psychological functioning between pairs of the three Placebo-Treatment Groups was supported. No significant multivariate differences were found between pairs of these three groups on the five dependent variables.

The hypothesis that a High Expectation Group (in addition to receiving instruction in the Benson meditation technique, it was provided with information aimed at increasing the expectation of positive psychological change as a result of regular meditation) would show significantly greater improvement in psychological functioning than the Experimental Group, the three Placebo-Treatment Groups, and the Control Group was not supported. The results indicated that there were no significant multivariate differences between the High Expectation Group and any of the five remaining groups on the five dependent variables. The fact that the mean scores for the High Expectation Group were not significantly different from those of the Control Group is particularly interesting in that the High Expectation Group practiced the full Benson meditation technique, as did the Experimental Group, and yet did not improve significantly more than the Control Group in psychological functioning as measured by the five dependent variables. In other words, the
introduction of supportive information aimed at increasing the expectation of positive psychological change as the result of meditation appears to have an effect of negating the value otherwise derived from the practice of the Benson technique. One explanation of this finding which was briefly entertained, and then rejected, was that inducing a high expectation of positive psychological change as the result of the practice of meditation is subversive of the instruction to maintain a passive attitude, thus negating the Benson instructions. Since a finding of the present study was that the instructional component of the Benson technique which calls for the maintenance of a passive attitude did not contribute significantly to the meditation process, this explanation does not appear to be sound. A more plausible explanation for this finding is that the High Expectation Group subjects were led to expect greater positive changes in psychological well-being than can be readily experienced over a six week period. Thus, they were not as sensitive to subtler changes in their psychological functioning as were the Experimental Group subjects who did not have a heightened expectation of positive psychological change as the result of short-term meditation. For the High Expectation Group subjects, anything short of dramatic changes in their psychological functioning may have been experienced as failure, and thus their disappointment was reflected in their test scores.
In summary, the findings of the present study indicate that the regular, short-term practice of Benson's meditation technique has a positive effect upon the psychological functioning of the individual. Specifically, the practice of the Benson technique appears to be effective in reducing trait anxiety, or anxiety proneness, and in increasing the time-competence dimension of self-actualization, that is, the ability to use time effectively in the present, and to incorporate the past and future into present goals. Short-term meditation does not appear to significantly effect the internal-external locus of control dimension, or the internal dimension of the self-actualization construct as measured by our instruments.

The current study also provides some preliminary data on the possible dynamics of the meditation process. The findings suggest that the instructional components of the Benson meditation technique which call for the progressive relaxation of the muscle system, and the use of a mantra are of central importance to the process of meditation in terms of affecting the reduction of trait anxiety, and the increase of time-competence. At this point in time one can only speculate as to why meditation, and specifically these two components of the meditation technique have a salutary effect on these psychological variables. One possible explanation for the apparent effect of meditation on anxiety reduction is based on Schachter's work on the determinants
of emotional states. Based on a number of clinical studies, Schachter (1964) states the hypothesis that:

...an emotional state may be considered a function of a state of physiological arousal and a cognition appropriate to this state of arousal. The cognition, in a sense, exerts a steering function. Cognitions arising from the immediate situation as interpreted by past experience provide the framework within which one understands and labels one's feelings. It is the cognition which determines whether the state of physiological arousal will be labelled "anger", "joy", or whatever.

In other words, Schachter suggests that emotional arousal is physiologically nonspecific, and the subjective experience of any specific emotion exists only on a cognitive level. Although Schachter's theory is based on the study of general physiological arousal, his basic premise may also be applicable to the physiology and psychology of meditation. Beary, Benson and Klemchuk (1974) demonstrated that the practice of the Benson meditation technique produces a hypometabolic physiological state characterized by a significant decrease in oxygen consumption, carbon dioxide elimination, and respiration rate. Employing Schachter's theory, the emotional state experienced during meditation would be identified by the meditator based on both the hypometabolic state, and a cognition of this state arising from the immediate situation as interpreted by past experience. The present study indicated that the cognition which arises during meditation leads to the labelling of the relaxed physiological state as a lack of psychological stress, or an absence of anxiety (rather than fatigue, boredom, etc.). The question
remains as to what in the immediate situation of meditation would lead to such a cognition. The answer may lie in an understanding of the role of the mantra in the meditation process. Carrington and Ephron (1975) suggest that rhythmici-
ty is an important element in meditation, and is particular-
ly evident in those forms of meditation which utilize a mantra. In support of this contention they cite a study by Salk (1973) which demonstrated that infants respond to the sound of a continuous recorded heartbeat with a significant reduction in crying, and a significant weight increase as compared to a control group of infants who did not have this constant, rythmical stimulus. He suggests that during the prenatal period the fetus may develop an association be-
tween the rythmicity of the mother's heartbeat and the ten-
sion free intrauterine environment, and that similar rythmi-
cal sounds encountered later in life have a "functional con-
nection with the original (intrauterine) experience" and become "permanently associated with a feeling of well-being."
Salk's study suggests a psychophysiological explanation of
the commonly experienced soothing effects of rythmic sounds such as the ocean, music, etc., and perhaps it provides the cognitive link in the meditation experience as well. The meditator may associate the mantra with a sense of well-
being, and this cognition thus would provide a psychological framework for the interpretation and labelling of the hypo-
metabolic state experienced during meditation as one of
lowered anxiety.

In regard to the effect of Benson's meditation technique on the time-competence dimension of self-actualization, it would appear that the mantra again is of central importance. Benson (1974) suggests that the purpose of the mantra "is to free oneself from logical, externally oriented thought by focusing solely on the stimulus." In other words, during the meditation period, when thoughts occur which draw the individual toward reflection on the past, or anticipation of the future, the mantra enables the individual to focus on the "here and now" of the meditation experience. The meditator, in setting aside time each day for meditation, may become increasingly sensitive to his/her time orientation, and may begin to equate present-orientation, which is a major focus of the meditation process, with feelings of well-being, and thus shift toward a more time-competent orientation. The sense of well-being associated with the time spent in the meditation state may have carry-over effects to other times as well.

A further finding of the current study was that the use of supportive information aimed at increasing the expectation of positive psychological change as the result of regular meditation appears to have an effect, at least in the short-term, of negating the value otherwise derived from the practice of the meditation. This finding is of particular interest in that, since the Benson technique is designed to
be self-taught, there is little opportunity to provide encouragement to the novice meditator in the form of supportive information. The results suggest that encouragement such as was given in this study is not only unnecessary for good results, but may actually be detrimental of such results during the first six weeks of meditation.

Hopefully, the present study will provide an impetus for further research in the area of meditation. One limitation of this study is that it only examined the psychological effects of short-term meditation. It is reasonable to assume that the experience of meditation changes over time, and therefore it is important to examine the long-term effects of the meditation process. Secondly, the present study utilized only normal adults as the subject population. Considering that meditation appears to be steadily growing in popularity in the general population, the use of normal adults in research meditation is quite appropriate. Nevertheless, it would be equally valuable to explore the potential therapeutic usefulness of meditation with particular clinical populations. The results of this study would suggest that meditation may prove effective in the prevention and treatment of anxiety, and in interventions aimed at personal growth rather than the amelioration of specific psychological disorders. Thirdly, this study has examined only a limited number of psychological variables. It is necessary to both replicate the present study, and to conduct
further research which examines the effects of meditation on other personality and psychological variables.
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APPENDICES
APPENDIX A

MEDITATION INSTRUCTIONS FOR THE
THREE PLACEBO-TREATMENT GROUPS
Placebo-Treatment Group 1

(1) Sit quietly in a comfortable position.

(2) Close your eyes.

(3) Breathe through your nose. Become aware of your breathing. As you breathe out, say the word "ONE" silently to yourself. For example, breathe IN...OUT, "ONE"; IN...OUT, "ONE"; etc. Breathe easily and naturally.

(4) Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed, and later with your eyes opened. Do not stand up for a few minutes.

(5) Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude, and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "ONE". With practice, the response should come with little effort. Practice the technique twice a day, but not within two hours after any meal, since the digestive processes seem to interfere with the technique.
Placebo-Treatment Group 2

(1) Sit quietly in a comfortable position.

(2) Close your eyes.

(3) Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.

(4) Breathe through your nose. Breathe easily and naturally.

(5) Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed, and later with your eyes opened. Do not stand up for a few minutes.

(6) Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude, and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "ONE". With practice, the response should come with little effort. Practice the technique twice a day, but not within two hours after any meal, since the digestive processes seem to interfere with the technique.
Placebo-Treatment Group 3

(1) Sit quietly in a comfortable position.
(2) Close your eyes.
(3) Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.
(4) Breathe through your nose. Become aware of your breathing. As you breathe out, say the word "ONE" silently to yourself. For example, breathe IN...OUT, "ONE"; IN...OUT, "ONE"; etc. Breathe easily and naturally.
(5) Continue for 10 to 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed, and later with your eyes opened. Do not stand up for a few minutes.
(6) When distracting thoughts occur, try to ignore them by not dwelling upon them and return to repeating "ONE". With practice, the response should come with little effort. Practice the technique twice a day, but not within two hours after any meal, since the digestive processes seem to interfere with the technique.
APPENDIX B

INTRODUCTORY STATEMENTS
Introductory Statement for the Experimental Group and the Three Placebo-Treatment Groups

This study provides an opportunity for you to learn a new meditation technique which was developed at Harvard Medical School, and is based on extensive research on the physiological effects of a wide range of meditation and relaxation techniques. It is believed to contain all of the essential elements found in these techniques. It is easily learned, and does not require any change in your life-style, or adherence to any particular religious or spiritual philosophy. Research has shown that this technique is effective in producing a relaxed physiological state characterized by a slowing of the heart rate, a decrease in oxygen consumption, an increase in alpha brain-wave activity, and other changes indicative of a hypometabolic state.

The purpose of this study is to determine what psychological benefits can be derived from the regular practice of this form of meditation.

This study is of a confidential nature, and therefore discussion of what you are doing with friends and classmates should be kept to a minimum.
Introductory Statement for the High Expectation Group

This study provides an opportunity for you to learn a new meditation technique which was developed by Dr. Herbert Benson, a cardiologist at Beth Israel Hospital in Boston, and a researcher at Harvard's Thorndike Memorial Laboratory. It is an easily learned technique which does not require any change in your life style, or adherence to any particular religious or spiritual philosophy.

This technique is based on a careful examination of a wide range of meditation and relaxation techniques. Dr. Benson has found that the regular practice of this technique elicits what has been termed the "relaxation response", "a natural, innate protective mechanism against overstress which allows us to turn off harmful bodily effects", and which is characterized by a significant decrease in oxygen consumption, CO₂ elimination, rate and volume of respiration, heart rate and blood lactate level, and an increase in alpha brain-wave activity and skin resistance. All of these changes are indicative of a relaxed physiological state. The "relaxation response" can be contrasted with what has become popularly known as the "fight or flight" response, an innate physiological response to stressful situations characterized by increased oxygen consumption, blood pressure, and respiration rate.
Extensive research has shown that this technique is highly effective in combatting hypertension, as well as other physiological signs of stress, in reducing anxiety, and in bringing forth positive psychological changes within the individual. This study is an extra-verification study in which some secondary points will be examined, and which will add to the large body of positive findings which has already been accumulated.
APPENDIX C
DEBRIEFING STATEMENT
Dear Participant:

Once again I want to thank you for your participation in the meditation study. This study is an investigation of the psychological benefits that can be derived from the regular practice of a meditation technique developed by Dr. Herbert Benson, a cardiologist and researcher at Beth Israel Hospital in Boston. Specifically, this study is looking at the effects of meditation on three psychological variables: anxiety; locus of control; and self-actualization. The tests that you recently completed were designed to measure these variables.

A primary goal of this study is to determine which aspects of the meditation exercise contribute significantly to psychological changes within the individual. Toward this end, each of you were randomly assigned to one of six groups: a group which received instruction in the full meditation technique as developed by Dr. Benson; one of three groups which received instruction in a modified version of the technique; a group which, in addition to receiving instruction in the full technique, was provided with information aimed at increasing your expectation that you would benefit psychologically from the regular practice of meditation; or a "waiting list" group which received instruction in the full technique after a six week waiting period, and after completing the battery of tests. In using this experimental design it will
be possible to determine which components of the meditation process, if any, contribute to positive psychological changes.

Many of you have asked how I am able to measure change without administering the tests twice, once before learning the meditation, and then again six weeks later. Let me explain briefly. In many experimental situations the procedure of giving the same tests twice to an individual can potentially confound the results obtained in that, once familiar with the test questions, the individual may anticipate the type of response changes that are being expected or hypothesized. As an alternative, it is possible to compare test results of different groups in an experiment using only one testing session if all individuals are randomly assigned to the groups. The randomization process is the best assurance of equivalence between groups at the beginning of an experiment, and the pretest is not essential.

Since many of you have been practicing a modified version of the Benson technique it is important that, at this time, you become aware of the full instructions for the meditation exercise. These instructions are provided on the attached page, and are based on four components which Dr. Benson believes to be central to the meditation process: (1) a quiet environment; (2) a comfortable position; (3) a repeated word or "mantra"; and (4) a passive attitude. Space does not allow going into the details of the background and
development of the Benson technique, and therefore I strongly suggest, particularly if you plan to continue meditating, that you read Dr. Benson's current book, *The Relaxation Response*, which is available in paperback at a modest cost.

If you have any further questions concerning either your participation in the study, or the technical aspects involved, please feel free to call me at 826-4014.

Sincerely

[Signature]