Comparison of Individual vs. Group Progressive Muscle Relaxation Training on State and Trait Anxiety

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A COMPARISON OF INDIVIDUAL VS. GROUP PROGRESSIVE MUSCLE RELAXATION TRAINING ON STATE AND TRAIT ANXIETY

by

Janet L. Niefert

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Master of Arts Department of Psychology

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A COMPARISON OF INDIVIDUAL VS. GROUP PROGRESSIVE MUSCLE RELAXATION TRAINING ON STATE AND TRAIT ANXIETY

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Western Michigan University, 1986

This study investigated the relative effects of group and individually administered progressive muscle relaxation on the reduction of state and trait anxiety. A six-week training program was conducted for 12 graduate and undergraduate volunteers. The State-Trait Anxiety Inventory and the Relaxation State Behavioral Checklist were administered prior to and immediately following training. A Subjective Stress Record was maintained daily for two weeks prior to training and for the six weeks of training. No decrease was found in trait anxiety scores after training. A significant decrease in state anxiety scores was found in both individually trained and group trained subjects. The findings do not indicate preference for either training setting.
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CHAPTER I

THE PROBLEM AND THE BACKGROUND

The Problem

The relationship between disease and stress is an important area of concern today. Increasingly, medical research is identifying stress as a major causative variable in a wide variety of illnesses. Concommitantly, modern society has become increasingly stressful. Some of the more commonly acknowledged stress-related problems involve skin problems, allergies, asthma, ulcers, hypertension, hyperthyroidism, headaches, musclespasms, and migraines (Selye, 1956, 1976). Jacobson, in You Must Relax (1957) writes: "Tension disorders include various common nervous disorders including states of fear and anxiety and they are often involved also in conditions known as peptic ulcer, nervous indigestion, spastic colon, high blood pressure, and coronary heart attacks" (p. x). Pelletier (1977) theorizes that the etiology of the majority of diseases is stress related. Jacobson (1977) makes an even stronger case, stating, "There are reasons to believe that tension is part of the cause of many deaths each year. Possibly it kills directly or indirectly far more people than does malignancy" (p. 120).

As medical research pinpointing stress as a health problem has grown, so have methodologies and theories for coping with stress. In recent years a variety of "stress management" methods have been developed. They include: tranquilizing medications, progressive
relaxation, meditation, yoga, autogenic suggestion, stress inoculation, and others.

While each of these methods has been used effectively to reduce stress, the technique chosen as the focus of this investigation is progressive muscle relaxation (PMR). PMR was chosen because of the relative ease with which PMR techniques can be learned by practitioners and then taught to clients. Because many variations of PMR are currently being used to treat anxiety, there exists a need to clarify which procedures are most efficacious.

Progressive Muscle Relaxation training involves systematically tensing and releasing various muscle groups in the body and increasing awareness of and attention to the feelings of tension and relaxation that are manifested by those procedures (Borkovec & Sides, 1979). The ultimate goal for the participant is to learn to identify even mild tension and eliminate that tension. Once acquired, the skill can be used as a method of combating an anxiety response to situational stressors and also as a means of maintaining low levels of physiological activity (a subjective sense of calmness) throughout the day (Bernstein & Borkovec, 1973). Wolpe (1958), in discussing desensitization theory, stated the role of relaxation is to inhibit an anxiety response in the presence of anxiety-eliciting stimuli. The literature is replete with data supporting Wolpe's description (Bernstein & Borkovec, 1973; Canter, Kondo, & Knott, 1975; Jacobson, 1938; Ollendick & Nettle, 1977; Spielberger, Gorsuch, & Lushene, 1970; Stoudemire, 1975; Wolpe, 1958).

It is important to specify what kind of anxiety would be reduced
by this relaxation procedure. Spielberger (1966) has identified two
distinct anxiety concepts: trait and state anxiety. State anxiety
(A-State) is

*a transitory emotional state or condition of the human
organism that is characterized by subjective, con­
sciously perceived feelings of tension and apprehension
and heightened autonomic nervous system activity. A­
States may vary in intensity and fluctuate over time.*
(Spielberger, 1970, p. 3)

Spielberger (1970) conceptualizes Trait anxiety (A-Trait) as

*relatively stable individual differences between people
in the tendency to respond to situations perceived as
threatening with elevations in A-State intensity... Trait anxiety implies differences between people in the
disposition to respond to stressful situations with
varying amounts of A-State.* (p. 3)

Trait anxiety is commonly referred to as "anxiety proneness" and
refers to an individual's predisposition to respond with heightened
anxiety to threatening stimuli. Results of studies testing the
effects of PMR on State and Trait Anxiety suggest that A-State is
more conducive to reduction via relaxation therapy than is A-Trait
(Johnson & Spielberger, 1968; Stoudenmire, 1972).

The question this research will address is whether group train­
ing in Progressive Muscle Relaxation is more effective than individ­
ual training in Progressive Muscle Relaxation for the reduction of
State and Trait anxiety.

There are several reasons why group training can be considered
a valuable treatment modality. The first is the obvious efficiency.
A clinician can provide treatment to a greater number of clients if
they are seen in a group rather than individually. Though efficient
use of the clinician's time should not serve as the primary
justification for treating in a group setting those clients whose needs might be better met in individual treatment, as Walker, Hedberg, Clement, & Wright (1981) state, "it might be inappropriate not to use group therapy when this treatment strategy appears to be an efficient and economical means of responding to a patient's request for service" (p. 42).

A second reason is effectiveness. This researcher has uncovered no evidence to support or disprove that group training is more efficient. Several factors present in group situations, which have been labeled therapeutic by various theorists and/or researchers (Archer & Reisor, 1982; Corey & Corey, 1977; Yalom, 1975) and substantiated by this investigator's clinical observations as having a positive impact include:

1. Compliance—client's compliance in following through with the PMR exercises at home is monitored at the start of each group session. Knowing that they will be questioned about their follow through and about their subsequent progress in front of their peers facilitates compliance both to the PMR exercises and to the collection of data.

2. For many group members, the group experience is the first opportunity to meet and talk with others who are experiencing similar problems with stress in their lives. Knowledge that others have a similar problem and are utilizing the same solution stimulates client confidence in PMR which facilitates their success at using the technique.

3. Hearing during each session of other group members' progress or lack of progress facilitates client compliance and motivation.
Many clients experience difficulty in their first few attempts to use PMR exercises. Reassurance in the knowledge that others are experiencing the same problems can be more powerful than reassurance by the therapist alone. Conversely, reassurance can be provided by contact with group members who are experiencing success with the exercises.

4. Another value of group treatment is the value of group input in problem solving. A group member who brings to the group problems concerning, for example, finding the time or place to practice at home may receive suggestions or support from other members who have solved this problem. Part of differential relaxation is learning to predict and plan for stressors. Group input can help individual members creatively plan for implementing PMR into their stress situation.

The Background

The PMR literature was reviewed to discover whether the relative efficacy of group vs. individual training has been established and to identify the most effective relaxation training procedure, which could then be implemented in both group and individual settings.

Research in PMR training has been plagued by a lack of standardized training format and lack of investigation into which of the procedural components are essential and which are not.

Beginning with Wolpe's (1958) first modification of Jacobsonian procedures, the trend in the development of relaxation training has been toward the specification of more efficient training conditions.
Hillenberg and Collins (1982) reviewed eighty studies on PMR and concluded, "procedural variability has been highlighted as a consistent finding across the eighty studies reviewed" (p. 258) and furthermore "it is difficult to compare relaxation training studies when the procedures employed differ along several dimensions and when clear descriptions of session content are absent" (p. 258). Although there has been a flood of procedural variations they have not been accompanied by careful assessment of their relative effectiveness. According to Bernstein and Borkovec (1973),

> When investigators use procedures that differ subtly from one another in such factors as timing, rationale, and muscle groups, even if all these procedures result in "real" relaxation, results from one study are not comparable to the results of another. (p. 1)

Additionally, many of the training manuals that have been developed are lacking in both procedural detail and clinical sensitivity (Bernstein & Borkovec, 1973).

As Hillenberg and Collins (1982) state, although "relaxation training is typically effective, the actual mechanisms responsible for such improvement is not well understood" (p. 251). "Further research must address the critical procedural variables" (p. 259).

Random variation of procedures with any of the PMR training components may introduce differences so that generalization from one study to another or from controlled research to clinical practice may be inappropriate.

One way to insure replicability of procedures across investigations is to investigate relative efficacy of various components and
develop a uniform method of presentation.

Procedural and methodological elements that were addressed for the purpose of this experiment were: live versus taped instruction, number of sessions, home practice, and sequence and timing of muscle contraction and relaxation.

Methods of Presentation

Live vs. Taped

Although taped relaxation instructions would ensure standardization in presentation, a review of relevant literature indicates that live presentation is more effective. In a review of the psychophysiological effects of PMR, Borkovec and Sides (1979) concluded that tape-recorded instruction is not as effective as live instruction. They hypothesized that subject control over the progress of training was the aspect responsible for that result.

A number of other studies support that conclusion. Paul and Trimble (1970) studied thirty undergraduate female subjects to evaluate the physiological and self-report response to live versus taped presentation of relaxation training, hypnotically suggested relaxation, and self-relaxation control procedure, and found taped presentations significantly inferior to live presentations.

Israel and Beiman (1977) studied the physiological and subjective tension responses of twenty-five self-referred subjects to live and taped PMR and to self-relaxation presentations. While all three methods produced significant reduction of tension, live presentation of PMR instructions resulted in significantly greater reductions in
subjective anxiety than the other two methods.

Beiman, Israel, and Johnson (1978) compared live and taped presentations of progressive muscle relaxation, self-relaxation, and electromyogram (EMG) biofeedback on measures of physiological arousal and self report of anxiety with forty undergraduate females. They found live relaxation training to be superior to taped and to self-relaxation and EMG biofeedback.

Further support for live versus taped instructions can be found in Burish and Lyles (1981), Jacobson (1934), Lehrer (1978), and Russell, Sipich, and Knipe (1976). Hillenberg and Collins (1982) not only find support for live instructions but further state "no studies have documented taped relaxation to be equal to or better than live training" (p. 254).

One might conjecture from these persistent findings that live is better than taped presentation because there is greater potency of stimulus control provided by a live trainer than is provided by a recorded voice. Subject control over the progress of training, in which the therapist does not proceed to subsequent muscle groups until the subject signals relaxation in the previous group, is a common live training procedure. Lack of effectiveness of tape recorded relaxation instruction may result from loss of this response-contingent progression. Another possibility is that with live instruction the trainer in previously described studies may have individualized instruction. For example, one way to individualize instruction is to ask the subject at the end of the first relaxation training how relaxation feels to him/her, and then incorporate the
adjectives used by the individual subject into the relaxation instructions given in the future (Bernstein & Borkovec, 1973). For example, a subject might describe relaxation as feeling his/her muscles go limp. In subsequent training sessions the trainer incorporates the suggestion of feeling the muscles going limp into the suggestive relaxation pattern. The aforementioned studies did not indicate whether these steps were actually part of their procedures.

An additional reason why this investigator chose to use live rather than taped instruction and to not provide a taped instruction to assist in home practice is because the taped instructions can interfere with the subject learning to relax to his/her own command. A desired outcome of training is that persons will be conditioned to relax to their own command. The ability to do this provides greater availability and flexibility to utilize the technique than is possible if the subject needs to have a tape player available to relax, and so enhances generalization. Dependency on taped instruction used in homework becomes a stumbling block to the generalization of the relaxation response.

**Number of Presentations**

Another component in which studies evidence considerable variability is the number and length of sessions required. Jacobson (1964) reports cases in which one client was treated in one two and a half hour session; several cases in which clients were treated in under four two hour sessions; but most of Jacobson's clients were seen for twenty or more sessions and usually for time periods greater than an
hour. Yet Jacobson (1957) also stated support for "abbreviated application of progressive relaxation technique" which he termed a "most desired attempt" at improving the procedure (p. 55). As a greater number of clinicians began using PMR to deal with a variety of clinical concerns many modifications of the original Jacobsonian technique have evolved. In these modified versions of PMR training there is great disparity in the number, length, and frequency of training. Based on their review of research on the psychophysiological effects of progressive relaxation, Borkovec and Sides (1979) suggest that a greater number of presentations is a key component in the success of PMR. They found that studies in which PMR was typically effective employed four or more sessions. Furthermore, in studies in which PMR was not found to be more effective than the control procedure the mean number of sessions was 2.3. Lehrer (1982) differs, stating:

"When studies are categorized by live vs. taped instruction and within-session effects vs. generalized effects, there is no observable difference in the number of training sessions between studies that do show significant physiological relaxation effects and studies than do not." (p. 423)

Bernstein and Borkovec (1973) recommend at least ten sessions, but Hillenberg and Collins, in their review, found 47% of the studies reviewed used more than four sessions and only 5.6% used ten or more. Despite his earlier experimental work in which he used many sessions, Jacobson (1977) states, "Progressive relaxation training of about six or seven sessions' duration has proved to be highly effective" (p. 123)

Based on personal clinical experience this investigator concurs with Jacobson that effective results, as determined by a reduction
in client report of anxiety and anxiety-related somatic complaints, can be achieved in six weeks with weekly training sessions of one hour or less and daily at home practice. Noticeable differences (per client's daily subjective stress record and verbal report) have existed between the first, third, and sixth weeks of training, but in this investigator's experience little or no significant difference in level of relaxation exists from the sixth to eighth or tenth week of training. What little difference does exist appears to be a refinement of the skills taught (i.e., relaxing more quickly, seeing more opportunities in day-to-day situations to use the technique, etc.). These refining behaviors can be done by the client after completing six weeks of training without need for additional therapist support. In other words, from the clinical experience of this investigator the basic skills required to achieve good results with PMR training can be learned in six sessions. Further practice appears to be instrumental in the generalization of the response rather than the actual mastery of the skills involved. One might also conjecture there is a risk of the client developing a dependency on the trainer if training is extended for too many weeks. Extended numbers of sessions may make transferring the locus of control for relaxation from therapist to client more difficult.

For these reasons, six training sessions were used in this experiment.
Home Practice

The PMR literature varies with respect to the variable of utilization of home practice. Hillenberg and Collins (1982) report 40% of the studies they reviewed did not utilize some type of home practice. This is surprising since researchers prior to 1982 (Bernstein & Borkovec, 1973; Wolpe, 1969) emphasized home practice as a critical component of relaxation training. Bernstein and Borkovec (1973) stress the importance of home practice, stating that the success of the procedure is largely dependent on daily practice. They recommend the client be encouraged to practice twice daily for at least fifteen to twenty minutes each time with at least three hours separating the two practice sessions. Though Hillenberg and Collins (1982) support the use of home practice, they also note there have not been any empirical studies which demonstrated home practice as an essential procedural component. Of the studies Hillenberg and Collins reviewed, even those which report utilization of home practice do not report the number of practice sessions (e.g., daily, three times weekly, etc.) or length (e.g., twenty minutes, forty minutes, etc.) of practice sessions, or the order of muscle progression.

What is even more surprising than the lack of attention to the necessity of home practice is the lack of discussion in the literature regarding compliance. In those studies mentioning home practice as a critical variable in the procedure, no mention was made of the percentage of subjects who did or did not comply with the prescribed daily practice. Because PMR training attempts to inhibit an anxiety response by conditioning a relaxation response to the anxiety

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cue (the anxiety cue is the subjective feeling of muscular tension), the need for daily home practice to allow this conditioning to occur seems apparent. Additionally, the rationale for incorporating the tensing component into the PMR procedure is to teach the individual to notice increasingly subtle levels of tension as that individual experiences them in day to day life. Therefore, it would appear that home practice is necessary to develop that skill.

It has been the clinical experience of this investigator that compliance with home practice is important in mastering the PMR technique. More discussion in the literature addressing the issue of compliance with home practice is necessary. In an effort to achieve compliance in this experiment, the need for at least twenty minutes of daily home practice was emphasized to subjects as an essential part of training. Additionally, self-monitoring was utilized to increase compliance in that subjects were instructed to keep daily records of at-home practice sessions.

Order and Timing

The order of muscles relaxed and the length of time each muscle is tensed and relaxed have not been specified by most researchers. In defining the conditions required for relaxation, Jacobson (1957) strongly stated the need for tensing/relaxing as the means by which the client learns to recognize when and where he tenses when under the control of fearful stimuli, so he can then learn to relax. In his standard training method Jacobson (1964) spends approximately one hour of training on each of forty-four different muscles.
Currently there exists some difference of opinion about the advisability of the tensing part of the relaxation procedure. Bernstein and Borkovec (1973) argue that feeling the contrast between muscle contractions and their subsequent release helps clients to feel more relaxed. This is supported by Borkovec and Hennings (1978). Lehrer (1982) disagrees stating that it is possible that tensing during training may be counter productive because it may make perceiving very low levels of muscle tension more difficult and indicates Jacobson's method is devoted to "turning tension off" rather than feeling the difference between tension and relaxation. Despite this position, that large muscle contractions may interfere with the acquisition of relaxation skill, Lehrer admits that "some contraction during training appears to be necessary for effective skill acquisition" (p. 418). M. East (personal communication, January 30, 1985) recommends training with muscle contraction for the first two weeks only, assuming the client is practicing twice a day, because of the danger of training a "tension response" as well as a relaxation response. According to Borkovec and Hennings (1978), when clients are not given specific instruction to attend to the differences in sensation, the therapeutic effects of progressive muscle relaxation are attenuated. From the information gleaned from this review it appears that there has not been any empirical data supporting these conclusions but rather conjecture based on a variety of hypotheses regarding the physiological mechanisms that take place during relaxation training. Though there were no conclusive data and since the majority of researchers support at least some muscle contraction in
the procedure, in this experiment tensing was used in the first two sessions and subsequent home practices and discontinued thereafter.

**Previous Studies in Group Anxiety Reduction**

**Desensitization Studies**

Despite the previously discussed procedural variations, individual training in progressive muscle relaxation has been demonstrated as effective by a number of researchers (Canter et al., 1975; Reinking & Kohl, 1975; Schilling & Poppen, 1983; Stoudenmire, 1975). The effectiveness of PMR has been so thoroughly accepted that it has been used in some cases as a control procedure when comparing other methods of stress reduction (Eayrs, Rowan, & Harvey, 1984). A large portion of current literature is devoted to comparing the effectiveness of PMR and other relaxation methods and also to determining the essential components of PMR. The literature is strangely silent as to the relative effectiveness of individual PMR training as opposed to group PMR training. To date, this investigator is aware of no study comparing the relative efficacy of group versus individual training in the reduction of anxiety.

Support for the effectiveness of relaxation training done in group settings can be found in previous research utilizing group desensitization techniques in the treatment of test phobic clients (Calef, Calef, Sundstrom, Jarrett, & Davis, 1974; Dawley & Wenrich, 1973; Ihli & Garlington, 1969; Kondas, 1967; McManus, 1971; Scissorns & Njaa, 1973; Suinn, 1968).

Though group desensitization includes some training in PMR, the
relaxation training component received less attention from researchers in the previously cited studies than did the hierarchy construction and desensitization phases. Most of the studies utilized group relaxation training but only in the first or second group sessions. In addition, the training was done with a relaxation tape. Though many of the aforementioned factors deemed important for producing effective relaxation (e.g., live presentation) were not present, researchers did get successful desensitization; however, no specific measurements were used to assess the level of relaxation. In addition the purpose of these studies was to enable the clients to relax in the presence of a specific threatening stimuli (i.e., tests), which differs from the focus of this study—to achieve a more global relaxation response to everyday stressful events.

Results of these early desensitization studies support the view that progressive muscle relaxation techniques, which are effective with individuals in dealing with anxiety may be utilized in training a group without loss of effectiveness.

Other Group Anxiety Reduction Studies

A survey of the literature for anxiety reduction training done in groups has indicated a great variation of approach. Archer & Reisor (1982) trained subjects selected from an undergraduate college population in a variety of relaxation oriented and cognitive anxiety management techniques. The relaxation oriented approaches included modified Jacobsonian PMR and Benson's relaxation response. Cognitive components were in the nature of Meichenbaum's (1977) cognitive
approach. Archer and Reisor utilized ten two-hour sessions. Though anxiety measurement questionnaires were used, the authors presented no statistical data, utilizing instead phenomenological comments pertaining to the authors' own experience as well as comments from the subjects. How the PMR was utilized, whether taped or live, the physical setting, whether or not undergraduate students were anxious, the number of subjects in each training group, utilization of homework assignments, and which muscle groups were employed, were not described by the authors. There was no control group, nor did researchers compare the group training with individualized training as the present experiment attempts to do. Although the authors claimed positive results, the paucity of components previously described as essential for effective relaxation and lack of control procedures brings into question the validity of the author's results.

May, House, and Kovacs (1982) studied an approach designed for generalized anxiety and stress rather than specific problem areas. They described their program as serving a heterogeneous population (no psychotic patients were included; other subjects were a mixture of patients receiving mental health services, both in- and out-patients, and those not currently receiving other mental health services); incorporating a variety of somatic and cognitive techniques; and requiring the clients to be responsible for selection and application of various techniques. The authors utilized six one-hour sessions, with the focus of session two on PMR. They report that the order in which muscles were relaxed, and the length of time for tensing and relaxing was left to the individual discretion of each group leader.
Whether or not home practice was encouraged was unreported. No dependent measures were utilized. Positive results were construed from phenomenological data (verbal report of subjects). Their results are questionable due to the lack of control procedures, as well as the lack of previously described factors considered necessary for effective relaxation.

Hoover and Parnell (1984) report a relaxation program in which they utilized a psychiatric inpatient population and provided educational information on causes of stress and effective coping mechanisms which included information on PMR. Four one-hour sessions were presented over a two week period. The only subject exclusion criterion was psychosis. No controls and no dependent measures were utilized. Successful results were reported on the basis of positive staff and patient verbal feedback. The value of this study is also questionable since successful results seem to be defined by the authors as the patients stated enjoyment of the program, rather than by any measurement of the patient's increased ability to relax following training.

Eayrs, Rowan, and Harvey (1984) compared three "coping skills" groups utilizing relaxation training as a control. The subjects were 30 (fifteen male and fifteen female) mental health clients with a diagnosis of "generalized anxiety state" or who had a variety of symptoms in which anxiety was thought to be the major component. Subjects received one and one half hour weekly sessions for six weeks and fortnightly meetings for the final two sessions, which totaled twelve hours of therapist contact time. The coping skills package
was developed by taking discrete coping skills from current clinical literature in anxiety and anxiety management. They included: PMR, anxiety management training, behavioral targeting, positive self talk, self monitoring, and self reinforcement. The PMR portion was taped. The length of the tape both within the coping skills package and for the control group was unstated, as was the length of the tense-relax components. The age of the subjects was not reported. Dependent measures were self and others' report questionnaires, the State-Trait Anxiety Inventory, a visual analogue scale created by the authors, and a symptom checklist created by the authors. The authors (Eayrs et al., 1984) found some support for the superiority of the coping skills package as measured by the Spielberger anxiety inventory, but taken together the results are somewhat inconclusive. However, in view of the overall successful outcome it would appear that lack of between group differences is due to the effectiveness of the control procedure rather than the ineffectiveness of the experimental conditions. (p. 126)

The authors further suggested that the group design which limited training to eight sessions was too short for the coping skills course, whereas the "relaxation control group . . . was able to learn and consolidate one skill in depth" (p. 126). That this study, in which the PMR control group session consisted of a relaxation tape, refreshments, and unguided group conversation, was found effective provides support to the view that PMR taught in a group, with attention to the data supported components, can be more effective than individual training in PMR.

Despite variability of procedure, the aforementioned studies share some common weaknesses. Lack of controls, length and number of
session, order of muscles relaxed, which muscle groups were employed, and the utilization of homework were either not addressed or not presented by the authors. These studies all used taped rather than live instructions and the amount of time spent in each tensing and relaxing component was not indicated. These procedural variabilities make it difficult to compare the studies and also bring into question the validity of the results cited.

Stoudenmire (1975) studied 108 undergraduate college females randomly assigned to either PMR or a music listening control group. His purpose was to investigate the relative effects of PMR and "relaxing music" on state and trait anxiety. "Anxious subjects were those who fell at least one-half of one standard deviation above the trait anxiety mean of the State-Trait Anxiety Inventory (STAI) as published in the test manual" (Stoudenmire, 1975, p. 490). Each experimental group divided subjects into six-member subgroups for training. Data on STAI were taken at pre-treatment and at completion of each training session. Data were analyzed by comparing STAI pre-treatment scores with scores of STAI taken after completion of the third training session. The author found both PMR and relaxing music reduced state anxiety but neither reduced trait anxiety. The author interpreted the results as "support for Spielberg's state-trait theory in that brief anxiety-reduction techniques are effective for state but not for trait anxiety" (Stoudenmire, 1975, p. 490). He further stated that the results also suggest that relaxing music can be as effective a method of state anxiety reduction as muscle relaxation training.
Although Stoudenmire got the same results with music as with PMR training, these results must be carefully examined because the author did not use components previously described as important in maximizing relaxation (e.g., PMR instructions were taped rather than live). Other specific components were not detailed in the study. However, the author did achieve relaxation with group training, which provides additional support for the efficacy of PMR training done in groups.

While these previous studies have provided some indication of the effectiveness of relaxation training done in groups, they have not addressed specifically the question of whether the full impact of relaxation training done individually is carried over into the group setting. The present study addressed specifically the issue of efficacy of relaxation training done in a group setting as opposed to an individual setting. The hypothesis of this study is that group relaxation training is actually more effective than relaxation training administered individually.

Due to the prevalence of stress and stress-related complaints, there is a dire need to provide treatment in this area by the most effective means possible. Therefore, the proven effectiveness of relaxation training done in groups would increase the availability of treatment resources to those in need of them.

The design of this study followed the Bernstein and Borkovec (1973) training format, a procedure that attempts to standardize presentation of PMR training. Bernstein and Borkovec's standardized method includes those components previously described as being
advantageous to effective relaxation training. Although there are no conclusive data proving this method to be the most effective, other researchers have utilized this format in an attempt to ensure comparability and replicability of their studies. In an effort to maintain this attempt to achieve some standardization of presentation, this study also utilized the Bernstein and Borkovec method.
CHAPTER II

METHOD

Subjects

Twelve graduate and undergraduate volunteers, consisting of five males and seven females, 20 to 42 years of age (mean age 25.5), were recruited from newspaper ads in the student newspaper and posted notices asking for people who were "tense or anxious" and who wished to participate in a "stress reduction project." Persons who responded were screened by telephone for current participation in psychotherapy, current use of psychotropic or tranquilizing medication, and prior experience in relaxation or meditative techniques. Those reporting one or more of the above were excluded from participation in the study.

Design

Subjects were randomly assigned to one of two treatment groups numbering six subjects each. These groups were the Group Training (GT) group and the Individual Training (IT) group. The IT group consisted of four males and two females. The GT group consisted of one male and five females. The two groups were used in order to examine the relationship between stress reduction and the setting in which the training takes place. Specifically tested was the application of PMR given individually or training administered in a group.
Equipment and Instruments

The only equipment used in this research was individual exercise mats made of foam rubber with vinyl covering which were covered by white sheets for hygienic purposes. The sheets were laundered by the investigator following each usage. The training was conducted in a pleasant conference room with comfortable chairs that the subjects sat in for discussion sections and mats on the floor for the relaxation portions. During the GT training the mats were arranged in a semi-circle (heads meeting in the center, feet to the periphery) with the investigator at the open end of the semi-circle.

Procedures

All subjects participated in an eight-week program. Following telephone screening each subject met individually with the investigator for a one-hour pre-training assessment session. Upon arrival at the training room, the subject was seated at a desk while the investigator explained the procedures and informed consent was obtained. Then the State-Anxiety Inventory was administered to the subject. The subject was instructed to think of the most stressful time experienced in the past week and to respond to the A-State questions with reference to how he/she had felt at that time. The Trait-Anxiety Inventory was administered immediately following the administration of the A-State questions. This sequence of administration is recommended in the STAI manual because the authors found the A-State can be affected by the emotional climate created by
administering the A-Trait first. The A-Trait has been found to be unaffected by the conditions under which it is given. The subject was instructed to answer the A-Trait questions in terms of how he/she generally feels. The subject was then asked to recline on a comfortable mat and to relax as completely as possible being careful not to fall asleep. When the subject indicated by prearranged signal (the raising of the right index finger) that complete relaxation had been achieved, the investigator evaluated the subject on the Relaxation State Behavioral Checklist. Each subject was given ten minutes maximum to reach this state. If the subject did not signal relaxation after ten minutes the subject was evaluated at whatever level of relaxation had been achieved. Following that evaluation, the Subjective Stress Record (further described p. 38) was explained to the subject. The subject was instructed to collect data on the SSR for two weeks. Following two weeks of data collection PMR training began.

These measures were taken to ascertain the baseline level of responding to anxiety. Each subject was administered the same instruments following the PMR training.

Throughout the training the same format was administered to both IT and GT groups unless otherwise specified.

Both GT and IT subjects were trained during one weekly session for six weeks. For IT subjects Session 1 lasted 90 minutes. Session 2 was a 60 minute session, and the remaining four training sessions lasted 30 minutes each. For GT subjects Session 1 lasted 90 minutes. Session 2 was a 90 minute session, and the remaining four training sessions lasted 30 minutes each. Sessions 1 and 2 focused on the...
tension-relaxation of 16 muscle groups. Sessions 3 and 4 focused on relaxation without tensing of seven muscle groups, and Sessions 5 and 6 focused on the relaxation of four muscle groups and on counting.

Session 1

The following format was used in Session 1 for both groups. The investigator provided an explanation of the physiological aspects of stress (Selye, 1976) to the GT group as a group and to the IT group individually. The subjects were asked to identify areas of the body in which they carry stress (i.e., shoulder/neck tension, stomach, etc.); and how stress manifests itself in each (i.e., headaches, temper outbursts, withdrawal from frightening stimuli, etc.). This was done individually in the IT group and by using a round-robin approach in the GT group.

The subjects then compiled a list of anxiety producing situations --fear of academic or other failure, worry about the future, anxiety about male-female relationships, worry about personal inadequacy, etc. The purpose of this activity was to help subjects start to pinpoint areas of stress and anxiety in their own lives. In the IT group the investigator assisted each subject in compiling the list, and in the GT group the list was compiled collectively.

Next, the investigator explained the rationale for PMR and then demonstrated each tense/relax exercise and guided the subject(s) through the PMR exercise. The first session's exercise focused on the tension/relaxation of sixteen muscle groups. They were:
the right hand and forearm, the right biceps, the left hand and forearm, the left biceps, the forehead, the upper cheeks and jaws, the lower cheeks and jaws, the neck and throat, the chest, shoulders, and upper back, the abdominal or stomach region, the right thigh, the right calf, the right foot, the left thigh, the left calf, the left foot. Subjects were given a homework assignment to continue practicing the PMR exercises at home twice daily and to chart in the SSR their daily stress levels. They were also requested to begin noticing what events or thoughts caused them to feel stressed. No formal diary was kept but the subjects were encouraged to record stressful events on the back of their SSR.

Session 2

At the start of Session 2 and at every subsequent session the investigator checked the SSR, discussed the subject's progress on the home exercises, and solved any problems subjects were having--intruding thoughts, inability to regulate breathing, or inability to relax one or more muscle group, etc. Within the GT setting, group process--personal relationships between members was not the focus; however, group members were encouraged to assist each other in problem solving by contributing suggestions they had effectively utilized (i.e., one group member shared an imagery activity she used to clear her mind of thoughts before beginning her exercise).

This type of interaction was time limited, with a maximum limit of fifteen minutes, and its purpose was problem-solving oriented rather than group-process or relationship oriented.
Further discussion followed, the goal of which was to teach subjects to identify their own stressors, predict the occurrence of those stressors, and to plan to prevent or obviate them via relaxation methods whenever possible. This discussion was done in a round-robin fashion within the group setting. The PMR exercise was presented last and focused on the tensing/relaxation of 16 muscle groups. The IT group received essentially the same Session 2 training except that discussion was between the subject and trainer only, which allowed the IT subjects a greater concentration of trainer time but deprived them of problem-solving ideas, moral support, etc., received by the GT subjects.

Sessions 3 and 4

In Sessions 3 and 4 discussions of client's progress on the home exercises occurred. The trainer asked the subjects the following types of questions:

1. Did you have any trouble doing the exercise?
2. Were any muscles particularly difficult to relax?
3. Any problems with wandering or intruding thoughts?
4. Are you becoming more aware of when you tense up during each day?
5. Approximately how often do you tense up in a given day?
6. Have you tried telling yourself "relax" when you notice yourself tensing?

The PMR exercise focused on relaxation without tensing of the following seven muscle groups: the right arm and hand, the left arm and
hand, the face, the neck and throat, the chest, shoulders, upper back, and abdomen, the right leg and foot, and the left leg and foot.

Sessions 5 and 6

In Sessions 5 and 6 discussion as previously described in Sessions 3 and 4 took place. The PMR exercise focused on relaxation without tensing of four muscle groups and deepening relaxation while counting to ten. The four muscle groups were the left and right arms, hands, and biceps, the face and neck, the chest, shoulders, back, and abdomen, and the left and right upper leg, calf, and foot.

Format

The investigator directed the following succession of events which, per the Bernstein and Borkovec (1973) protocol, was deemed necessary for relaxation to occur for each muscle group.

1. The subject was instructed to focus attention on the designated muscle group.

2. At a prearranged signal from the investigator, the muscles of that group were tensed.

3. Tension was maintained for approximately 5-7 seconds (the duration for tensing calves and feet was shorter due to tendency of these muscles to cramp easily).

4. At a prearranged signal the muscle group was relaxed.

5. The subject was directed to maintain focus on the muscle group as it relaxed.

The instructions given by the investigator were those recommended

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by Bernstein and Borkovec (1973). They were read in each session as written below to allow for as much standardization as possible in presentation; however, the instructions had also been memorized by the investigator to allow for a natural sounding presentation. The script read as follows:

I would like you to focus all of your attention on the muscles of your right hand and lower arm. By making a tight fist I'd like you to tense the muscles in the right hand and lower right arm, now. (p. 25)

The subjects had been previously instructed not to begin tensing until the investigator said the word 'now' which constitutes the tension signal. Care was taken, by means of careful observation of each subject, that the subjects did not tense prior to the cue as this is how the investigator controlled the exact length of time each muscle group was tensed. During the 5-7 seconds of tensing the investigator instructed subjects to: "Feel the muscles pull; notice what it's like to feel tension in these muscles as they pull and remain hard and tight" (p. 26). The relaxation cue, "O.K.; relax" was given at the end of the 5-7 second tensing period. The relaxation period lasted 30-40 seconds. Statements made at that time by the investigator were designed to be suggestive and not prescriptive in helping the subjects relax. Following "O.K., relax," the investigator said, "just letting the muscles go, notice the difference between tension and relaxation, focusing on the feeling in this muscle group as it becomes more and more relaxed" (p. 26), and continued the relaxation "patter" until the 30-40 second relaxation period lapsed. The tension-relaxation cycle was repeated one additional time for each of the muscle groups.
When each muscle group had been tensed and relaxed twice, the investigator gave the following instructions to allow subjects to continue relaxing:

O.K., now, we've relaxed the muscles in the arms and hands; just allow them to continue relaxing. We've relaxed the muscles in the face and neck; go on allowing them to remain deeply relaxed. We've relaxed the muscles of the chest, the shoulders, the upper back, the abdomen; allow these muscles now to become even more deeply relaxed. We've relaxed the muscles of the legs and feet; just allow these muscles now to remain deeply and completely relaxed.

(p. 28)

The subjects were then asked to "scan" their bodies and notice any muscles in which they felt tension. Next the subjects were instructed to focus on those tense muscles and "relax, letting go of the tension, allowing yourself to become more and more relaxed." After that the subjects were instructed to enjoy their relaxed state for a few minutes, and then the investigator asked the subjects to slowly move their arms and legs, open their eyes and terminate their relaxation period.

Following the arousal from the relaxed state, the investigator asked each subject (in the GT group this was done in a round-robin manner) a general question about the session—"Well, how was that?—and then specific questions about any problems encountered in relaxing, such as "What was the trouble in getting the neck muscles relaxed?"

For sessions 3–6 in which tensing does not occur the script was as follows:

O.K., now I'd like you to focus all your attention on the muscles of the arms and hands and very carefully identify any feelings of tightness or tension that might
be present there now. Notice where this tension is and what it feels like. O.K., relax, just recalling what it was like when you released these muscles, just letting them go and allowing them to become more and more deeply relaxed. (p. 35)

This relaxation "patter" was continued for 30-40 seconds. The relaxation of each muscle group was completed using the above described procedure. Except for eliminating the tensing component this procedure was identical to the procedure described for sessions 1 and 2.

Sessions 5 and 6, which addressed only four muscle groups, also utilized counting as a method of achieving deeper relaxation. The ultimate goal of teaching subjects to relax to counting from one to ten is to allow the subject to attain complete relaxation in approximately one minute (Bernstein & Borkevec, 1973). The script for relaxation by counting follows.

As you remain very deeply and completely relaxed now I'm going to count from one to ten, and, as I count I'd like you to allow all the muscles all through the body to become even more deeply and more completely relaxed on each count. Just focus your attention on all the muscles in the body and notice them as they become even more deeply relaxed as I count from one to ten. One, two, noticing the arms and hands becoming more and more relaxed now; three, four, focusing on the muscles of the face and neck as they become even more deeply relaxed now, five, six, allowing the muscles in the chest, shoulders, back, and abdomen to relax even more deeply now; seven, eight, noticing the muscles of the legs and feet becoming more and more completely relaxed; nine, and ten. (p. 36)

Assessment Measures

State-Trait Anxiety Inventory

Pre- and post-treatment measures of anxiety were determined by the State-Trait Anxiety Inventory (STAI) under the title
"Self-Evaluation Questionnaire" (Spielberger, Gorusch, & Luschene, 1968). The STA contains two scales, the A-State inventory (Appendix A) and the A-Trait inventory (Appendix B). Both scales contain twenty items each of which has four possible responses of varying weight. Since it was hypothesized that PMR training would decrease both state and trait anxiety, both portions of the inventory were administered pre- and post-experimentally to all subjects. This instrument was chosen because it was normed on undergraduate college students; it has been demonstrated to detect changes in anxiety level; correlates highly with other anxiety measures (i.e., the Taylor Manifest Anxiety Scale), and the STA requires only a sixth grade reading ability level.

Subjective Stress Record

Daily levels of stress and anxiety were measured by the Subjective Stress Record (SSR) for a baseline period of two weeks prior to onset of training and for the six weeks of training. The SSR is a chart on which the subject marks his/her level of stress and anxiety on a five-point scale. The corresponding values of the numbers are: 1 = mild or no stress; 2 = low stress; 3 = moderate stress; 4 = high stress; 5 = very high stress.

The SSR was designed by this investigator to be self-administering and is a basic behavioral record of daily anxiety. This type of record is recommended by Goldfried & Davison (1976). This instrument has been used previously in clinical settings by this investigator. The values assigned to each description were averaged weekly. The
average of the second week of pre-training baseline data was used as a pretraining measure and compared to the average of the values from the last week of training (Appendix C).

**Relaxation State Behavioral Checklist**

Pre- and post-treatment measures of anxiety were determined by a Relaxation State Behavioral Checklist (RSBC) developed by this investigator. The RSBC contains eleven items which were deemed indicative of a relaxed state by several researchers (Bernstein & Borkovec, 1973; Jacobson, 1957; Schilling & Poppen, 1983). It is also similar in content, but not in method of scoring, to those used by Luiselli (1980) and by Steinman, Steinman, Luiselli, & Marholin (1979, cited in Luiselli, 1980) with the developmentally disabled.

The checklist allowed the trainer to evaluate each subject's level of relaxation in terms of the absence or presence of each item over ten thirty-second intervals. A score for each item was compiled by counting the number of P (present) scores accrued over the evaluation period five minutes). The scores of all times were summed and the difference between the pre- and post-training scores was the measurement used. Lower scores indicate greater relaxation (Appendix D).
It was hypothesized that group progressive muscle relaxation training would be more effective than relaxation training administered individually. To demonstrate this it must be shown that the subjects in the GT group displayed a significant decrease in anxiety from pre-test to post-test, and that this decrease was greater than the decrease displayed by the IT group.

Although 12 subjects began the training, one GT subject dropped from the study and so was lost to follow-up. Consequently, there was a total of six subjects in the IT group and a total of five subjects in the GT group.

State anxiety was measured by the STAI Form X-1. Trait anxiety was measured by the STAI Form X-2. Additional instruments used were the Subjective Stress Record (SSR) and the Relaxation State Behavioral Checklist (RSBC). The twelve comparisons and the relative change in magnitude between the conditions analyzed are shown in Table 1.

State-Trait Anxiety Inventory X-1

To establish the effect of PMR training on state anxiety, pre- and post-training measures of the STAI Form X-1 were taken for both the IT and GT groups. A one-tailed t test was performed on the group means. Mean scores were used because mean measurement was the
Table 1

Summary of Changes in Measures on Four Inventories, Results of t Tests, and the Relative Change in Magnitude Between Scores

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Pre Mean</th>
<th>Post Mean</th>
<th>Mean Difference</th>
<th>/t/</th>
<th>P</th>
<th>Percent Change</th>
</tr>
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<tr>
<td>State-Trait Anxiety Inventory - State</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT</td>
<td>50.5</td>
<td>36.2</td>
<td>14.3</td>
<td>3.37</td>
<td>&lt; .05</td>
<td>28.4%</td>
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<tr>
<td>GT</td>
<td>48.8</td>
<td>36.8</td>
<td>12.0</td>
<td>3.38</td>
<td>&lt; .05</td>
<td>24.6%</td>
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<tr>
<td>IT/GT</td>
<td></td>
<td></td>
<td>2.3</td>
<td>.42</td>
<td>not significant*</td>
<td></td>
</tr>
<tr>
<td>Subjective Stress Record (SSR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT</td>
<td>3.85</td>
<td>1.83</td>
<td>2.02</td>
<td>4.97</td>
<td>&lt; .05</td>
<td>52.5%</td>
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<tr>
<td>GT</td>
<td>3.34</td>
<td>1.74</td>
<td>1.69</td>
<td>3.785</td>
<td>&lt; .05</td>
<td>47.9%</td>
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<tr>
<td>IT/GT</td>
<td></td>
<td></td>
<td>.42</td>
<td>.70</td>
<td>not significant*</td>
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<tr>
<td>Relaxation State Behavioral Checklist (RSBC)</td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>IT</td>
<td>41.7</td>
<td>3.2</td>
<td>38.5</td>
<td>8.041</td>
<td>&lt; .05</td>
<td>92.4%</td>
</tr>
<tr>
<td>GT</td>
<td>41.4</td>
<td>4.2</td>
<td>37.2</td>
<td>7.290</td>
<td>&lt; .05</td>
<td>89.9%</td>
</tr>
<tr>
<td>IT/GT</td>
<td></td>
<td></td>
<td>1.3</td>
<td>.19</td>
<td>not significant*</td>
<td></td>
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<tr>
<td>State-Trait Anxiety Inventory-Trait</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>IT</td>
<td>44.2</td>
<td>40.3</td>
<td>3.8</td>
<td>1.03</td>
<td>not significant</td>
<td></td>
</tr>
<tr>
<td>GT</td>
<td>40.6</td>
<td>37.2</td>
<td>3.4</td>
<td>1.04</td>
<td>not significant</td>
<td></td>
</tr>
<tr>
<td>IT/GT</td>
<td></td>
<td></td>
<td>.4</td>
<td>.09</td>
<td>not significant*</td>
<td></td>
</tr>
</tbody>
</table>

* = result of two-tailed test

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primary statistic used in the normalization of the STAI, and was also used to determine its reliability and validity. The greater the level of anxiety, the greater the value scored on the STAI. Consequently, a reduction in anxiety would be represented by a decrease in value. For the IT group the mean pre-test score was 50.5, the mean post-test score was 36.2, and the mean difference was 14.3. This represented a 28.4% decrease in anxiety from the pre- to the post-training measurement. A comparison of the pre- and post-test measures demonstrated a significant reduction in anxiety in the IT group, \( t(5) = 3.37, p < .05 \). The scores of each individual in the IT group decreased from the pre- to the post-test. The largest change was 32 points; the smallest change was 4 points. The GT group also demonstrated a significant reduction in anxiety. The mean pre-test score was 48.8, the mean post-test score was 36.8, and the mean difference was 12.0. This represented a 24.6% decrease in anxiety from the pre- to the post-training measurement. A comparison of the pre- and post-test measures demonstrated a significant reduction in anxiety in the GT group, \( t(4) = 3.38, p < .05 \) (Table 1). The scores of each individual in the GT group decreased from the pre- to the post-test. The largest change was 21 points; the smallest change was 7 points.

To determine in which training setting greater anxiety was achieved, a two-tailed t test was performed using the difference between the mean differences of the IT and GT groups. No significant difference between the two groups was demonstrated.
State-Trait Anxiety Inventory X-2

To establish the effect of PMR training on trait anxiety, pre- and post-training measures of the STAI Form X-2 were taken for both the IT and GT groups. A one-tailed t test was used to analyze the group means. A comparison of the pre- and post-treatment measures did not demonstrate a significant reduction in anxiety in the IT group. Neither was there a significant reduction in anxiety in the GT group. In addition, there was not a statistically significant difference between the mean differences of the IT and GT groups.

Subjective Stress Record

Reduction of anxiety was also measured by the Subjective Stress Record. Subjects rated their overall daily stress level on a five-point scale. The numeric values of the second week of baseline data were averaged and used as a pre-training measure. The mean of the values from the final week of training was used as a post-training measure. A one-tailed t test was used to analyze these data. For the IT group the mean pre-test score was 3.85, the mean post-test score was 1.83, and the mean difference was 2.02. This represents a 52.5% decrease in anxiety. A comparison of the pre- and post-test measures demonstrated a significant reduction in anxiety in the IT group, t(5) = 4.97, p < .05. A significant reduction in anxiety was demonstrated in the GT group. The mean pre-test score for the GT group was 3.34, the mean post-test score score was 1.74, and the mean difference was 1.60 which demonstrated a 47.9% decrease in anxiety. A comparison of the pre- and post-test measures demonstrated a
significant reduction in anxiety in the GT group, \( t(4) = 3.785, p < .05 \).

Analysis of the difference between the mean differences of the IT and GT groups did not show a statistically significant difference between the two groups. The results of this comparison are in agreement with the findings of the group comparison on the STAI-X1.

**Relaxation State Behavioral Checklist**

A third measure of anxiety reduction was the Relaxation State Behavioral Checklist. A one-tailed t test was used on the mean difference between the pre- and post-test means for both the IT and GT groups. Since this is an inverse measure a high level of relaxation would be represented numerically by a negative value. Consequently, an increase in relaxation would be represented by a decrease in value. For the IT group the mean pre-test score was 41.7, the mean post-test score was 3.2, and the mean difference was 38.5. This represented a 92.4% increase in relaxation from the pre- to the post-training measurement. A comparison of the pre- and post-test measures demonstrated a significant increase in relaxation in the IT group, \( t(5) = 8.041, p < .05 \). For the GT group the mean pre-test score was 41.4, the mean post-test score was 4.2, and the mean difference was 37.2. This represented a 89.9% increase in relaxation. A comparison of the pre and the post-test measures demonstrated a significant increase in relaxation in the GT group, \( t(4) = 7.290, p < .05 \).

In comparing the difference between the mean differences of the IT and GT groups a two-tailed t test was performed. No statistically significant difference between the two groups was demonstrated.
CHAPTER IV
DISCUSSION

The hypothesis of the present study, that progressive muscle relaxation training administered to a group is more effective than PMR training administered in an individual setting, was not demonstrated. The findings of this study, however, do indicate that PMR training is effective in reducing state anxiety whether administered in an individual or a group setting. The present experiment demonstrated a marked reduction in anxiety and stress following PMR training. This finding is in agreement with past researchers who administered PMR training in individual settings (Bernstein & Berkovec, 1973; Canter, Kondo, & Knott, 1975; Jacobson, 1938; Reinking & Kohl, 1975; Schilling & Poppen, 1983; Stoudenmire, 1975; Wolpe, 1958) as well as Stoudenmire (1975) who administered PMR in a group setting.

PMR training in both treatment settings was found ineffective in reducing trait anxiety. This finding supports Spielberger's (1966) theory that state anxiety can be reduced by brief anxiety reduction techniques but that trait anxiety cannot, and is in agreement with the clinical findings of Johnson & Spielberger (1968) and Stoudenmire (1955).

It was presumed that the subjects of this study were experiencing state anxiety when they responded to recruitment notices requesting subjects who were "tense" or "anxious" and desiring a "stress
reduction program. The methodology used in this study had a thera-
peutic impact on that state anxiety. This impact may have been due
to the particular PMR technique employed which taught subjects to
recognize the signs of their own stress, and to generalize the PMR
technique to a variety of daily stressors. Additionally, the sub-
jects were trained to implement the technique in less than one
minute. This quick ability to relax in a wide variety of stressful
situations may be why state anxiety can be reduced by PMR training,
regardless of the training setting.

Spielberger conceptualizes trait anxiety as a personality dimen-
sion which implies a strongly entrenched behavior characteristic.
There may be several reasons why reduction of trait anxiety was not
attained. The absence of reduction of trait anxiety in both groups
may indicate PMR is not effective with trait anxiety. It is possible
that the length of training may have been inadequate for reducing
trait anxiety or there may be other reasons. This study was not able
to provide any additional knowledge regarding PMR's lack of effective-
ness in reducing trait anxiety.

Measurement of anxiety by the Subjective Stress Record (SSR) pro-
vided another indication of the efficacy of PMR training on state
anxiety. This instrument functioned both as a measurement of pre-
and post-training changes in anxiety and also as a training device.
It is well established in behavior theory that self-monitoring of
behavior serves to facilitate subject compliance with the chosen
intervention. The SSR provided the subjects with a graphic represen-
tation of their progress which helped motivate subjects to continue
in their efforts to master the technique. One GT group member indicated that the SSR was important because it enabled him to see the progress he had made during the course of the training. He stated, "I'm feeling so much better now. I had forgotten how stressed I was before we started (training). This chart helps me to see my improvement." Similar comments were offered by other subjects in both training groups. One IT group subject stated that the SSR facilitated his compliance with home practice because "having to write down my stress levels every day kept me focused on working at this technique. I had to think about it every day."

The completed SSR is a graphic presentation of the individual's progress in stress reduction. The curve obtained differs between individuals. Most commonly, stress levels remain high the first two weeks of training, begin to reduce the third or fourth week, and reduce more dramatically the fifth or sixth week. If this pattern does not occur there may be a problem in the training process, i.e., inadequate instruction, lack of compliance with home practice, etc. It is important that the trainer talk with the individual to determine the cause of the problem and correct it.

The data from the Relaxation State Behavioral Checklist (RSBC) require comment. The pre- and post-treatment RSBC measures were so markedly different as to bring into question their validity. The mean pre-test score for the IT group was 41.7, the mean post-test score was 3.2, and the mean difference was 38.5, for a change in magnitude of 92.4%. For the GT group the mean pre-test score was 41.4, the mean post-test score was 4.2 and the mean difference was 37.2, for
a change in magnitude of 89.9%. This was a trainer-administered instrument and lacked interscorer reliability. The probability of scorer bias seems very high in the direction of giving undue weight to scores at the post-test measure. At the same time there may have been an additional confounding treatment variable present, that is, a long-term relationship between observer/trainer and subject which was not present at the pre-training assessment but had developed over the course of the training. During the pre-training assessment subjects were asked to recline and relax in an unfamiliar setting in the presence of the observer/trainer whom they had never met. By the post-training assessment the subject and the observer/trainer were very familiar with each other and the trainer, having been paired with the relaxation. This would help to explain the very high increase in relaxation in the post-training assessment.

Compliance with home practice continues to be an important factor in achieving positive results in anxiety reduction programs. This was evident in the present study when pre and post measures of STAI-X1 and SSR were compared. Both training groups demonstrated statistically significant reductions over the period of training. Since part of the PMR intervention required home compliance, it is reasonable to conclude that part of the reduction in anxiety can be attributed to this compliance factor. What appears to be less clear is the role compliance played in the failure to find support for the hypothesis of between-group differences.

There was no evidence to indicate that a significant difference exists between these two training settings. It is not clear why this
study failed to find support for the hypothesis that PMR administered in a group setting would be more effective in reducing anxiety than PMR administered individually.

This study indicates that both group and individual training in PMR are equally effective in the reduction of stress and anxiety. Since stress is a prevalent problem in modern society, there is a great need to provide stress management services. Group training may be the preferable method of providing those services because it increases the availability of treatment resources to those in need of them.

In addition, a preference for group administration of PMR was indicated by 75% of the subjects. The GT subjects reported a high degree of satisfaction with the group setting. This investigator's expectation was that most subjects would prefer the personal attention provided by individual training. However, all GT group members expressed satisfaction that they were selected to be in the GT group. Additionally, half of the IT members verbalized regret that they had been assigned to the IT group instead of the GT group. A common reason offered for this preference was that the GT group provided an opportunity to be with other people working on the same problem.

Since both training settings produced positive results and both utilized live relaxation, six training sessions, home practice, and the Bernstein and Borkovec method of sequencing and timing muscle contraction and relaxation, this study provides support for previous research which identified these components as necessary for effective relaxation training.
### SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

**STAI FORM X-1**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DATE</th>
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</table>

**DIRECTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, at *this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

| 1. I feel calm                                      | 0 0 0 0 |
| 2. I feel secure                                  | 0 0 0 0 |
| 3. I am tense                                     | 0 0 0 0 |
| 4. I am regretful                                 | 0 0 0 0 |
| 5. I feel at ease                                 | 0 0 0 0 |
| 6. I feel upset                                   | 0 0 0 0 |
| 7. I am presently worrying over possible misfortunes | 0 0 0 0 |
| 8. I feel rested                                  | 0 0 0 0 |
| 9. I feel anxious                                 | 0 0 0 0 |
| 10. I feel comfortable                            | 0 0 0 0 |
| 11. I feel self-confident                         | 0 0 0 0 |
| 12. I feel nervous                                | 0 0 0 0 |
| 13. I am jittery                                  | 0 0 0 0 |
| 14. I feel “high strung”                          | 0 0 0 0 |
| 15. I am relaxed                                  | 0 0 0 0 |
| 16. I feel content                                | 0 0 0 0 |
| 17. I am worried                                  | 0 0 0 0 |
| 18. I feel over-excited and “rattled”              | 0 0 0 0 |
| 19. I feel joyful                                 | 0 0 0 0 |
| 20. I feel pleasant                               | 0 0 0 0 |

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APPENDIX B

STATE-TRAITS ANXIETY INVENTORY FORM X-2
**DIRECTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
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</thead>
<tbody>
<tr>
<td>21. I feel pleasant</td>
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<td>22. I tire quickly</td>
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<td>23. I feel like crying</td>
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<td>24. I wish I could be as happy as others seem to be</td>
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<td>25. I am losing out on things because I can't make up my mind soon enough</td>
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<td>26. I feel rested</td>
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<td>27. I am &quot;calm, cool, and collected&quot;</td>
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<td>28. I feel that difficulties are piling up so that I cannot overcome them</td>
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<td>29. I worry too much over something that really doesn't matter</td>
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<td>30. I am happy</td>
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<td>31. I am inclined to take things hard</td>
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<td>32. I lack self-confidence</td>
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<tr>
<td>33. I feel secure</td>
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<td>34. I try to avoid facing a crisis or difficulty</td>
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<td>35. I feel blue</td>
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<td>36. I am content</td>
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<td>37. Some unimportant thought runs through my mind and bothers me</td>
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<td>38. I take disappointments so keenly that I can't put them out of my mind</td>
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<td>39. I am a steady person</td>
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<tr>
<td>40. I get in a state of tension or turmoil as I think over my recent concerns and interests</td>
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APPENDIX C

SUBJECTIVE STRESS RECORD
<table>
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NAME

BEHAVIOR 5 = VERY HIGH STRESS; 4 = HIGH STRESS; 3 = MODERATE STRESS;
2 = LOW STRESS; 1 = MILD OR NO STRESS
APPENDIX D

RELAXATION STATE BEHAVIORAL CHECKLIST
Subject is to be instructed to relax as completely as possible. Once subject signals that relaxed state has been achieved, observer checks each of the following that apply. Observations are to be made at thirty second intervals for five minutes.

A = ABSENT   P = PRESENT

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East, M. Personal communication, January 30, 1985.


