The effects of Kundalini Yoga and desensitization on speaking anxiety

Rama Kirn Kaur Khalsa

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THE EFFECTS OF KUNDALINI YOGA AND DESENSITIZATION ON SPEAKING ANXIETY

A Thesis
Presented to the
Faculty of
California State College
San Bernardino

In Partial Fulfillment of the Requirements for the Degree Master of Arts in Clinical Counseling Psychology

by
Rama Kirn Kaur Khalsa
February 1977
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Approved by:

Chairperson

Date 2/11/77
The purpose of this study was two-fold. The study was designed: a) to compare Desensitization and Kundalini Yoga as treatments for social speaking anxiety, and b) to determine the effects of the treatments on the subject's state of consciousness during the treatment sessions. Subjects were randomly assigned to either a Kundalini Yoga group, a Desensitization group or a waiting list control. Each group received 8 sixty minute group treatment sessions. As predicted, the subjective measures indicated that the majority of subjects in both treatments experienced a moderate to great reduction in anxiety at post-treatment and follow-up assessments. Subjective measures indicated that Kundalini Yoga was a more effective treatment of trait anxiety while Desensitization was a more effective treatment for state anxiety. Physiological and psychological test measures, however, did not indicate significant change. Q-Sort data, reflecting the subject's state of consciousness during the treatment sessions, indicated that the subjects in both experimental groups predominantly experienced a deeply relaxed state similar to the EEG state of alpha.
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INTRODUCTION

The construct of anxiety has been divided into state and trait components (Spielberger, 1970; Martens, 1971). Trait anxiety is viewed as a stable personality characteristic. This characteristic is defined as a latent disposition for a reaction of a certain type to occur if triggered by appropriate, sufficiently stressful stimuli. State anxiety conversely is viewed as the transitory state of an organism and is frequently described as "stress". Stress can be seen as the state of an organism when there is an interaction between the individual and the environment which is more extreme than the ordinary arousal state. Some kind of perceived threat must be present. The integrity of the organism is involved and a normal adjustment response cannot be found (Martens, 1971). A measurement of trait anxiety does not indicate how an individual changes from one situation to another; it describes anxiety proneness or overall level.

Presently, there are numerous views regarding the etiology and treatment of anxiety. Despite the many treatment approaches to this problem, little research exists comparing the relative merits of treatment modes in reducing anxiety. In response to this need, the present study is focused on comparing the effects of two previously uncompared
treatment modes, Kundalini Yoga therapy and Desensitization, on social speaking anxiety. Yogic therapies are rather new treatment modes in the West, and very few studies have been done on their potential use with clinically relevant problems. Desensitization, on the other hand, has empirical support for treatment of many types of anxiety problems, yet has been compared most commonly with insight therapies.

Desensitization Therapy

Desensitization is a commonly used technique for treating persistent avoidance responses to innocuous events and situations (Wolpe, 1958). Theoretically, Desensitization assumes that an anxiety problem develops through learning; via a Pavlovian paradigm, the client has come to associate a neutral stimulus with an anxiety producing unconditional stimuli and is subsequently avoided. The overall goal of Desensitization is to extinguish the anxiety elicitation power of the "neutral" cue and substitute a more appropriate, functional response to it.

Desensitization therapy firstly involves determining whether the avoidance responses are basic or secondary to the individual's problem. If they are basic, the problem is ranked according to increasing
degrees of anxiety intensity. A hierarchy is then constructed proceeding from the least disturbing to the most disturbing items. The next step is to teach the client deep muscle relaxation (Jacobsen, 1938). When the client has reached a deeply relaxed state, the therapist describes the least disturbing item on the hierarchy and instructs the client to imagine it as vividly as possible. Graded real life exposure and modeling procedures can be substituted for imagined exposure to hierarchy items if practical. If the client reports anxiety during presentation of the first hierarchy item, he is returned to the relaxed state; once he feels deeply relaxed, the therapist again described the first item. This process continues until the client feels comfortable and relaxed while imagining the hierarchy item, and each of the subsequent hierarchy items.

Certain conditions are generally necessary for successful use of Desensitization. The client should be able to relax, should be able to react anxiously to noxious stimuli in imagery, and there should be some gradation in the experience of anxiety. If these three conditions are not met, other treatment techniques are appropriate.

Desensitization has been accomplished individually
and in groups with significant success treating a wide variety of anxiety and fear related problems (Burnett & Ryan, 1964; Cooke, 1966a, 1966b; Davidson, 1968; Emory & Krumboltz, 1967; Johnson, 1966; Lazarus, 1961, 1968; Lang & Lazovik, 1965, 1968; Lang, Lazovik, & Reynolds, 1965; Moore, 1965; Paul, 1964, 1966, 1967; Zeisset, 1968). These controlled studies have established the effectiveness of Desensitization with "classic phobias," more generalized social evaluative anxiety, some psychophysiological disorders, and other distressing behaviors in which the direct treatment of anxiety was considered of fundamental importance for the client (Franks, 1969). Desensitization is of questionable value with problems of pervasive and generalized anxiety. Hierarchy construction in these cases is very difficult. Also, some failures in controlled and case studies appear to stem from difficulty with imagery and lack of adequate supervision of inexperienced therapists (Franks, 1969).

The mechanics of Desensitization have also been extensively researched. The number of hierarchy items completed during treatment appears to be a good measure of treatment success (Lang, Lazovik, & Reynolds, 1965). The data further suggest that imagined fear stimuli do evoke autonomic as well as verbal fear responses, and
that the visualization of anxiety imagery may produce similarly ordered autonomic responses (Franks, 1969). The importance of relaxation in Desensitization has been difficult to assess due to design problems; however, most available research reports a positive correlation between the number of hours subjects spend in relaxation practice and fear reduction in Desensitization (Larsen, 1965; Schubot, 1966; Cooke, 1965; Grossberg, 1965). Drugs have been found to have detrimental effects when used as an aid to relaxation, as the therapy experience does not appear to generalize outside of the drug state (Otis, 1965).

The cognitive set of the subjects has been found to be an influence in the degree of success with Desensitization. People who explain their behavior change as a response to a treatment strategy which relates to their own personalities and experiences are more likely than others to change when exposed to Desensitization (Folkins, 1968). Research provides clear evidence that cognitive set effects verbal and somatic components of fear behavior (Bandura et al., 1967; Franks, 1969; Geer et al., 1967; Hart, 1966; Jones, 1924; Lazarus, 1964). It appears that the effects of threatening stimuli may be both accentuated and reduced by manipulation of set and instructional variables (Sternback, 1964; Graham, 1962).
For many therapists, cognitive set is a master system which dominates emotional and physical state. Schacter and Singer (1962), for example, argue that emotional experience is a two component event, consisting of physiological arousal and an accompanying cognition, with the cognitive aspect dominant over the overt components of emotion. From this perspective, Desensitization is viewed as an operant training paradigm, designed to shape the response, "I am not afraid" (or a potentially competing response such as "I am relaxed") in the presence of a graded set of stimuli. Within the cognitive model, Desensitization has also been interpreted as a mechanism where the subject learns to control the presentations of stimuli and the responses they evoke. The presence of the control aspect appears to reduce fear and anxiety; the assumption is that feared stimuli are aversive because the subject has no organized response to it except avoidance (Hebb, 1949).

In summary, some progress has been made investigating the mechanisms and components of Desensitization as they relate to outcome. Relaxation training and instructions appear to facilitate the process of anxiety reduction, yet their necessity has not been clearly established. Cognitive set and completion of the
hierarchy items appear to be related to success.

The success of Desensitization may well lie in the fact that it is a multiple level treatment, designed to modify the physiological, overt, and verbal responses of the subjects to anxiety situations.

Kundalini Yoga Therapy

In general orientation, most yogic systems are similar to humanistic and transpersonal psychologies in that the health process is seen as one of progressive evolution of man's full potentials and an actualized experience of self.

The philosophy of Kundalini Yoga holds that a "basically relaxed state of being is synonymous with mental and physical health" (Harbhajan Singh Yogi, 1975). Yogically, most anxiety is seen as an indicator of imbalance within the human organism and between the organism and the environment. Generally, the yogic approach to treating illness is to treat the whole man and his experience. All experience, whether ill or healthy, is viewed as a subtle multi-level process that is interrelated. Some of the aspects of man's experience are the cognitive set, the physiological state, the intuitive state, the emotional state, and the spiritual state. These aspects of experience are interwoven to form the
momentary assessment of being. In treating mental and physical illness, Kundalini Yoga treats as many aspects of the being as possible and attempts to bring these aspects into conscious rather than unconscious awareness.

This holistic approach to health is reflected in the many and diverse techniques used to treat anxiety. En vigorating exercise series, working on muscle groups related to breathing and common tension areas, coupled with deep relaxation series using imagery, breathing techniques, and meditation are all part of this treatment. Also, particular stress is given to developing an awareness of tensions, both physical and emotional, through the concentrative and meditative techniques. Theoretically, regular practice of these techniques results in: a) lowering of the overall metabolic rate; b) an awareness of tension producing emotional, cognitive, and physical patterns; and c) knowledge of tension reducing techniques. Unlike Desensitization, Kundalini Yoga therapy does not focus on specific anxiety producing contexts in most of its techniques.

Research done on yoga and meditation began with the study of yogic control of autonomic functions. Developing control over bodily, cognitive, and emotional functions is an important goal of most schools of yoga.
Research examined reported abilities ranging from remaining in difficult postures for long periods of time to long term breath control (Vakil, 1950; Hoenig, 1968; Anand, 1961c). Researchers in yogic "feats" generally concluded that direct unmediated control over autonomic functions occurred only rarely in the total number of yogis studied. Where such control exists, intervening involuntary mechanisms are usually employed. Because many well known practitioners refused to participate in "stunts" for philosophical reasons, the results of these studies are still very controversial.

After the initial surge in research on yogic autonomic control, many investigators studied physiological correlates of meditation. Most research of this type was conducted on Transcendental Meditation (TM). Its wide spread use and relative simplicity compared to other meditations made it a good target for basic research. The technique of TM consists basically of sitting quietly twice a day for about 20 minutes and mentally repeating a Bej Mantra (seed or basic sound) while letting thoughts flow in and out of one's awareness.

The findings indicated that the physiological response to TM is relaxation; moreover, many physiological correlates of anxiety dropped significantly during TM practice (Allison, 1970; Wallace, 1970).
During TM, respiratory rate and cardiac output decreased, blood lactate (which has been associated with high blood pressure) dropped markedly, and skin resistance increased (Wallace, 1970, 1972).

EEG studies indicated that meditation is different from normal sleeping, waking, or dreaming states. In some EEG studies (Wallace, 1970, 1972), alpha and theta readings were amplified especially in the frontal lobes, while other studies showed beta and 40 Hz. states as predominant in deep meditation (Banquet, 1973). The TM state has been described by many TM researchers (Wallace, 1971; Orme-Johnson, 1974) as a "wakeful metabolic state" having many of the physiological qualities of the relaxation state and some of the response qualities of the waking state.

The effects of TM on the non-meditating state have also been studied. Studies on groups of meditators and non-meditators reported that TM produced physiological rest, and correlated with decreased heart and respiration rate outside of meditation (Routt, 1973; Orme-Johnson, 1973).

Physiological correlates of Zen Buddhist meditation (zazen) have also been researched (Kasamatsu, 1963; Okuma, 1958). The practice of zazen is more
complex than TM and consists of different levels of techniques. Specific seating postures are encouraged that make long sitting possible with a straight spine. The meditator sits with eyes open and stares at a blank wall for 35-50 minutes while concentrating on the breath, counting, general awareness, or a koan (zen paradoxical statement) depending on one's level of practice. In zazen, one also lets thoughts flow in and out of mental awareness while remaining focused on the object of concentration.

Kasamatsu (1963) examined the heart rate, GSR, respiration rate and EEG correlates of zazen meditation in Zen monks. The results regarding heart rate, respiration rate, GSR and EEG were similar to those reported in TM studies (Wallace, 1970, 1972; Benson, 1972). Kasamatsu divided the state of EEG feedback into 4 stages which correlated with length of zazen practice:

Stage I: a slight change which is characterized by the appearance of alpha waves inspite of open eyes;

Stage II: an increase in amplitude of persistent alpha waves;

Stage II: decrease in alpha frequency;

Stage IV: appearance of rhythmic theta train (final stage doesn't always occur).
Alpha feedback, which is frequently mentioned in relation to meditation states, is reported to be a composed relaxation state, while theta is frequently associated with the pre-sleep state. Okuma et al., (1958) reported similar EEG feedback, emphasizing the alpha state, as did Kasamatsu (1968).

Physiological research has also been done on specific techniques in Kundalini Yoga. One such technique is called "breath of fire." It is a breathing technique used extensively with various postures and exercises and is practiced from 30 seconds to 20 minutes at a time. The technique involves a rapid pumping motion at the navel point, inhaling while the abdomen expands, and exhaling while the abdomen contracts. The breathing is done through the nose. Using EEG, Goodman (1973) examined the effects of "breath of fire" on an experimental group comparing them with a clinical hyperventilation and a normal breathing control group. He found that "breath of fire" was very different from the other conditions. The EEG response to 3 minutes of "breath of fire" was an increase in the percentage of alpha that spread from the back to the frontal areas of the brain.

Glassman (1975) examined the physiological correlates of different types of physical exercise
including 3 Kundalini Yoga exercises. His general conclusions were that there was a general trend towards a reduced metabolic rate in all 3 of the Kundalini Yoga exercises, though there were many other physiological changes which could not be explained in a specific way. Another study (Goodman, 1972) compared the EEG feedback of an Indian Hatha yogi with a 3 year Kundalini Yoga meditator and found that the Kundalini Yoga student was able to generate a constant alpha from all four major areas of the brain and change EEG feedback significantly by changing to other Kundalini Yoga meditations. The Indian yogi unexpectedly did not alter EEG feedback by practicing different meditations.

In summary, physiological research on yoga and meditation techniques is in a very basic stage, yet there appears to be some evidence that these techniques appeared to effect subjects in a manner conducive to deep relaxation. Also, the work of Routt (1973) and Orme-Johnson (1973) indicated that these physiological effects generalized to the subjects' state outside meditation as well.

Research has also been done on the effects of yoga and meditation on psychological correlates of anxiety. Of particular relevance to the present
study are three experiments directed towards reducing subjects' anxiety. Anxiety was assessed in two TM studies via the Institute for Personality & Ability Testing Anxiety Scale (Farwell, 1974), and the Spielberger Anxiety Inventory and Cattell Anxiety Scale (Ferguson et al., 1974). Both studies reported that as treatment progressed, TM subjects showed a significant reduction in anxiety level, and this decrease increased with length of practice up to a period of 43 weeks. Stone (1975) investigated the effects of 10 weeks of Kundalini Yoga practice on beginning yoga students using the Personality Orientation Inventory (POI) and the State-Trait Anxiety Inventory. The POI results indicated that a significant increase in subscale 8, self-acceptance, took place. The State-Trait Anxiety Inventory results showed a significant reduction in state and trait anxiety levels.

One weakness of the anxiety reduction studies reported above is that the subjects were not selected from clinically relevant populations. One study which did employ subjects with clinically relevant anxiety neurosis was conducted by Girodo (1974). The patients' symptoms were monitored by an anxiety symptom questionnaire prior to a TM-like meditative treatment. After 4 months of practice, 5 subjects reported significant improvement,
while 4 subjects did not report significant change. The 4 "failures" then engaged in implosion therapy during which their anxiety reportedly decreased. Analysis of the subjects' characteristics indicated that meditation was beneficial for patients with a shorter history of illness; implosion appeared more beneficial with subjects with a long history. There was also evidence to suggest that the former had more cognitive-like symptoms such as apprehension and worry.

Another study explored use of a meditative technique called "shavasan" as an alternative to the present drug management of clinical hypertension (Datey et al., 1967). After practicing this technique daily for several months, the majority of the subjects reported that their headaches, nervousness, irritability and insomnia had improved. The subjects also reported a sense of well-being after shavasan. The blood pressure measures indicated that there was a significant drop in blood pressure measures in 75% of the subjects who completed the treatment. The exercise has many advantages over the use of drugs in that there are no side effects, no cost, and no required equipment. Similar results were reported by another study using TM on hypertension (Benson et al., 1972).

Though this study is exploratory in nature, some
hypotheses have been formulated based on the research previously mentioned. The hypotheses are as follows:

1. In the Desensitization and Kundalini Yoga groups there will be a significant reduction from baseline to post-treatment in the subjects' heart and respiration rates.

2. In the Desensitization and Kundalini Yoga groups there will be a significant reduction in IPAT Anxiety Battery and Taylor Manifest Anxiety scores across treatment.

3. Subjects in both treatments will report a reduction in their anxiety problems on the post-treatment and follow-up questionnaires relative to their baseline measures.

4. Subjects in the Kundalini Yoga treatment will report a greater reduction in generalized, trait anxiety, while Desensitization subjects will report a greater reduction in state anxiety problems on the post-treatment questionnaire relative to their baseline measures.

5. On the Q-Sort test, both Kundalini Yoga and Desensitization subjects will rate the "alpha-state" of composed relaxation as highly representative of their state and the "beta-state" of diffuse arousal as highly unrepresentative of their state at the assessment times (at the end of the first, fourth, and eighth treatment
sessions). On the Q-Sort test, the subjects in the Kundalini Yoga group will also rate the "40 Hz.-state" of focused arousal as progressively more representative of their state.
METHOD

Subjects

Thirty-two subjects responded to posters and newspapers placed around California State College, San Bernardino and the surrounding community. Advertisements requested subjects who experienced intrusive anxiety in speaking situations. Of those persons who attended the baseline measurement session, 24 committed themselves to the study. These subjects were assigned to one of five treatment groups by random drawing of names from a hat. The subjects were thus assigned to one of two Desensitization groups, two Kundalini Yoga groups or a control group. Each group contained 4 or 5 subjects.

Prior to the start of treatment or after one treatment session, 9 of the 24 subjects withdrew from the study. Reasons for withdrawal included transportation problems, heavy school assignments, illness, and scheduling problems. Seven subjects in the Kundalini Yoga condition, 4 subjects in the Desensitization condition, and 4 subjects in the control condition completed the study. These 15 subjects averaged 28 years of age and consisted of 6 men and 9 women (Table 1).
Table 1

Characteristics of Subjects in Control Group, Treatment Groups, and Total Sample

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>Age</th>
<th>Stan. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Mean</td>
</tr>
<tr>
<td>Control</td>
<td>1</td>
<td>3</td>
<td>31.00</td>
</tr>
<tr>
<td>Kundalini Yoga</td>
<td>3</td>
<td>4</td>
<td>27.00</td>
</tr>
<tr>
<td>Desensitization</td>
<td>2</td>
<td>2</td>
<td>27.00</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>9</td>
<td>28.33</td>
</tr>
</tbody>
</table>
Design

A 3 x 3 factorial design was used with treatment condition (Kundalini Yoga treatment, Desensitization treatment, and a waiting list control) and time of assessment (baseline, end of treatment, and at 5 months post-treatment) as the two independent variables. Each subject participated in 11 sessions overall. These included one baseline session, 8 treatment sessions, a post-treatment session, and a follow-up session.

Assessment Measures

In each group, heart and respiration rates were measured in response to stimuli contexts inducing relaxation or anxiety at baseline and the end of treatment. Trait anxiety level was measured by the IPAT Anxiety Battery, the Taylor Manifest Anxiety Scale, and questionnaires in each group at all three assessment times. At the end of the first, fourth, and eighth treatment sessions, the Kundalini Yoga and Desensitization groups were measured with a Q-Sort. The Q-Sort attempted to capture in descriptor statements such as "I feel relaxed," 4 EEG states: alpha, beta, theta, and 40 Hz. Descriptors for alpha, beta, and theta were derived from biofeedback literature on
those states. Descriptors for 40 Hz. were derived in a correlation study using EEG measures (Newton, 1975).

The dependent variables were the heart and respiration rates per minute in the relaxation and anxiety contexts; the scores on the IPAT and Taylor Scales; the quantified answers on the questionnaires; and the level of descriptor accuracy on the Q-Sort.

Procedure

Baseline Procedures. The baseline session was conducted with each subject individually. After the subject arrived, the experimenter stated that the first session would be focused on gathering information from all subjects, and that this information was required in order to assess the needs of the subjects.

After the introduction, the subject was given two psychological tests to complete, the Taylor Manifest Anxiety Scale and the IPAT Anxiety Battery. Both of these tests measure manifest or trait anxiety through 40 multiple choice questions examining different facets of anxiety occurring over a wide time span. The purpose of this step was to obtain a measure of trait anxiety from the subjects.
The subject was then asked to fill out a questionnaire, designed for the study, to obtain a multi-modal analysis of the subject's anxiety problem. The questionnaire inquired into the behavioral, affective, sensory, imagery, cognitive, interpersonal and drug aspects of the subject's anxiety experience. The questionnaire (Appendix A) was based on Lazarus's multi-modal assessment methodology (Lazarus, 1976).

The experimenter and subject then jointly developed an anxiety hierarchy relating to the individual subject's anxiety problem. Hierarchy construction was approached through the equal interval method widely used in behavior therapy (Wolpe & Lazarus, 1959). This method consisted of the subject's reporting his most anxiety producing context, then his lowest anxiety provoking context, then an intermediary context, etc. until five contexts of increasing anxiety inducing properties were collected. The goal of this step was to obtain information on each subject's anxiety contexts.

The subject was then introduced to the physiological equipment; he was told that seminar planning required some physiological information from each subject. Once the subject reported being comfortable with the
equipment, he laid down on a cot with the transducers in place. At this point the experimenter instructed the subject to close his eyes and relax as fully as possible. A 5 minute music tape was then played; the music tape was designed especially for relaxation induction (Institute for Consciousness and Music, Baltimore, Maryland). During the five minute period, the subject's heart and respiration rates were recorded. The object of this step was to obtain physiological recordings while the subject was relaxed; the music was intended to serve as a cognitive focus, thus reducing the danger of arousal due to spurious anxiety producing thoughts.

The experimenter then verbally introduced the subject's most aversive hierarchy item. The scene was elaborated for 3 minutes. The elaboration of this scene was tape recorded for later use in the post-treatment session. The goal of this step was to measure the subject's physiological response to imaginal representation of the subject's most anxiety producing context.

Treatment Procedures. Both treatment conditions consisted of 8 one-hour sessions held twice a week for 4 weeks. The groups were led by the author and a colleague, both psychology graduate students and Kundalini Yoga
instructors. Each therapist led one Kundalini Yoga group and one Desensitization group.

At the end of the first, fourth, and eighth treatment sessions, a Q-Sort test (Newton, 1975) was given to all experimental subjects. The 40 Q-Sort test cards were given to the subjects who were then told to sort them into four accuracy categories. The subjects were told to reflect on their present state of being as the criteria for assigning the descriptor cards to an accuracy category. The accuracy categories were "very accurate", "somewhat accurate", "somewhat inaccurate", and "very inaccurate". The purpose of this step was to assess the subjects' state of consciousness at that time.

Desensitization Treatment. The focus of the first session was to form a group anxiety hierarchy by group discussion. Each subject received a summary of the anxiety hierarchy information gathered in the baseline session. The therapist then briefly described the rational for using imagery with relaxation and facilitated combining the separate hierarchies into one group hierarchy starting with the lowest anxiety producing items and working upwards.

The second session was spent training the subjects to relax using the muscle tension and relaxation method
developed by Jacobsen (1938). The subjects were asked to lie down and relax as fully as possible. A tape was then played guiding the subjects through the relaxation procedure (Lazarus, 1962). The tape was used in order to decrease therapist variability in the induction of relaxation. At the conclusion of the relaxation period, the subjects were asked to imagine themselves in a very pleasant situation as vividly as possible using all of their senses. The subjects were encouraged to practice the relaxation technique at home before the next session.

The last 6 Desensitization treatment sessions involved pairing the anxiety hierarchy items with muscle relaxation. Once the subjects were relaxed, the experimenter described the lowest hierarchy item. Each item was presented 3 times for 10-20 seconds. If, during the item presentation, one or more subjects reported anxiety, 2-3 minutes of relaxation instructions were given. The pace of the group was geared to the slowest individual in the group with the criteria for progress being a 20 second tolerance with no reaction from the whole group and a 60 second tolerance if there had been an anxiety response. These technique parameters are similar to those used in group Desensitization treatments by Lazarus (1961, 1968) and

**Kundalini Yoga Treatment Procedures.** Each of the 8 Kundalini Yoga sessions was slightly different. There were however major themes in the treatment process. The four themes were exercise, relaxation sequences, pranayam (breath control), and meditation. Each of these areas required the subjects to use some kind of concentration as part of the technique.

The yogic exercises initially focused upon the base of the spine, then shifted to the lower torso, and gradually shifted to the neck and skull. These exercises were taught in sets of 3 with a brief relaxation period between sets. Special attention was given to the muscle groups in the chest and abdomen that are used in breathing.

Another group of techniques used in the Kundalini Yoga treatment were the relaxation sequences. These sequences were similar to the Jacobsen relaxation series except that breathing and imagery were used in relaxing the muscle groups. The subjects were instructed to hold their breath while tensing and exhale while relaxing the muscles. These sequences were done at the end of each session to allow each individual to leave the sessions feeling relaxed, and to develop a subtle awareness of their tension and relaxation experiences.
through regular practice.

Pranayam, or breath control, was another important aspect of this treatment. The subjects were taught techniques of long deep breathing, left nostril breathing, and control of breathing rhythms. All of the breathing techniques required deep concentration to perform correctly.

During the last 4 sessions, the subjects practiced the "Beggar's meditation." The subjects were instructed to concentrate on feeling relaxed while inhaling slowly and deeply, and on an intensely anxious situation while exhaling in the same manner. The subjects were further instructed to stare into their cupped hands and concentrate on the scenes being imagined.

Further details of the techniques' rationale and protocol are included in Appendix C.

Post-Treatment and Follow-up Procedure

The post-treatment assessment session was the same as the baseline session with the following exceptions. First, the baseline questionnaire was revised to include more questions relating to the subjects' experience of the treatment sessions and anxiety change. Second, the anxiety hierarchy construction and introductory imagery exercises were
eliminated. Third, the anxiety imagery used in the baseline session was tape recorded and replayed as part of the anxiety context for physiological measures. This was done to eliminate variation between baseline and post-treatment assessments in the anxiety context.

The 5 month follow-up included the IPAT Anxiety Battery, the Taylor Scale, and a follow-up questionnaire. These three measures were sent to all the subjects by mail with a request for rapid return. The follow-up questionnaire included more questions relating to long term treatment effects and recommendations for future treatment seminars.
RESULTS

Table 2 shows the subjects' mean heart and respiration rates when exposed at baseline and post-treatment to stimuli inducing anxiety and relaxation. It was predicted that there would be a significant reduction from baseline to post-treatment in the subjects' heart and respiration rates. A multi-level factorial analysis of variance performed on the heart rate data showed that no significant changes took place across treatment. Some of the heart rate data did, however, change in the predicted direction. The mean heart rate for the Desensitization subjects decreased over treatment by 6.1 beats in the anxiety context, while the rate for the Kundalini Yoga group increased by 2.95 beats. Also, with the exception of the Desensitization and Kundalini Yoga measures at post-treatment, the subjects showed, as predicted, lower mean heart rates in the relaxation than in the anxiety context.

Due to mechanical difficulties with the respiratory transducer, the data of 6 subjects were lost during the baseline session and of 5 subjects during the post-treatment session. The respiratory results should thus be interpreted cautiously as the extremely small number of remaining subjects did not permit meaningful statistical analysis. Table 2 indicates that some of the respiratory data did,
Table 2
Mean Heart and Respiration Rates of Desensitization, Kundalini Yoga, and Control Group Subjects to Anxiety and Relaxation Stimuli at Two Phases of the Experiment

<table>
<thead>
<tr>
<th>Group</th>
<th>Stimuli</th>
<th>a Heart Rate</th>
<th>b Respiration Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anxiety</td>
<td>Relaxation</td>
<td>Anxiety</td>
</tr>
<tr>
<td>Control</td>
<td>Baseline</td>
<td>73.42</td>
<td>71.17</td>
</tr>
<tr>
<td></td>
<td>Post-Treat.</td>
<td>66.42</td>
<td>64.47</td>
</tr>
<tr>
<td>Desensitization</td>
<td>Baseline</td>
<td>80.00</td>
<td>70.44</td>
</tr>
<tr>
<td></td>
<td>Post-Treat.</td>
<td>73.92</td>
<td>74.17</td>
</tr>
<tr>
<td>Kundalini Yoga</td>
<td>Baseline</td>
<td>73.30</td>
<td>71.59</td>
</tr>
<tr>
<td></td>
<td>Post-Treat.</td>
<td>76.25</td>
<td>76.31</td>
</tr>
</tbody>
</table>

The number of subjects who completed the test for heart rate at two phases of the experiment was 4 (Control), 4 (Desensitization), and 7 (Kundalini Yoga).

The number of subjects who completed the test for respiration rate was 2 (Control); 2 baseline and 3 post-treatment (Desensitization); and 4 baseline and 5 post-treatment (Kundalini Yoga).
however, change in the predicted direction. The respiratory rate of the Kundalini Yoga group decreased by 1.9 breaths per minute over treatment in the anxiety context, while the Desensitization and control groups increased by 4.91 and 4.17 breaths per minute respectively. Table 2 also indicates that all three groups showed higher respiratory rates in the anxiety context than in the relaxation context at the post-treatment assessment; the differences in respiratory rate for the control, Desensitization, and Kundalini Yoga groups were 5, 1.2, and 1.2 respectively.

Table 3 shows the subjects' mean scores for the IPAT and Taylor Anxiety Scales at baseline and post-treatment assessments. Due to the unavailability of 30% of the subjects for the follow-up administration of the tests, reliable results could not be drawn from the follow-up data; the follow-up data were therefore excluded from further analyses.

It was predicted that in both treatment groups there would be a significant reduction in the IPAT and Taylor Scale scores across treatment. A multi-level factorial analysis of variance was performed on this data and showed that no significant changes took place. Table 3 indicated however, that many mean scores changed in the predicted direction. The Desensitization and Kundalini Yoga groups decreased in their general anxiety
Table 3

Baseline and Post-Treatment Mean Scores of Desensitization, Kundalini Yoga, and Control Subjects on the IPAT Anxiety Scale and the Taylor Anxiety Scale

<table>
<thead>
<tr>
<th>Group</th>
<th>n^a</th>
<th>IPAT</th>
<th>Taylor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Baseline</td>
<td>(4)</td>
<td>41.25</td>
<td>21.00</td>
</tr>
<tr>
<td>Control Post-Treat</td>
<td>(4)</td>
<td>41.50</td>
<td>21.00</td>
</tr>
<tr>
<td>Desensitization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>(4)</td>
<td>37.50</td>
<td>24.50</td>
</tr>
<tr>
<td>Post-Treat.</td>
<td>(4)</td>
<td>33.50</td>
<td>21.75</td>
</tr>
<tr>
<td>Kundalini Yoga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>(7)</td>
<td>40.00</td>
<td>22.14</td>
</tr>
<tr>
<td>Post-Treat.</td>
<td>(7)</td>
<td>29.43</td>
<td>16.57</td>
</tr>
</tbody>
</table>

^aNumbers in parentheses indicate the number of subjects who completed tests.
scores on both tests by 2.75 and 5.57 points respectively on the Taylor Scale, and by 4.0 and 10.57 points respectively on the IPAT Scale.

Table 4 shows the percentage of Q-Sort descriptors sorted into accuracy categories by the Desensitization subjects during three treatment sessions. The subjective state cards most often sorted into the "very accurate" and "somewhat accurate" categories were the composed relaxation (alpha) cards. In the first, fourth and eighth sessions, 88%, 100% and 80% of the alpha cards were sorted into these categories. The state cards least often sorted in the "very accurate" and "somewhat accurate" categories were the diffuse arousal (beta) cards. This is reflected in the percentage of cards sorted into these categories in the first, fourth and eighth sessions; 37%, 25% and 35% respectively. As predicted, the alpha state descriptors appear most representative of the Desensitization treatment experience, while the beta state descriptors appear least representative.

Table 5 shows the percentage of Q-Sort descriptors sorted into accuracy categories by the Kundalini Yoga subjects during three treatment sessions. Similar to the Desensitization group, the alpha state descriptors appear most representative of the Kundalini Yoga
Table 4
Percentage of Subjective Descriptors for Subjects Sorting in Desensitization Treatment Sessions

<table>
<thead>
<tr>
<th>Categories</th>
<th>Very Accurate</th>
<th>Somewhat Accurate</th>
<th>Somewhat Inaccurate</th>
<th>Very Inaccurate</th>
</tr>
</thead>
<tbody>
<tr>
<td>n&lt;sup&gt;a&lt;/sup&gt; Treatment Sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theta (Unfocused relaxation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) 1st</td>
<td>6%</td>
<td>16%</td>
<td>30%</td>
<td>48%</td>
</tr>
<tr>
<td>(4) 4th</td>
<td>20%</td>
<td>25%</td>
<td>15%</td>
<td>40%</td>
</tr>
<tr>
<td>(4) 8th</td>
<td>0%</td>
<td>35%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>Alpha (Composed relaxation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>49%</td>
<td>39%</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>4th</td>
<td>85%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>8th</td>
<td>10%</td>
<td>70%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Beta (Diffuse arousal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>4%</td>
<td>34%</td>
<td>38%</td>
<td>24%</td>
</tr>
<tr>
<td>4th</td>
<td>25%</td>
<td>0%</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td>8th</td>
<td>10%</td>
<td>25%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>40 Hz. (Focused arousal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>38%</td>
<td>34%</td>
<td>20%</td>
<td>8%</td>
</tr>
<tr>
<td>4th</td>
<td>43%</td>
<td>20%</td>
<td>32%</td>
<td>5%</td>
</tr>
<tr>
<td>8th</td>
<td>5%</td>
<td>25%</td>
<td>5%</td>
<td>30%</td>
</tr>
</tbody>
</table>

<sup>a</sup>The numbers in parentheses indicate the number of subjects who completed the task in the first, fourth, and eighth sessions.
Table 5

Percentage of Subjective Descriptors for Subjects Sorting in Kundalini Yoga Treatment Sessions

<table>
<thead>
<tr>
<th>Categories</th>
<th>Very Accurate</th>
<th>Somewhat Accurate</th>
<th>Somewhat Inaccurate</th>
<th>Very Inaccurate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td><strong>Treatment Sessions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theta (Unfocused relaxation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) 1st</td>
<td>23%</td>
<td>29%</td>
<td>26%</td>
<td>22%</td>
</tr>
<tr>
<td>(6) 4th</td>
<td>5%</td>
<td>27%</td>
<td>27%</td>
<td>42%</td>
</tr>
<tr>
<td>(6) 8th</td>
<td>6%</td>
<td>22%</td>
<td>32%</td>
<td>40%</td>
</tr>
<tr>
<td>Alpha (Composed relaxation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>37%</td>
<td>30%</td>
<td>24%</td>
<td>9%</td>
</tr>
<tr>
<td>4th</td>
<td>40%</td>
<td>47%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>8th</td>
<td>44%</td>
<td>46%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Beta (Diffuse arousal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>4%</td>
<td>9%</td>
<td>23%</td>
<td>64%</td>
</tr>
<tr>
<td>4th</td>
<td>2%</td>
<td>15%</td>
<td>33%</td>
<td>50%</td>
</tr>
<tr>
<td>8th</td>
<td>2%</td>
<td>12%</td>
<td>38%</td>
<td>48%</td>
</tr>
<tr>
<td>40 Hz. (Focused arousal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>18%</td>
<td>23%</td>
<td>17%</td>
<td>42%</td>
</tr>
<tr>
<td>4th</td>
<td>17%</td>
<td>27%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>8th</td>
<td>20%</td>
<td>33%</td>
<td>27%</td>
<td>20%</td>
</tr>
</tbody>
</table>

*The numbers in parentheses indicate the number of subjects who completed the first, fourth, and eighth sessions.*
treatment experience, while the beta state descriptors appear least representative. The percentages of alpha descriptors placed in the "very accurate" and "somewhat accurate" categories in the first, fourth, and eighth sessions were 67%, 87%, and 90% respectively; the percentages of beta descriptors in these categories were 13%, 17%, and 14% respectively.

To test the hypothesis that the composed relaxation state (alpha) was a more accurate indicator of treatment group effects than the diffuse arousal state (beta), a multi-level factorial analysis of variance was performed. This statistical test supported the hypothesis that the differences between the state categories were significant, \( F(3,90)= 4.13, p < .001 \). Interpretation of this data should be cautious since the Q-Sort is only an ordinal scale, subjective measure.

Tables 4 and 5 also indicate that the focused arousal state (40 hz.) was a more accurate descriptor of the Kundalini Yoga treatment experience at the end of the treatment sessions than the Desensitization treatment experience at that time. The Kundalini Yoga subjects placed 41%, 44%, and 53% of the 40 Hz. descriptors in the "very accurate" and "somewhat accurate" categories during the first, fourth, and eighth sessions respectively; while the 40 Hz. descriptor percentages for the Desensitization subjects were 71%, 63%, and 30%
respectively.

With the exception of one subject in the yoga group, all subjects completed the post-treatment questionnaire (Appendix D). Three independent judges rated the subjects' answers on the questionnaire. All three judges reviewed the judgement criteria for each question with the experimenter so that criteria for assigning category ratings to the subjects' responses were clearly understood. To heighten interjudge reliability, the ratings were generally defined on the basis of numerical criteria. For example, a rating of "great changes" was defined as the subject reporting two or more areas of change. When one judge disagreed, the majority (2) prevailed in terms of the rating assigned to the answer in question. At least 2 of the 3 judges agreed on the ratings of all questions. There was a positive correlation between the three judges on the question ratings (r=.847).

Approximately 66% of the Kundalini Yoga subjects and 100% of the Desensitization subjects reported specific situational changes in their anxiety problems. All of the Kundalini Yoga and 75% of the Desensitization subjects reported some or many general changes in their anxiety problems. These changes consisted solely of improvements in their anxiety problems. In terms of
general success of the treatments, 100% of the subjects in both groups reported that their goals were met somewhat or in many ways.

Four of the treatment subjects were not available to complete the 5 month follow-up questionnaire (Appendix E). The remaining subjects included 5 Kundalini Yoga subjects and 2 Desensitization subjects. As the follow-up questionnaire was a multiple choice test, the data was quantifiable. The subjects' choices are included in Appendix E and are summarized below.

Only 20% of the subjects practiced the prescribed techniques after the seminars ended, though this was recommended to all of them. Nevertheless 100% of the subjects in both groups reported that their anxiety problems were less intense or completely gone. The Kundalini Yoga group reported somewhat less bodily and mental tension, though both treatment groups recorded a 50% or greater improvement in these areas. Sixty percent of the Kundalini Yoga subjects and 50% of the Desensitization subjects reported that their goals were met in many ways or completely. This is slightly less than the post-treatment questionnaire results. Finally, 80% of the subjects in the Kundalini Yoga group and 100% of the subjects in the Desensitization group reported
more ability to cope with anxiety problems in general, while 100% of the subjects in both groups reported having a greater understanding of themselves since the seminar began.
DISCUSSION

The first hypothesis predicted significant reductions in heart and respiration rates across treatment in both treatment groups. The results indicated that neither treatment significantly reduced these two physiological correlates of anxiety. It was assumed that the heart and respiration rates of the treatment subjects would be significantly lower in the relaxation stimuli condition than in the anxiety stimuli condition. This assumption was not supported by the results. Since comparison of the relaxation and anxiety stimuli conditions failed to indicate a significant difference, it is concluded that either one or both of the stimuli used did not effect the subjects' anxiety level as measured by heart and respiration rate.

There are two possible explanations for the lack of significant difference over treatment in the physiological results. First, the reduction of subjects from 24 to 15 insured that only a huge physiological effect would result in statistical significance. Second, only two 10 minute physiological assessments were done. Since heart and respiration rate are reflective of the subject's state only during the time of actual measurement, it appears very tentative to assume that these two mea-
surements reflect the subject's overall physiological baseline and post-treatment anxiety and relaxation levels. This procedure assumes that an overall physiological condition can be generalized from a sample of two assessments.

A possible explanation for the finding of no difference between the relaxation and anxiety stimuli conditions was the faulty assessment of the relaxation baseline. Several design factors may have effected the relaxation measures. First, the setting for measurement was possibly stressful for socially anxious subjects. The unfamiliar experimenter and array of physiological equipment may have presented obstacles to deep relaxation for many subjects. Secondly, the subjects had a very short time to respond to the relaxation stimuli. Other experiments measuring relaxation physiologically allowed the subjects 20-30 minutes to enter a relaxed state (Allison, 1970; Wallace, 1970). Lastly, the relaxation stimuli were cognitive in nature and may not have effected the physiological state, as exercises or some other physical stimuli might have.

The second hypothesis predicted that Taylor and IPAT scores would be significantly lower at post-treatment assessment than at baseline in both treatment groups. Comparison of the treatment groups at post-treatment indicated that neither treatment reduced generalized
anxiety as measured by these two psychological tests.

Again, there are several possible factors which may have contributed to the nonsignificance of the psychological measures. First, the statistical difficulty involving the loss of 9 of 24 subjects has been previously mentioned. Second, treatment effectiveness may have been hampered by the small number of treatment sessions. On the follow-up questionaire, 80% of the subjects recommended that the treatment be longer. Third, treatment effectiveness may have been hampered by the questionable motivation level of many subjects. On the follow-up questionaire, one third of the subjects reported an awareness of resistance and reluctance to change.

The third hypothesis predicted that subjects in both treatment groups would report a reduction in their anxiety problems on the post-treatment and follow-up questionnaires. Questionaire results indicated that subjects experienced such a reduction. All of the experimental subjects reported on the post-treatment questionaire that their goals for change were met somewhat or in many ways, and the majority of subjects in both groups reported attainment of goals on the follow-up questionaire. Also, the majority of subjects in both groups reported a reduction in intensity
and frequency of their anxiety problems at post-treatment and a somewhat smaller reduction at follow-up. There appeared to be a slight regression in treatment effects between the post-treatment and follow-up assessment.

As previously mentioned, group treatment of anxiety via Desensitization has been shown to significantly reduce subjects' state anxiety in a variety of contexts (Emory & Krumboltz, 1967; Lazarus, 1961, 1968; Paul, 1964, 1966, 1967, 1968; Shannon, 1967). The questionnaire results indicate that the Kundalini Yoga treatment resulted in the same level of anxiety reduction as Desensitization at post-treatment and follow-up assessments. These results are in accord with previous meditation studies (Farwell, 1974; Ferguson et al., 1974; Hjelle, 1972; Wallace, 1970; Wallace & Benson, 1972) which reported that meditation effects included anxiety reductions.

Before concluding that the questionnaire results support the general hypothesis that both treatments effectively reduced anxiety problems, certain factors must be considered. First, the subjects' reports are not supported by the physiological or psychological results. They indicated no significant anxiety reduction. Second, the small number of subjects completing the treatments do not allow for generalization of subjective,
non-statistical results to a general population with any reliability. Because of these factors, definite conclusions cannot be made on the basis of the questionnaire data.

The post-treatment questionnaire indicated that Kundalini Yoga subjects reported a greater reduction in general anxiety level, while Desensitization subjects reported a greater reduction in specific contextually prompted anxiety. These results appear to support the fourth hypothesis which predicted this type of treatment experience in the two groups. These findings should be viewed cautiously, however, because the limiting factors previously mentioned in relation to the questionnaire results also apply here.

One possible explanation for these findings may be the differential focus of the treatment techniques used. The principle focus of the Desensitization treatment was the pairing of relaxation with specific instances of anxiety as arranged on anxiety hierarchies. There was almost no effort in the Kundalini Yoga treatment to pair relaxation with specific anxiety contexts. The only Kundalini Yoga technique which dealt with specific anxiety contexts was the "Beggar's meditation." This meditative technique included certain phases in which the subject alternately concentrated on visualizing
an extremely anxiety provoking scene and then a very relaxing scene. Though this meditation bears certain similarities to the Desensitization technique, it was used during only a third of the treatment time. Most of the Kundalini Yoga techniques were aimed at bodily and mental tension of a general nature. Though it appears that the different techniques used in the two treatments could be responsible for the reported findings, further research is needed to confirm this. In any event, because there are no previous studies examining this aspect of the two anxiety treatments, and because of the limitations previously mentioned, these findings, and interpretation, should be viewed with extreme caution.

The fifth hypothesis, which predicted that on the Q-Sort test both Kundalini Yoga and Desensitization subjects would rate the "alpha-like" state of composed relaxation as highly representative of their subjective state in treatment sessions, was supported. The second aspect of this hypothesis predicted that both treatment groups would rate the "beta-like" state of diffuse arousal to be highly unrepresentative of their subjective state in the treatment sessions. This prediction was supported by the Q-Sort data. These findings suggest that both treatments have a relaxing effect on the subjects in the treatment sessions,
though the duration of this effect is not clear from the data available.

It was additionally hypothesized that Kundalini Yoga subjects would rate the "40 Hz.-like" state of focused arousal as progressively more representative of their subjective state as treatment progressed. The Q-Sort data appears to be supportive of this prediction. The 40 Hz. rating was higher in accuracy level over treatment sessions as rated by the Kundalini Yoga subjects. Though there is no data to indicate the cause of this effect, it was conjectured that the strong emphasis on concentration and the subjects' increasing experience lead to this condition in the subjects' state.

It is important to note that the Kundalini Yoga subjects reported that the alpha descriptors and to a lesser degree the 40 Hz. descriptors were highly representative of their subjective state. These findings appear to be contradictory in that a relaxation state (alpha) and a focused arousal state (40 Hz.) cannot coexist experientially or physiologically. There are two possible explanations of this effect. First, the meditative part of the Kundalini treatment may be effecting the subjects in a manner similar to TM in that a "wakeful metabolic state" is produced which has some of the
physiological qualities of the relaxation state and some of the response qualities of the waking state (Wallace, 1971; Orme-Johnson, 1974). Second, it may also be possible that the 40 Hz. descriptors were more descriptive of a cognitive-type arousal, rather than a physiological arousal. If this is the case, then the results are indicating a physiological sense of relaxation and a cognitive sense of stimulation and concentration. Both of these explanations are very tentative and need confirmation from further research.

One final comment must be made in relationship to the Q-Sort results. Because there were many dependent variables used in this study, the most appropriate statistical procedure to analyze the results would have been a multivariate analysis of variance. This was not possible however, because of the small number of subjects. Because of this statistical limitation, the alpha level may have been inflated in the analyses of variance performed on the dependent variables. In relationship to the Q-sort data, this alpha inflation may be responsible for the statistical significant of the Q-Sort results in its analysis of variance.
Summary & Conclusions

Physiological and psychological data were not supportive of the general hypothesis that Kundalini Yoga and Desensitization effectively treated anxiety problems. They were also unsupportive of the hypothesis that Kundalini Yoga is better suited for treating trait anxiety while Desensitization more effectively treats state anxiety problems. Subjective data, however, suggests that both of these hypotheses may be valid. Future research might therefore profitably expand the present exploratory study including the following recommended design modifications: a) the number of subjects in each treatment group should be increased to a minimum of fifteen, b) the number of treatment sessions should be increased to 10 two hour sessions, c) physiological measures should be assessed during a minimum of five baseline and post-treatment assessments, d) additional physiological measures (GSR, EEG, etc.) should be included, and finally e) the relaxation measurements should be taken after the subject has rested for 20 minutes in a quiet setting. Future research in this area could clarify the usefulness of Desensitization and Kundalini Yoga therapies with different types of anxiety problems.

With regard to the effects of treatment on the
subject's state of consciousness, the question arises: how do the specific treatment techniques effect the subject's state and how long do these effects last. By using EEG and other subjective state monitors such as the Q-Sort, these questions may be explored further.
APPENDIX A

Baseline Questionnaire

1. Describe the anxiety problems you would like to change. What specifically happens to you?

2. Describe three different anxiety producing situations. One situation should be the worst you can imagine, another should be the least possible anxiety producing situation, and the third should be an intermediate situation which produces an average experience of anxiety. Example: I am afraid of horses and the worst possible situation I can imagine is being on top of a huge, wild horse. A mildly anxious situation would be seeing a picture of a horse in a book that I am reading. An intermediate situation that makes me anxious is standing near a horse with a fence between us.

3. How often do these difficulties occur?

4. When did they begin?

5. Describe any important events in your life that occurred at the same time you difficulties began.

6. Have you worked on your difficulty? If so, how?

7. How do these difficulties effect your life?

8. What are the advantages of having this problem in your life situation?
9. How do people in your life respond to your difficulty?

10. Describe the consequences of an event where you experience this problem. (Your own behavior and feelings and also those of important people in your environment.)

11. Describe some typical preceding events that lead to your experiencing this difficulty.
Example: First I begin by thinking about how bad I could get hurt if I visit someone who owns a horse like my grandmother. She often calls and invites me over and immediately I start feeling tense and trying to get out of it.

12. Describe any parts of your body that are particularly tense especially during an anxious experience.

13. Describe any scenes you may imagine before, during, or after one of these problematic anxious experiences.

14. Describe any self-talk or thinking you do before, during, or after a problematic anxious experience.

15. Describe your goals for this seminar. Give examples of how positive results would effect your behavior and your experience of yourself.

16. Are you taking any medication presently?
APPENDIX B

Q-Sort Questionnaire

<table>
<thead>
<tr>
<th>Theta</th>
<th>Alpha</th>
<th>Beta</th>
<th>40 Hz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>blunted</td>
<td>at ease</td>
<td>active</td>
<td>attentive</td>
</tr>
<tr>
<td>dreamy</td>
<td>calm</td>
<td>alert</td>
<td>concentrating</td>
</tr>
<tr>
<td>drifting</td>
<td>composed</td>
<td>anxious</td>
<td>effortful</td>
</tr>
<tr>
<td>drowsy</td>
<td>passive-like</td>
<td>energetic</td>
<td>focused</td>
</tr>
<tr>
<td>dull</td>
<td>peaceful</td>
<td>excited</td>
<td>investigating</td>
</tr>
<tr>
<td>floating</td>
<td>placid</td>
<td>exhilarated</td>
<td>searching</td>
</tr>
<tr>
<td>fuzzy</td>
<td>relaxed</td>
<td>lively</td>
<td>scrutinizing</td>
</tr>
<tr>
<td>hazey</td>
<td>tranquil</td>
<td>restless</td>
<td>studying</td>
</tr>
<tr>
<td>sluggish</td>
<td>uncritical</td>
<td>stimulated</td>
<td>thinking</td>
</tr>
<tr>
<td>wandering</td>
<td>unfocused</td>
<td>tense</td>
<td>vigilant</td>
</tr>
</tbody>
</table>

All 40 descriptors above were printed on separate cards preceded by the words "I feel" or "I am". The subjects were asked to sort the cards in the manner described in the results section.
APPENDIX C

Kundalini Treatment Procedures

Session 1:

Breathing: Left nostril breathing 2 minutes.

Exercise: Clients check and see if their chest area feels constricted or uncomfortable.

Exercise to relieve chest constriction. Sitting up, inhale and bring arms back so that the muscles across the chest are stretched. Exhale and bring arms across chest. Inhale and lift arms over head and slightly back. Exhale and swing arms down and back so that chest muscles are stretched.

Practice 15 seconds. Relax 10 seconds.
Practice 30 seconds. Relax 10 seconds.
Practice 45 seconds. Relax 10 seconds.

Extend hands and arms up in the air and shake vigorously.

Relax 2 minutes.

Breathing: Inhale left nostril, exhale right nostril. Use finger pressure to control flow. Practice 5 minutes.

Close the eyes and relax on the back. Practice long deep abdominal breathing for 5 minutes.

Relaxation Series: Tense and relax each of the following: hands, arms, both arms, toes, feet, ankles, calves, whole leg, both legs, stomach, back, neck, tongue, face, mind. Repeat again but this time exhale while relaxing and inhale and hold the breath while tensing.

Session 2:

Exercise: Practice exercise to relieve chest constriction for 30 seconds, relax 10 seconds. Repeat exercise for 1 minute, relax again for 10 seconds.
Session 2 (continued):

Breathing: Inhale through the left nostril, and exhale through the right for 5 minutes. Relax on stomach for 3 minutes with closed eyes.

Roll over. Inhale through left nostril and exhale through right, slowly and deeply. Eyes remain closed.

Exercise: Sit up in cross legged position and place hands on shins. Inhale and flex the spine forward. Exhale and flex the spine backwards so that the back looks slumped. Practice this flexing motion for a minute and 30 seconds.

Repeat for one minute and 30 seconds with hands on knees instead of on shins.

Repeat for 2 minutes with hands on shoulders.

Relax 2 minutes.

Shoulder lifts: place hands on shoulders, inhale and lift shoulders up, exhale and let shoulders drop. Practice 2 minutes.

Neck Rolls: Rotate neck slowly forward, then to the right shoulder, back and to the left shoulder. Practice one minute in each direction while doing long deep breathing.

Cat/Cow: Get onto hands and knees. Inhale and lift head upward and back as far as possible. While doing this arch spine downward so that it curves like a saddle. Exhale and flex spine in opposite direction while bringing chin to chest. Practice for 2 minutes.

Sit up in cross legged position. Lift the arms over the head at a 60 degree angle to the trunk of the body. Slightly cup hands and breath slowly and deeply in the abdomen. Eyes are closed. Practice 2 minutes, relax. Again, practice 2 minutes and relax.
Session 2 (continued);

Relaxation Series: Do tense and relaxation sequence the same as in session 1 using the breath.

Visualization: Relax each part of the body by mental command. Visualize each part clearly as you relax it. Mentally float over body and see it as totally relaxed.

Session 3:

Same as session 2 except breathing time is extended to 7 minutes and the time on the last exercise is extended to 3 minutes.

Session 4:

Exercise: Exercise to relieve chest constriction practice for 30 seconds, then relax. Practice for 1 minute then relax.

Breathing: Inhale through left nostril, exhale through right for 7 minutes.

Introduction to the Beggar's Meditation so that subjects can practice it directly after the exercises.

Exercise: Same as first 3 in session 2.

Heart lock: Hands are cupped and grip each other, then they are placed at the level of the heart. Inhale and raise left elbow, and exhale and raise right elbow while lowering left. Keep tense the hands and arms as if you were trying to pull the hands apart. Practice this motion with the breathing for 2 minutes, then inhale and pull at hands, then exhale and relax.

Beggar's Meditation: Sit up straight in comfortable cross legged position and make a cup with the hands by putting right hand slightly over left. The fingers will cross each other. Put the
Session 4 (continued):

cupped hands at chest level. Eyes should look only into the cup. Inhale deeply through the nose; exhale through the pucked lips, feeling the air on the hands. Feeling the air will help concentration. As you inhale mentally focus on a relaxing scene. When exhaling, focus on a very tense, anxiety producing situation. Remember to relax while inhaling and focus on the tense scene while exhaling. Practice for 5 minutes.

Relaxation Series: Same as session 1 only use the breath with the tensing and relaxing.

Visualization: This should be done as in session 2.

Session 5:

Begin with a 20 minute talk on yogic techniques of diet that help relaxation. These include drinking lots of water, having a basically alkaline diet, drinking camomile and fennel tea, and eliminating coffee and sugar from the diet.

Exercise: First group of exercises are the same as in session 4. Relax 5 minutes.

Shoulder lifts: inhale and lift shoulders up, exhale and drop. Practice 2 minutes.

Neck Rolls: Practice one minute in each direction.

Cat/Cow: Practice for 2 minutes. Relax 3 minutes.

Beggar's Meditation: Same as in session 4. Practice for 7 minutes.

Relaxation Series and Visualization: Same as in session 4.
Session 6:

Chest Constriction Exercise: Practice one minute, then relax for one minute. Repeat.

Breathing: Inhale through the left nostril, then exhale through the right. Slow the breathing rate down to 8 breaths or less per minute. Practice 7 minutes.

Exercise: Rolling the Spine: Flex the spine as far back as possible, then do the same to the left side, front, and right side. The spine flexes the maximum in each direction. Breath slowly and deeply while doing this for 3 minutes.

Torso Twist: Stand up and swing the left leg to the right while swinging the right arm to left. Go back to normal position and repeat using opposite arm and leg. Continue this procedure for 3 minutes.

Cat/Cow: Practice for 3 minutes.

Lie on back. Inhale and tense whole body as you bring clenched fists slowly to chest. Exhale and relax. Repeat 5 times.

Beggar's Meditation: Practice for 10 minutes.

Relaxation and Visualization: Same as in session 5.

Session 7:

Exercises: Same as in session 6.

Beggar's Meditation: Practice for 12 minutes.

Relaxation Series: Tense and relax muscle groups using the breath and suggestion of deep relaxation.

Visualization: Mentally relax each part of the body. Imagine floating over the body and seeing it as totally relaxed. Imagine very pleasant relaxed scene.
Session 8:

Exercise to relieve chest constriction: Practice for one minute, then relax for one minute. Repeat.

Breathing: Inhale through the left nostril; exhale through the right. Slow down breathing to 8 breaths per minute or less. Focus on anxiety contexts while breathing. Practice for 10 minutes.

Exercise: Same as in session 6.

Beggar's Meditation: Practice for 15 minutes.

Relaxation and Visualization: Same as in session 7.
APPENDIX D

Post-Treatment Questionaire & Ratings

1. How many of the 8 treatment sessions have you attended?
   Kundalini Yoga group: 77.08% attendance
   Desensitization group: 78% attendance

2. How many hours per week did you practice the techniques?
   Kundalini Yoga group: 3.5 hours per week
   Desensitization group: 1.75 hours per week

3. Did you note any specific situational changes since treatment began?
   None    Some    Many
   KY group 33%    33%    33%
   DS group 0%     75%    25%

4. Have you noted any general changes in yourself since treatment began?
   None    Some    Many
   KY group 50%    50%
   DS group 25%    25%    50%

5. Has your specific problem changed during the treatment?
   Worse    No Change    Better    Much Better
   KY group 0%    33%    17%    50%
   DS group 0%    25%    50%    25%
6. Has the frequency of these difficulties changed?
   More F.  No Change  Less F.  Much less F.
   KY group  50%  33%  17%
   DS group  50%  17%  33%

7. Has the intensity of the difficulties changed?
   More I.  No change  Less I.  Much less I.
   KY group  33%  50%  17%
   DS group  25%  75%

8. Have you been working on these difficulties in other ways?
   No  Yes, informally  Yes, therapy
   KY group  17%  66%  17%
   DS group  50%  50%

9. Are you aware of any reluctance within yourself to changing the problematic behavior or thought pattern?
   No  Yes, occasionally  Yes, often
   KY group  50%  50%
   DS group  75%  25%

10. Have people been responding to you differently in the last month?
    Yes, often  Yes, somewhat  No
    KY group  50%  50%
    DS group  100%

11. Are there still any parts of your body that are tense habitually? Occasionally?
Few H.  Several O.  Few O.

KY group  17%  33%  50%
DS group   75%  25%

12. Have your goals for the seminar been fulfilled?
   No  Somewhat  In many ways  In most ways

KY group  33%  66%
DS group   50%  50%

13. Are you taking any medication? Has the quantity of medication changed?
   No  Yes  Somewhat more  Somewhat less

KY group  83%  17%
DS group   75%  25%

The questions below were also included in the post-treatment questionnaire but were not rated due to problems with vague answers and rating criteria.

14. What were the general reasons for your absense from treatment sessions?

15. Were there any particular techniques you felt were especially helpful for you?

16. Were there any techniques you felt were detrimental for you?

17. Describe the specific problem you wanted to change.

18. How are these difficulties effecting your life now?

19. Describe any scenes you imagine before, during, or after a problematic situation. If these have changed, describe how.

20. Describe any self-talk or thinking you do before, during, or after a problematic incident. If this has changed, describe how.
APPENDIX E

Follow-up Questionaire & Answers

1. How often did you use techniques from the anxiety seminar since the end of the seminar?

   seldom    never
   KY group  20%  80%
   DS group  0%  100%

2. Did you notice any change in yourself since the beginning of the seminar?

   No   Some general changes   Complete
   KY group  80%  20%
   DS group  100%

3. Have you noticed any change in your specific anxiety problem?

   None   Some specific   Great changes
   KY group  80%  20%
   DS group  50%  50%

4. Has the frequency of your anxiety problem changed?

   Increase   No change   Decrease
   KY group  20%  80%
   DS group  100%

5. Have there been any changes in the intensity of your anxiety problem?

   More I.   Less I.   Completely gone
   KY group  80%  20%
   DS group  100%
6. Are there any changes in your bodily tension since the seminar began?

<table>
<thead>
<tr>
<th></th>
<th>More T.</th>
<th>Same</th>
<th>Less T.</th>
<th>Completely Relaxed</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY group</td>
<td>20%</td>
<td>20%</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>DS group</td>
<td>50%</td>
<td>50%</td>
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7. Have you noticed any changes in your mental tension since the seminar began?

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<thead>
<tr>
<th></th>
<th>More T.</th>
<th>Same</th>
<th>More relaxed</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY group</td>
<td>20%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>DS group</td>
<td>50%</td>
<td>50%</td>
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</table>

8. Have your goals for the seminar been fulfilled?

<table>
<thead>
<tr>
<th></th>
<th>Completely</th>
<th>In many ways</th>
<th>Not fulfilled</th>
</tr>
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<tbody>
<tr>
<td>KY group</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>DS group</td>
<td>50%</td>
<td>50%</td>
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</table>

9. Do you feel you understand yourself any better since the seminar began?

<table>
<thead>
<tr>
<th></th>
<th>Better</th>
<th>Much better</th>
<th>Less</th>
<th>Much less</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY group</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DS group</td>
<td>100%</td>
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</table>

10. Do you feel you know how to cope with anxiety problems better?

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<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>KY group</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>DS group</td>
<td>100%</td>
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</table>

11. Would you like the opportunity to work on your anxiety problems more?

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<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>KY group</td>
<td>80%</td>
<td>20%</td>
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</table>
11. (continued)

DS group 100%

12. Would you prefer the seminar were longer?

Yes No

KY group 80% 20%
DS group 100%

13. Do you feel you would have benefited more from individual sessions?

Yes No

KY group 60% 40%
DS group 50% 50%

14. Have you noticed any decreased drug use?

Yes No Irrelevant

KY group 20% 20% 60%
DS group 50% 50%

Several other questions listed below were included on the follow-up questionnaire but were not multiple choice and were not rated.

15. What do you feel are the important issues for you in dealing with your anxiety experiences?

16. Do you have any recommendations for future seminars?

17. Did you participate in any other kind of therapy?

18. If you noticed any changes in your anxiety experience, what do you attribute these to?
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