THE PROCESS OF SKILL DEVELOPMENT

IN RELAXATION TRAINING

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1991

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1992

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1997

THE PROCESS OF SKILL DEVELOPMENT

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Dissertation Approved:

Dissertation Adviser

Dean of the Graduate College

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to my major advisor, Dr. Frank Collins, Jr. for his belief in my abilities and his investment in my professional and personal development. My appreciation extends to my other committee members Dr. Richard Potts, Dr. John Chaney, and Dr. Donald Boswell. They continued to be a guiding force in the development of this study. I would also like to thank the graduate students that co-led the relaxation groups with me in this study. I could have not completed this study without their assistance. Lastly, I would like to thank Heather Stott and Michael McLaughlin for their significant contribution to this project.

By examining my training and career development, I can think of several contributors. Most significant are Frank L. Collins, Jr., Robert F. Weiss, Kenneth R. Jones, Leslie P. A. Root, Clinton "Butch" Martin, Nathaniel Abston, and Jack Schaefer. Without these dedicated individuals, I would not have been able to reach my goals.

I would also like to thank my friends and family for their support. I would like to express a special appreciation to Denise for her friendship and love through a difficult process. Of course, it all began with my parents, thanks go to them for the superb DNA. I would like to express my gratitude to Paula, Bruce, and Cassie for providing support during my many years in graduate school.

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CHAPTER I

INTRODUCTION

Relaxation training has been shown to be an effective treatment component for patients presenting with both psychiatric disorders (e.g., generalized anxiety disorder, and major depression) and some physical disorders (e.g., chronic pain, asthma, insomnia, tension headaches, and migraine headaches; Carlson & Hoyle, 1993). The goal of treatment is to train a patient in the self induction of a relaxed state. A relaxed state can be described along three systems; psychophysiology, behavior, and cognition. Psychophysiological presentation includes decreased heart rate, decreased respiration rate, decreased blood pressure, increased blood supply to periphery, and increased density of Alpha waves as measured by EEG (Levine, 1986). Behavioral presentation includes a body that is still, quiet, well-supported, and posture is symmetric (Poppen, 1988). Eyes are usually closed and lips slightly parted. Cognitive processing is slowed, thought content is pleasant and peaceful, and concentration is increased (Carrington, 1984). Although the relaxed state can be described separately using the three systems, it is best conceptualized as a combination of these systems.

The Problem of Effective Training

There are many ways to train a patient to induce a relaxed state. Jacobson (1938) was the first to develop a clinical procedure, Progressive Muscle Relaxation. Jacobson suggested that residual tension occurs continuously unless the individual induces deep relaxation. However, before a person can use deep muscle relaxation effectively, (s)he

must first recognize muscle tension and then relax this residual tension by concentrating on this muscle group. To facilitate induction of the relaxed state, an individual should have a passive attitude, decreased muscle tonus, and a quiet environment (Benson, Beary, & Carol, 1974). The development of the relaxation skill requires a great deal of practice. Jacobson's protocol was designed for 60 sessions or more sessions. However, contemporary approaches provide for far fewer sessions. The goal of Jacobson's approach was complete relaxation, at all times, of muscle groups not in use. The goal of more contemporary approaches is to develop the skill of inducing a relaxed state and the use of this skill in real life situations. How a person moves from learning the relaxation skill to applying the skill in real life situations has not been effectively addressed in the literature. The process of relaxation skill development will be addressed in this study.

A Model of Skill Development

The ability to induce a relaxed state is conceptualized as a skill. Relaxation training procedures are designed to teach a patient this new skill. The process of successfully teaching mastery of a new skill has been conceptualized in three stages: acquisition, application, and adaptation (Sohlberg & Maater, 1989; White & Haring, 1980). This process applies to teaching skills as varied as a jump shot in basketball to inducing a relaxed state. The Acquisition Phase focuses on teaching the acquisition of the new behavioral skill. In this phase, the individual learns how to perform the skill. In the example of learning to shoot a basketball, the trainee would learn the proper form of a jump shot, how to hold the basketball, and how to release the ball. Once the individual

has learned how to perform the skill, (s)he must then learn when and where to use this skill. The Application Phase focuses on teaching the individual the appropriate situations in which to apply the newly acquired behavioral skill. With the example of the jump shot, the trainee would train with the team, learning plays, and when and where (s)he should chose to use his/her acquired skill. In the final phase, Adaptation, the individual demonstrates an ability to generalize the application of the skills in everyday life. The trainee would use his/her new skill and make jump shots at the appropriate time in an actual game.

Experimental Questions

Relaxation training can be conceptualized using White and Haring's (1980) model of skill training. In the majority of the relaxation training procedures, the focus of training is the acquisition of relaxation skills. Some approaches train individuals application of these skills in real life situations. While all relaxation procedures provide training to facilitate the learning of relaxation skills, not all procedures provide the application phase of relaxation training. This paper examines the process used to teach the skill of inducing a relaxed state. Three experimental questions related to application training will be examined in this study: (a) Is the acquisition of relaxation skill is needed before application training is given?; (b) Is application training is an important phase in the training of relaxation skills?; and (c) Is further acquisition training may be important for individuals not initially acquiring relaxation skills?

Relaxation Procedures

Although relaxation training has demonstrated beneficial effects, the procedure used to produce a relaxation response can differ widely (Hillenberg & Collins, 1982). These include Progressive Relaxation (Bernstein & Borkovec, 1973; Jacobson, 1938) , Stretch-Based Relaxation (Carlson & Collins, 1986), Behavioral Relaxation (Poppen, 1988), Biofeedback Relaxation Training (Budzynski & Stoyva, 1984; Stoyva, 1979), Clinically Standardized Meditation (Carrington, 1978), and Yogic Training (Patel, 1984). While each of these procedures differ in the approach they use to teach the individual to induce a relaxation response, every procedure includes a rationale for training, encouragement for home practice, and use of identifiable stages of training. The following review discusses the stages of training used by various procedures.

Progressive Relaxation Training

Progressive Relaxation Training (PRT, Jacobson, 1938) involves the systematic tensing and relaxing of certain muscle groups. A distinction should be made between Jacobson's procedure and Berstein and Borkovec's (1973) abbreviated progressive relaxation training (APRT) procedure which is also often labeled as PRT. Differentiation between the two procedures is reflected in the specific goals and procedures. The goal of Jacobson's procedure is for the individual to relax all unnecessary muscle tension automatically and continuously throughout the day. The training required to meet this goal is comprehensive and involves many sessions. The goal of the abbreviated method is for the individual to relax his/her muscles by the cognitive process of recalling relaxed

muscle sensations. The training required to meet this goal is comparably less comprehensive and involves significantly fewer sessions. The specific procedures are explained below.

PRT. In Jacobson's (1938) procedure, the individual is taught to recognize any slight muscle tension, or "residual" tension, that may be occurring. The individual is then taught how to control and release the tension. Three stages of PRT can be identified: (a) recognition of muscle tonus utilizing tense-release cycles, (b) active relaxation of muscle tension utilizing cognitive "release" of muscles, and (c) application of skills to real life situations through differential training. The goal of training is automatic, unconscious relaxation of unneeded tension. This relaxation occurs differentially during all activities. For example, in the process of walking, an individual would keep the muscles required for walking tense (e.g., the leg muscles), while simultaneously relaxing the muscles not required for walking. Throughout training, the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of PRT).

ABRT. Bernstein and colleagues describe an abbreviated procedure of PRT that is a modification of Jacobson's procedures (Bernstein & Borkovec, 1979; Bernstein & Given, 1984). Two stages for APRT can be identified: (a) recognition of muscle tonus utilizing tense-release cycles, and (b) active relaxation of tense muscles utilizing cognitive recall. The goal of abbreviated PRT is for the individual to relax his/her muscles using a cognitive process of recalling relaxed muscle sensations. Throughout

training, the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of APRT).

Stretch-Based Relaxation Training

Stretch-Based Relaxation (SBR; Carlson & Collins, 1986) was developed as an alternative to progressive muscle relaxation techniques for pain patients (Carlson, Collins, Nitz, Sturgis, & Rogers, 1990; Carlson, Ventralla, & Sturgis, 1987; Kay & Carlson, 1992). Instead of tensing and releasing muscle tension as in progressive muscle relaxation, the muscle groups are slightly stretched. The stretching of muscles facilitates a differentiation of muscle sensations which contributes both to a recognition of muscle tension and fosters physiological relaxation of the muscles (Carlson, Ventralla, & Sturgis, 1987).

Stretch-Based Relaxation training is divided into two specific phases: basic muscle stretch relaxation training, and advanced relaxation training. In each phase two stages can be identified. In the first phase (basic training), the identifiable stages are: (a) recognition of muscle tonus, and (b) relaxation of muscle tension. In the second phase (advanced training), two stages are identified: (c) enhancement of basic skills with use of other relaxation methods, and (d) application of skills to real life situations. The goal of this training is for the individual to use the learned skills as needed in everyday situations. Throughout training the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of SBR).

Behavioral Relaxation Training

Behavioral Relaxation Training (BehRT; Poppen, 1988) involves the training of ten overt behaviors that induce a relaxed response. This is accomplished by prompting and verbal feedback concerning the individual's performance of ten specific relaxed positions or behaviors. Two stages of BehRT can be identified: (a) acquisition of the relaxed behaviors, and (b) active relaxation by participation in relaxed behaviors. In each session, there is an adaptation period of five to ten minutes, a pre-assessment of the relaxed state, an acquisition stage (during the first session only), proficiency training, and post-assessment of the relaxed state. The goal of training is for the individual to relax using the relaxation behaviors. Throughout training, the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of BehRT).

Biofeedback Relaxation Training

Biofeedback Relaxation Training (BioRT; Budzynski & Stoyva, 1984; Stoyva, 1979) trains the individual using auditory and/or visual feedback of specific physiological responses. Three stages of BioRT can be identified: (a) recognition of muscle tonus through tense-release cycles, (b) passive relaxation through "letting-go", and (c) application to real life situations. In this process the individual is taught to recognize any maladaptive physiological response and then control this response. The goal of training is for the individual to apply these skills to everyday life. Throughout training, the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of BioRT).

Clinically Standardized Meditation

While meditation has been a method of relaxation used in many cultures over thousands of years, Clinically Standardized Meditation (CSM; Carrington, 1978) is a standardized "non-spiritual" procedure. In CSM, the individual uses a mantra, which is a word that can be repeated both verbally and mentally. Two stages of CSM can be identified: (a) decrease of muscle tonus, and (b) passive relaxation. The goal of meditation training is the achievement of global effects including a reduction in anxiety, increased productivity, mood elevation, and lowered irritability (Carrington, 1984). Throughout training, the individual is encouraged to practice regularly. (See Appendix A for detail discussion of CSM).

Yogic Training

Yogic Training (YT; Patel, 1984) is a form of meditation but is differentiated from CSM in terms of the specific training stages involved. Patel applies a type of training incorporating principles of yoga. Three stages of YT can be identified: (a) active relaxation through rhythmic diaphragmatic breathing and systematic deep-muscle relaxation, (b) passive relaxation utilizing meditation, and (c) application of skills to real life situations. The goal of training is for the individual to apply the skills learned to real life situations as needed. Throughout training, the individual is encouraged to practice regularly. (See Appendix A for detailed discussion of YT).

Relaxation Treatment Studies.

In the examination of relaxation procedures, it is important to consider the literature on the effectiveness of relaxation training for specific populations. Research suggests that many different elements of training contribute to effective relaxation training. With respect to APRT, the literature suggests that a greater number of training sessions, use of "live" trainers versus tapes, training by skilled professionals versus paraprofessionals, positive outcome expectancies of the trainees, skill acquisition, and home practice contribute to the efficacy of the procedure (Borkovec & Sides, 1979; Carey & Burish, 1987; Hillenberg & Collins, 1982, Whitrock, Blanchard, & McCoy, 1988).

Studies investigating the clinical effectiveness of relaxation training for various populations suggest that researchers are not making full use of this knowledge. Table 1 in Appendix B summarizes nine recent studies highlighting relaxation training method(s) used, the populations trained, and the use of specific elements that have been demonstrated to be related to the effectiveness of training. None of these nine studies followed the protocol of APRT properly. Every study reviewed utilized a form of APRT modified by the authors. In these studies training sessions ranged from one to five sessions, with half of the studies providing two or fewer sessions. Further, a majority of the training sessions employed the use of taped instructions.

It is questionable whether these studies actually trained their subjects to induce a relaxed state. Further, it is difficult to ascertain the independent variables from an

examination of the methodologies of these studies. It is unclear whether the independent variable is providing the subject with relaxation training or is the acquisition of the relaxation skill. If the independent variable is simply providing the individual with relaxation training, the studies are at fault for not using a standardized procedure of relaxation training. Because each study used a modified APRT procedure, it is difficult to compare the procedures to APRT proper or to each other. It is difficult to compare these procedures to APRT proper and to each other. Alternatively, if the independent variable is the acquisition of an ability to induce a relaxed state, then the studies are at fault for not providing effective measures of the relaxation response. The studies that do employ measures use either indirect questions of the effectiveness of training (i.e., Appelbaum, et al., 1990), or self-report (i.e., Jacob, et al., 1992; Scrogin, Rickard, Keith, Wilson, & McElreath, 1992). Simply providing training in a skill does not necessarily mean that the individual acquires this skill.

Assessment of Relaxation Skill

Assessment of relaxation skills occurs in each of the relaxation approaches to a certain extent. For example, each training procedure provides for feedback from the individual by verbal self-report. However, objective assessment occurs in the protocols of only two of the training procedures, BioRT and BehRT. BioRT provides for physiological measures and BehRT provides for behavioral measures of relaxation. Lang (1977) conceptualizes the assessment of fear and anxiety along three systems: behavioral

observations, psychophysiological, and self-report. Each of these systems will be discussed with respect to relaxation skill assessment.

Behavioral assessment. Jacobson (1938) provided examples of behavioral observations that would assist the trainer in the assessment of the relaxation response. These include the observation of a steady respiration rate, absence of movement, increasingly slow responses to interruptions, and the "sleepy eyed" appearance of the individual at the end of the relaxation period. These assessment strategies are helpful for the general assessment of the relaxation response, but this method of assessment lacks objectivity.

BehRT emphasizes the behavioral assessment of the relaxation response in all phases of training (Poppen, 1988; Schilling & Poppen, 1983). The state of relaxation is defined by ten specific behaviors and are assessed along the Behavioral Relaxation Scale (BRS). For each of the ten behaviors, a differentiation is made between relaxed and unrelaxed behaviors. Ten observation periods are divided into three intervals. The recommended observation period consists of one minute. There is a 30 second interval to observe breathing rate, a 15 second interval to observe the other nine behaviors, and a 15 second interval to record the observations. Both the pre- and post-assessment are accomplished in the same manner.

This behavioral assessment method provides for a more objective measure of relaxation. However, it is biased. In BehRT, the individual is taught to participate in the specific behaviors measured by the BRS. Therefore, when used in conjunction with

BehRT, the trainer is simply measuring the compliance of the individual. One does not necessarily measure whether the trainee is relaxed. However, this method could be an effective way to assess the behavioral system if utilized in conjunction with a relaxation procedure not training compliance to these specific behaviors.

Psychophysiological assessment. Jacobson (1938) took measurements along the psychophysiological system in the form of electrical activity produced by muscle contractions. Technological advances in recording along this system and the specific method of assessment has improved over the years. Biofeedback Relaxation Training enables one to obtain a Physiological Stress Profile (PSP; Budzynski & Stoyva, 1984; Stoyva, 1979). Psychophysiological measures are monitored during three separate periods: a relaxed period, a stressor period, and a recovery period. Initially, the individual is asked to relax for a period of about 14 minutes. Then (s)he is presented with a mild stressor (e.g., mental arithmetic) for a period of 6 minutes, followed by a recovery period from the stressor. The recovery period varies and Budzynski and Stoyva suggest that anxious individuals are most often identified by a longer duration of physiological arousal in the recovery stage.

Self-report measures. Self-report of the degree of relaxation is used in every training procedure. However, none of the procedures provide a standardized method of self-report. Several standardized instruments of self-reported mood could be applied to the assessment of the relaxation response. Examples include the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1981), the Positive Affect/Negative Affect

Schedule Extended (PANAS-X; Watson & Clark, 1991), the Multiple Affect Adjective Check List Revised (MAACL-R; Zuckerman & Lubin, 1985), the Emotion Assessment Scale (EAS, Carlson, et al., 1989), and the State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). However, these instruments are not specifically designed to assess the relaxed state.

The Relaxation Inventory was designed specifically to provide the trainer with a self-report measure of the relaxed state (Crist, Rickard, Prentice-Dunn, & Barker, 1989). It is a psychometrically sound scale that could facilitate the assessment of relaxation skills. The trainee records the level of agreement or disagreement with statements along a five point Likert-like scale on three dimensions: physiological tension, physical assessment, and cognitive tension.

Process of Relaxation Training

Each of these relaxation procedures teach acquisition of a new skill, that of relaxation. Further, they all follow identifiable stages of skill training. These stages can be compared and classified in the context of White and Haring's (1980) first two phases of skill training: the acquisition phase and the application phase. The goal of relaxation training is the same for all procedures: generalization or adaptation to real life situations. However, the various processes of training in these procedures do not necessarily provide for both an acquisition phase and an application phase. All procedures provide for acquisition training, but some do not provide specific application training (i.e., APRT, BehRT, CSM). The following examines White and Haring's (1980) hypothesized phases

of effective skill training in regards to relaxation training. To provide an example of this training process, a detailed discussion of Stretch Based Relaxation, the relaxation training procedure used in the methodology of this study, is provided.

Acquisition phase. The trainee learns how to induce a relaxed state in this initial phase of training. This phase includes components of training that can be classified as overt, active covert, passive covert (Smith, 1988). Overt components are defined as the components of relaxation training that are observable (e.g., diaphragmatic breathing, body posture, and tensing of muscles). Covert components are defined as the components of relaxation training that are unobservable. Covert components can be classified as either active (e.g., cognitive concentration on the relaxation of muscles) or passive (e.g., cognitive concentration on a mantra and imagery). Relaxation training procedures follow a general process of teaching acquisition of this skill, with overt components being taught first, then active covert components, and then passive covert components. Overt components facilitate acquisition training as the individual learns to differentiate between a relaxed and unrelaxed state.

Stretch Based Relaxation Training provides both overt and active covert components for acquisition training of relaxation skills. Initially, the trainee is guided through muscle stretching exercises, in which different muscle groups are gently stretched for a period of 15 seconds. Then the trainee is asked to cognitively focus on the muscle group and "tell" that muscle group to relax for a period of 60 seconds. This process facilitates the experience of a relaxed state and teaches the trainee how to induce

a relaxed state. In the Acquisition Phase, the trainee is guided through a script while laying on the floor. This script takes about 30 minutes to complete. Over the course of training, the trainee is encouraged to practice daily at home.

Application phase Once the trainee acquires the skill of inducing a relaxed state, (s)he can be taught the appropriate situations in which apply this acquired skill. Again, not all procedures provide for this phase of training. In Stretched Based Relaxation Training, the trainee learns how to use the acquired relaxation skill of stretching a limited number of muscle groups while sitting upright in a chair. This is important because, in real life situations, the trainee would not likely be able to take 30 minutes to lie on the floor to relax. The focus of training moves to how, when, and where to utilize their relaxation skills. Throughout this phase of training, the trainee is encouraged to practice applying acquired relaxation skills in their everyday lives.

Adaptation phase. The goal of relaxation training is the use of relaxation skills in real life situations. In the Adaptation Phase, the trainee demonstrates the ability to use these skills in novel situations. Interestingly, the assessment of this phase is often overlooked. None of the relaxation procedures provide for an assessment of the ability to relax in novel situations.

Relaxation procedures can be summarized and compared by examining the stages of training, the components of the Acquisition phase, whether the training phases of Application is provided, and the goals of each relaxation training procedure. Table 2 in Appendix B provides a summary of this information.

Rationale and Purpose of the Present Study

As noted earlier, the process of relaxation training procedures can be conceptualized in three phases, acquisition, application, and adaptation. Every relaxation procedure has as it's goal the generalization or adaptation of skills to novel situations; the various relaxation training procedures achieve this goal differently. While all training procedures provide for acquisition training, only four provide application training (i.e., PRT, SBR, BioRT, and YT). This study examined the process of relaxation training and the question of whether application training is an important phase of this process.

Three questions about the process of relaxation training will be examined. First, is acquiring relaxation skills needed before application training can be given? Hypothesis One stated that a group of trainees that had acquired the skill prior to application training would demonstrate a greater ability to relax when compared to a group of trainees that had not acquired the skill of relaxation prior to application training. Secondly, is application training an important phase in the training of relaxation skills? Hypothesis Two stated that a group of trainees with acquired skills who were provided application training will demonstrate a greater ability to relax when compared to a group of trainees that have acquired the skill of relaxation but are not provided application training. Finally, is further acquisition training important for trainees not initially acquiring the relaxation skills? Hypothesis Three stated that a group of trainees not initially acquiring relaxation skills and receiving further acquisition training would demonstrate a greater ability to relax when compared to a group of trainees who had not initially acquired

relaxation skills before being moved to application training. The Stretch Based Relaxation Training procedure chosen to test these hypotheses, as it provides training in both the acquisition phase and the application phase.(Carlson & Collins, 1986).

CHAPTER II

METHOD

Participants

Subjects were recruited in Introductory Psychology classes at Oklahoma State University. Subjects who indicated an interest in participating in the study were given an initial interview during which the study was explained and informed consent was obtained (see Appendix C).

There were four pre-established criterion for subjects to be included in the final analysis. 1) The subject must attend the first session. 2) The subject must attend all individual assessments at the appropriate times and must complete all measures. 3) The subject must attend at least two of three Treatment Sessions Two through Four. 4) The subject must attend at least two of three Treatment Sessions Six through Eight. One hundred seven subjects were initially interviewed. A total of 68 subjects meet all criterion to be included in the final analysis. There were 33 subjects in the Acquisition plus Application group (AA) with a mean age of 22.06 years (standard deviation = 9.07) and age range of 18 to 54 years. There were 35 subjects in the Acquisition Only group (AO) with a mean age of 22.26 years (standard deviation = 7.31) and age range of 18 to 53 years.

Procedure

The procedure of the study included three separate assessment phases and relaxation training. The assessment phases included pre-training assessment, mid-

training assessment, and post-training assessment. Relaxation training includes two different protocols, AA and AO.

Assessment. Individual assessments of the subject's relaxation skill were made before training began (pre-assessment), after session four (mid-assessment), and after the relaxation training was completed (post-assessment). Subjects were placed in a room controlled for sound and sat in a comfortable chair. (S)he was taken through a baseline period of five minutes, a stressor period of four minutes, a relaxation period of eight minutes, and a measurement period of five minutes.

When a subject entered the room, (s)he was connected to psychophysiological devices measuring heart rate and finger temperature. The subject was asked to sit quietly in this room and the experimenter exited. The subject sat quietly for a period of five minutes.

After this five minute period, the experimenter entered the room and the subject performed a mental math task for four minutes. The mental math procedure consisted of the presentation of a randomly chosen four digit number. The subject was asked to subtract by serial thirteens and was given feedback concerning the accuracy of the responses. In the stressor period, the four digit number was presented for 45 seconds, then the experimenter waited for a period of 15 seconds before presenting the next four digit number. The stressor period continued for four minutes.

After giving the mental math stressors, the experimenter directed the subject to use their relaxation skills and then left the room. The subject attempted to relax for eight

minutes. Measurement along all three systems was then taken for five minutes preceding the eight minute relaxation period. Refer to Appendix C for the script used by the experimenter for the stressor period and the record forms used for the pre-treatment, mid-treatment, and post treatment assessments..

Relaxation training. Training of subjects occurred in a total of ten treatment groups, with five AA treatment groups and five AO treatment groups. To insure consistency in group treatment, one group leader ran every group. The group leader was assisted by a co-leader. All group leaders were graduate students in the Clinical Psychology or Counseling Psychology programs at Oklahoma State University. The group leaders met weekly to discuss the protocol. Supervision was provided by a Professor Frank L. Collins, Clinical Training Director of the Psychology Department.

The protocol of Stretch Based Relaxation (Carlson & Collins, 1986) was used to train relaxation skills. The training included one session of rationale followed by three sessions of acquisition training. In session five, the subjects relaxed without direction at their own pace. At this point, subjects in both groups had received identical training. Session six involved the manipulation of either continuing acquisition training (AO) or moving to application training (AA). This training continued until the final session (session eight).

Independent Variables

Independent variables included Type of Training (acquisition only versus acquisition plus application) and Relaxation Skill Level (most skilled subjects at mid-

assessment versus least skilled subjects at mid). Details of these independent variables are discussed below.

Type of training. This variable compares a standard treatment protocol and a modified treatment protocol of Stretch-Based Relaxation (Carlson & Collins, 1986). Over two semesters, five AA treatment groups and five AO treatment groups were run. Subjects were randomly assigned to one of the two experimental groups.

The standard procedure provides for both acquisition training and application training. It includes eight sessions, with the first session providing the rationale of stretch-based relaxation training. Sessions 2 through 4 provide acquisition training for the skill of stretch-based relaxation. In session 5, the participants relax at their own pace. Sessions 6 through 8 provides for application training of the acquired skills. This standard group is identified as Acquisition plus Application Training (AA).

The modified treatment protocol provided for acquisition training in Sessions 2 through 4 and in Sessions 6 through 8 Instead of moving to application training, these subjects continued to receive acquisition training. The modification did not take place until session six. Therefore, the training is identical for both groups in sessions one through five. This modified group is identified as Acquisition Only Training (AO).

Relaxation skill level. Relaxation skill level was assessed utilizing individual assessments. Subjects were classified as one of two skill levels, subjects most skilled at mid-assessment (MS), and subjects least skilled at mid-assessment (LS). Placement into

one of the two groups was based on the subject's relative performance during individual assessments.

For each system, one score served as the criterion score used in a formula to determine each subject's Relaxation Skill Score. In the data analysis, the criterion score was converted to Z-scores and then combined in a formula further explained in the findings section. The behavioral system utilized the Behavioral Rating Scale data. The psychophysiological system utilized finger temperature data. The self-report system utilized the Relaxation Inventory.

Dependent Variables

The dependent variables included relaxation measures that focused on behavioral, psychophysiological, and self-report systems. Each of these measures were obtained during three separate phases of training: (1) pre-training, (2) mid-training, and (3) post-training.

Behavioral measure. The Behavioral Relaxation Scale (BRS; Poppen, 1988) was used to code overt measures of relaxation. The Behavioral Relaxation Scale utilizes ten behaviors that have been found to be correlated with relaxation. These ten behaviors are rated as relaxed or unrelaxed according to a detailed explanation of each behavior. The ten behaviors include the head, eyes, mouth, throat, shoulders, body, hands, feet, quiet, and breathing. This assessment scale has been demonstrated to be a valid measure of relaxation (Schilling & Poppen, 1983; Poppen & Maurer, 1982). It has been demonstrated to change in the expected direction with relaxation training in progressive

muscle relaxation, frontalis EMG, and BRT. However, no specific reliability values were provided for in the literature. This remains an area for further research.

Behavioral coding was completed by coders blind to Type of Training subject placement. Coders were trained by the method suggested by Poppen (1988). First, they read and studied the coding procedure. They then took a test on this material. If they did not score 100% on this test, they reread the material and took another version of the test. This continued until they scored 100%. They then practiced coding on sample videos. The coding instructor was present and after each coding period, they were asked to provide a rationale for the coding of each behavior. Coders were considered trained after they completed three sample videos.

During the assessment period, a five minute video recording was obtained for each subject during each assessment period. Behavioral coding of each subject assessment was completed over ten trials. Each trial consisted of a 20 second observational interval, and a ten second recording interval. There were two teams of coders. Each team completed behavioral coding of half of the subjects. A team consisted of two initial coders and one tie-breaker. The initial coders rated all of the behaviors across ten trails independently. These ratings were compared, and the experimenter noted any disagreements. The tie-breaker, resolved any disagreements by examining only these behaviors and rating them as relaxed or unrelaxed. There was 85% agreement with the initial coders. Therefore, the tie-breakers only examined 15% of the behaviors.

Psychophysiological measures. In each assessment phase, the measures used for assessment along the psychophysiological system were finger temperature and heart rate. Finger temperature is a measure that increases as an individual becomes more relaxed. This is due to the increased blow flow to the extremities caused by relaxation. Heart rate is a measure that decreases as an individual becomes more relaxed. These measures were taken continuously throughout the assessment period.

Self-report measures. In each assessment phase, the measures used for assessment along the self-report system were the Relaxation Inventory (Crist, Rickard, Prentice-Dunn, & Barker; 1989) and the Emotion Assessment Scale (EAS; Carlson et al, 1989). The Relaxation Inventory provided a measure of the relaxation response and the EAS provided a measure of subject's mood state. Each of these measures were administered at the end of the assessment session.

The Relaxation Inventory is a 45 item questionnaire with a Likert-like scale. This measure contains three orthoganal scales, Physiological Tension, Physical Arousal, and Cognitive Tension. The reliability coefficients for these scales are reported by Crist et al. (1989) as 0.89, 0.95, and 0.81 respectively. This assessment measure was shown to have adequate reliability and is valid for the measurement of relaxation. The score of this measure increases as an individual becomes more relaxed.

The Emotion Assessment Scale (EAS) is a 24 item questionnaire, consisting of eight sub-scales. These eight sub-scales are Anger, Anxiety, Disgust, Fear, Guilt, Happiness, Sadness, and Surprise. The reliability coefficients for these scales are

reported by Carlson et al. (1989) as 0.90, 0.91, 0.71, 0.89, 0.74, 0.90, 0.82, and 0.70 respectively The EAS has been shown to have adequate reliability and is valid for the measurement of emotions. For purposes of this study, the Anxiety sub-scale is used. The score of this sub-scale measure decreases as an individual becomes more relaxed.

Analytic Plan

Analysis of data required a step wise process of first placing subjects into the appropriate level of the Relaxation Skill independent variable and then performing t-tests to examine the hypotheses.

Analysis of experimental questions. The dependent variables used for comparison were the BRS score, the mean finger temperature and mean heart rate, the EAS Anxiety sub-scale score, and the Relaxation Inventory score. For each hypothesis, a t-test comparison was computed for the values obtained at the post-assessment. To test Hypothesis One, a t-test comparison of Relaxation Skill Scores for AA/MS and AA/LS at post-assessment was computed. It was predicted that AA/MS would demonstrate a greater ability to relax when compared to AA/LS. To test Hypothesis Two, a t-test comparison of Relaxation Skill Scores for AO/MS and AA/MS at post-assessment was computed. It was predicted that AA/MS would demonstrate a greater ability to relax when compared to AO/MS. To test Hypothesis Three, a t-test comparison of Relaxation Skill Scores for AO/LS and AO/MS at post-assessment was computed. It was predicted that AO/LS would demonstrate a greater ability to relax when compared to AO/MS.

CHAPTER III

RESULTS

For each subject, data were collected across three separate assessment periods, pre-treatment, mid-treatment, and post-treatment. Data included behavioral measures using the Behavioral Relaxation Scale, psychophysiological measures of finger temperature and heart rate, and self-report measures of the Relaxation Inventory and the Anxiety sub-scale of the Emotion Assessment Scale. Data were analyzed to examine pre-treatment homogeneity of the groups, overall effectiveness of training over time, and to examine the three hypotheses. For analyses, a significance level of $\alpha = 0.05$ was used. For analyses of the hypotheses, data was examined further using a Bonferri adjustment with $\alpha = 0.0033$

Homogeneity of Groups

Two tailed t-test comparisons for each of the pre-treatment assessment measures were completed. This was done to rule out significant pre-treatment differences between the treatment groups. Treatments groups were homogeneous for all measures. For the pre-treatment behavioral coding variable, the treatment groups were not statistically different, $t\ (62) = -0.11$, $p = 0.913$. For the pre-treatment heart rate variable, the treatment groups were not statistically different, $t\ (62) = 0.44$, $p = 0.633$. For the pre-treatment finger temperature variable, the treatment groups were not statistically different, $t\ (62) = 0.49$, $p = 0.626$. For the pre-treatment Relaxation Inventory variable, the treatment groups were not statistically different, $t\ (62) = -0.82$, $p = 0.414$. For the pre-treatment

EAS - Anxiety sub-scale variable, the treatment groups were not statistically different, t (62) = 0.50, p = 0.619.

Effectiveness of Training

Previous research indicates that relaxation training has been demonstrated to significantly change variables of behavioral domains, psychophysiological domains, and self-report domains. To examine the effects of relaxation training on subjects in this study a 2 X 3 Analysis of Variance was computed for the final 68 subjects.

The behavioral measure of Behavioral Relaxation Scale showed no significant interactions and no significant main effects. For the behavioral coding variable, there was not a significant interaction between Time and Group, F (2, 132) = 1.14, p = 0.322. There was no significant main effect for Time, F (2, 132) = 0.30, p = 0.741, and no significant main effect for Group, F (1,66) = 0.02, p = 0.887.

The psychophysiological measures of heart rate and finger temperature changes showed no significant interactions or main effects. For the heart rate variable, there was not a significant interaction between Time and Group, F (2, 132) = 1.80, p = 0.170. There was no significant main effect for Time, F (2, 132) = 0.41, p = 0.662, and no significant main effect for Group F (1,66) = 1.10, p = 0.298. For the finger temperature variable, there was not a significant interaction between Time and Group, F (2, 132) = 0.01, p = 0.993. There was no significant main effect for Time, F (2, 132) = 1.25, p = 0.290, and no significant main effect for Group, F (1,66) = 0.21, p = 0.651.

The self-report measures of the Relaxation Inventory and EAS - Anxiety sub-scale showed no significant interactions, but demonstrated a significant main effect of

time for both measures. For the Relaxation Inventory variable, there was not a significant interaction between Time and Group, F (2, 132) = 0.01, p = 0.994. There was a significant main effect for Time, F (2, 132) = 7.54, p = 0.001, and no significant main effect for Group, F (1,66) = 0.52, p = 0.473. For the EAS - Anxiety sub-scale variable, there was not a significant interaction between Time and Group, F (2, 132) = 0.16, p = 0.851. There was a significant main effect for Time, F (2, 132) = 12.97, p = 0.001, and no significant main effect for Group, F (1,66) = 0.01, p = 0.935.

Further examination of the main effect of time for Relaxation Inventory and EAS - Anxiety sub-scale demonstrated that both groups reported becoming increasingly more relaxed and less anxious across treatment. Figures 1 and 2 in Appendix B illustrate the increase of reported relaxation and decrease of reported anxiety across time.

Hypothesis Analysis

Consideration of the statistical method used to analyze the hypotheses required a test of the intercorrelation of the outcome measures. If these are highly correlated, then a regression analysis would be implicated. The outcome measures of heart rate, finger temperature, Behavioral Relaxation Scale score, Relaxation Inventory, and Emotion Assessment Scale - Anxiety sub-scale were analyzed to find correlation between measures. There was a significant negative correlation between the self-report measures, r = -0.5178, p = 0.001. However, no other significant correlation was found. This would suggest utilizing t-tests to examine the hypotheses. Analysis of data required a step-wise

process of first placing subjects into the appropriate level of the independent variable of Relaxation Skill and then performing independent t-tests to examine the hypotheses.

Relaxation skill. Subjects were classified as having acquired one of two skill levels; subjects most relaxed at mid-assessment (MS), and subjects least skilled at mid-assessment (LS). Relaxation skill level was assessed utilizing one criterion measure in each of the three systems. The behavioral system utilized Behavioral Rating Scale data. The psychophysiological system utilized finger temperature data. The self-report system utilized Relaxation Inventory data. For each system, difference between mid-training assessment data and pre-training assessment data were computed. Then, a Z-score was computed for each of these values. The Z-scores were computed using all 68 subjects meeting criterion to be included in the study. The sum of the three Z scores is the Relaxation Skill Score (RSS) for an individual subject. The formula used is [Z-score (Behavioral Relaxation Scale $_{MID}$ - Behavioral Relaxation Scale $_{PRE}$) + Z-Score (Relaxation Inventory $_{MID}$ - Relaxation Inventory $_{PRE}$) + Z-Score (Finger Temperature $_{MID}$ - Finger Temperature $_{PRE}$)].

Each subject was sorted by type of treatment and then ranked by RSS. A median split was calculated based on these rankings. Sixteen subjects with the highest RSS in the AA group were assigned to AA/MS, and sixteen subjects with the lowest RSS in the AA group were assigned to AA/LS. . Sixteen subjects with the highest RSS in the AO group were assigned to AO/MS, and sixteen subjects with the lowest RSS in the AO group were assigned to AO/LS. Based on the placement of the subjects from lowest to highest RSS,

one subject in the AA group (in the middle) and three subjects in the AO group (in the middle) were excluded from these analyses to provide for an even number of subjects in each cell. This provided for the most extreme subjects in each group. A total of 64 subjects were used in the analysis of the experimental questions. The AA treatment group was represented by 19 females and 13 males with a mean age of 22 years. The AA treatment group was represented by 16 females and 16 males with a mean age of 21 years. For each hypothesis, a one-tailed t-test was computed for every dependent variable.

Hypothesis One. To test Hypothesis One, a t-test comparison of each dependent variable for AA/MS and AA/LS at post-assessment was calculated. It was predicted that AA/MS would demonstrate a greater ability to relax when compared to AA/LS. Table 3 in Appendix B summarizes the mean and standard deviation of each post-treatment measure.

For the post-treatment behavioral coding variable, AA/MS and AA/LS were not statistically different, t (30) = 0.72, p = 0.239. For the post-treatment heart rate variable, AA/MS and AA/LS were not statistically different, t (30) = - 1.34, p = 0.095. For the post-treatment finger temperature variable, AA/MS and AA/LS were not statistically different, t (30) = - 0.70, p = 0.245. For the post-treatment Relaxation Inventory variable, AA/MS was significantly greater than AA/LS, t (30) = - 1.79, p = 0.042. For the post-treatment EAS - Anxiety sub-scale variable, AA/MS was significantly lower than AA/LS, t (30) = 1.76, p = 0.044.

The self-report measures of the Relaxation Inventory and the EAS - Anxiety sub-scale were significant in the direction of the one-tailed t-test. Figures 3 and 4 in Appendix B illustrate the post-treatment values for each cell of Treatment Group by Relaxation Skill for the Relaxation Inventory variable and the EAS - Anxiety sub-scale variable, respectively. The highlighted bars represent the AA/MS and AA/LS comparison. As shown by these figures, subjects in the AA/MS cell reported being more relaxed and less anxious than subjects in the AO/MS cell.

Hypothesis Two. For the hypothesis that application training is an important phase in the training of relaxation skills, a t-test comparison of each dependent variable for AO/MS and AA/MS at post-assessment was calculated. It was predicted that AA/MS would demonstrate a greater ability to relax when compared to AO/MS. Table 4 in Appendix B summarizes the mean and standard deviation of each post-treatment measure.

For the post-treatment behavioral coding variable, AA/MS and AO/MS were not statistically different, t (30) = - 0.03, p = 0.488. For the post-treatment heart rate variable, AA/MS and AO/MS were not statistically different, t (30) = - 1.12, p = 0.136. For the post-treatment finger temperature variable, AA/MS and AO/MS were not statistically different, t (30) = - 0.74, p = 0.234. For the post-treatment Relaxation Inventory variable, AA/MS and AO/MS were not statistically different, t (30) = - 0.91, p = 0.186. For the post-treatment EAS - Anxiety sub-scale variable, AA/MS and AO/MS were not statistically different, t (30) = 1.05, p = 0.152.

Hypothesis Three. To test Hypothesis Three, a t-test comparison of each dependent variable for AO/LS and AA/LS at post-assessment was completed. It was predicted that AO/LS would demonstrate a greater ability to relax when compared to AA/LS. Table 5 in Appendix B summarizes the mean and standard deviation of each post-treatment measure.

For the post-treatment behavioral coding variable, AO/LS and AA/LS were not statistically different, t (30) = - 0.95, p = 0.176. For the post-treatment heart rate variable, AO/LS and AA/LS were not significantly different, t (30) = 1.87, p = 0.071. For the post-treatment finger temperature variable, AO/LS and AA/LS were not statistically different, t (30) = 0.83, p = 0.205. For the post-treatment Relaxation Inventory variable, AO/LS and AA/LS were not statistically different, t (30) = - 0.27, p = 0.396. For the post-treatment EAS - Anxiety sub-scale variable, AA/MS and AA/LS were not statistically different, t (30) = - 1.05, p = 0.151.

Bonferri Adjustment

Since there were 15 t-test comparisons, the α level was recalculated at 0.0033 using a Bonferri adjustment. Using this α level, the significant differences found for Hypothesis One in the self-report data were found to be non-significant.

Summary

In this study, data were collected in three assessment periods. Data included behavioral measures using the Behavioral Relaxation Scale, psychophysiological measures of finger temperature and heart rate, and self-report measures of the Relaxation

Inventory and the Anxiety sub-scale of the Emotion Assessment Scale. Data analysis examined the pre-treatment homogeneity of the groups, overall effectiveness of training over time, and the three hypotheses.

Both treatment groups were found to be homogeneous prior to treatment. The treatment gains are represented by the self-report measures. These suggest that the subjects subjectively became more relaxed and less anxious with treatment. However, there was not a treatment control group with which to compare these treatment gains. When placed into Relaxation Skill levels, significant differences were seen only with the self-report measures of Hypothesis One. This hypothesis stated that acquiring relaxation skills would facilitate learning to apply these skills and compared post-treatment measures of subjects in AA/MS cell and AO/MS cell. These data suggest that subjects who acquire the skill of relaxation and are taught application skills report feeling more relaxed and less anxious than those who receive further acquisition training. However, these findings must be tempered by the analyses using Bonferri adjustment for the α levels. They were found to be non-signficant.

CHAPTER IV

DISCUSSION

Literature reviews have suggested that relaxation training is an effective treatment for many psychiatric and medical problems (Carlson & Hoyle, 1993; Hillenberg & Collins, 1982). Further, recommendations for effective training have been documented in the literature. Components of effective relaxation training include the use of "live" trainers versus tapes, training by skilled professionals versus paraprofessionals, and home practice (Borkovec & Sides, 1979; Carey & Burish, 1987; Hillenberg & Collins, 1982, Whitrock, Blanchard, & McCoy, 1988). To extend the focus of this research in this area, this study examined the process of relaxation skill development, which has not been addressed in the literature in regards to relaxation training.

Utilizing White and Haring's (1980) model of skill development, three hypotheses addressed this process of skill development. Hypothesis One stated that acquiring relaxation skills would facilitate the application of these skills. Hypothesis Two stated that subjects acquiring the skill of relaxation prior to application training would demonstrate a greater ability to relax when compared to those who acquired the skill of relaxation but continued with acquisition training. Hypothesis Three stated that subjects not acquiring the skill of relaxation but given continued acquisition training would demonstrate a greater ability to relax when compared to subjects not acquiring the skill of relaxation and given application training.

Findings

Upon examination of the data, there is a suggestion that Stretch Based Relaxation benefited the perception of being more relaxed and less anxious. As shown in Figures 1 and 2 in Appendix B, both treatment groups demonstrated an increase in self-reported relaxation and a decrease in self-reported anxiety. However, it is unclear whether the effects on self-report measures can be accounted for entirely by the treatment because the research design did not provide for a treatment control group. These differences could be better accounted for by demand characteristics. This design did not use a treatment control group because of literature demonstrating the effectiveness of this relaxation training procedure (Carlson, Collins, Nitz, Sturgis, & Rogers, 1990). Secondly, the hypotheses in this study did not require a control group. While there were improvements in self-report measures across time, these effects were not demonstrated by the psychophysiological or behavioral measures. These measures appeared insensitive to measuring any differences across time. Since significant differences were found in both groups with self-report measures, it would follow that the specific hypotheses would find significance only with self-report measures.

Consistent with this line of thinking, significant differences were found with self-report measures. However, these differences were demonstrated only with Hypothesis One, which predicted that acquiring relaxation skills would facilitate learning to apply these skills. Therefore, when provided relaxation application training the group of individuals demonstrating an ability to relax prior to application training reported being

more relaxed and less anxious than those not demonstrating an ability to relax prior to application training. These differences suggest that, if application training is provided, assessing the relaxation ability prior to application training would be useful in identifying those individuals likely to benefit most from relaxation training. However, using Bonferri adjustment of the α level there were no significant differences.

The less conservative α level of 0.05 demonstrated no significant differences for Hypotheses Two or Three. Hypothesis Two predicted that those subjects acquiring the skill of relaxation prior to application training would demonstrate a greater ability to relax when compared to those acquiring the skill of relaxation who continued with acquisition training. There were no significant differences between these subjects. The data suggest that there is no added benefit from moving to application training. Hypothesis Three states that further acquisition training may be important for individuals not initially acquiring the skill of relaxation. Again, there were no significant differences between these subjects. The data suggest that there is no additional benefit from further acquisition training. The mixed findings offer equivocal support to the belief that an individual must acquire relaxation skills before the initiation of application training. There was no added benefit from further acquisition training.

Limitations of Study

The lack of significant results of the present study allow for speculation about the lack of controlled variables, outcome measures, stress induction technique, subject population, and specific assumptions made regarding the hypotheses.

Lack of controlled variables. In this study, there were several variables were not controlled. Although every group was lead by the same experimenter, there were six different co-leaders. The co-leaders consisted of five females and one male. These co-leaders were not matched across groups. Some ran only one group, others ran two groups. Other variables not controlled for include age, gender, and ethnic background of the subjects. This treatment outcome study lacked control of some variables that may have played a role in the outcome of this study.

Outcome measures. Stretch Based Relaxation Training has been demonstrated to be an effective treatment. In this study, self-report measures tended to support that there was some change during relaxation treatment in this study. However, the support is clouded by the lack of effect upon psychophysiological and behavioral measures of relaxation. These measures were insensitive to any potential changes. This study may have had a problem with the outcome measures used. Relaxation treatment outcome studies typically use the decrease in frequency or intensity of a presenting problem of a specific medical or psychiatric disorder. For example, in a relaxation treatment outcome study examining the effect of this treatment on chronic tension headaches, the outcome measure would be the frequency and intensity of tension headaches. These measures are clinically applicable to specific populations. However, they do not directly measure relaxation skill. The focus is more on the skill of controlling and decreasing the frequency and intensity of tension headaches utilizing the induction of a relaxed state. In this study, an attempt was made to operationalize relaxation skill by the ability to

significantly increase finger temperature, decrease heart rate, increase relaxation behaviors, increase self-reported relaxation, and decrease self-reported anxiety.

It is interesting to note that both the psychophysiological measures and the behavioral measure used in this study are also used training an individual to induce a relaxed state. Both finger temperature and heart rate can be used in Biofeedback Relaxation Training to aid an individual in learning to control these responses. The behaviors on the Behavioral Relaxation Scale are used to train an individual to induce a relaxed state in Behavioral Relaxation Training. These method of training are then used as outcome measures for successful training in these methods. For example, if an individual is receiving biofeedback of his/her heart rate, this may or may to have an effect on his/her finger temperature or relaxation behaviors. However, it is highly probable that this individual will be able to decrease his/her heart more effectively than when (s)he began training. As discussed earlier, Behavioral Relaxation Training teaches an individual to participate in the very behaviors that are measured by the BRS. This is then used as an outcome measure of successful training. Because an individual participates in these behaviors, this does not necessarily lead to the assumption that they have induced a relaxed state. The outcome measures used in this study may not have effectively "captured" relaxation skill. They may be more effective in "capturing" compliance to a specific method of relaxation training. An outcome measure of Stretch Based Relaxation could measure whether the subject participated in muscle stretching exercises during the relaxation period.

Stress Induction. The method used to induce a stress response may not have been effective in this study. Mental math stressors have been utilized in previous studies to induce a stress response. However, this may not have given a sufficient stress response for the subject to "recover" from. Based on individual math skill level, this stressor may have affect subjects differently. An alternative stressor could have been a cold presser, in which the subject's hand is placed in water maintained at zero degrees Celsius for a certain period of time. This method is typically used in pain research. However, this physical demand may be an effective stressor.

Subject population. Another limitation of this study was the use of a non-clinical population. The use of subjects with significantly high levels of arousal may have demonstrated greater measurable changes when inducing a relaxed state. An individual with generalized anxiety disorder would show a greater change from baseline to relaxation induction than an individual that does not present as anxious.

A clinical population may also have a higher level of motivation. Someone who is uncomfortable will be more motivated to make changes to increase their comfort level. The subjects used in this study were motivated to participate in research to gain extra credit in their Introductory Psychology classes. Since extra credit was based on class attendance, the motivation was to show up to each class, not necessarily to learn relaxation skills.

Hypothetical assumptions. Finally, it may be that the hypothetical assumptions regarding the process of skill development may not apply. It certainly may be the case

that the process of training in the "office" is not important. Rather, it may be more important that the individual learn the specific method and then use home practice in "real-life" situations. Home practice may be a better analogy to application training. This may be the primary method of skill development. The process of relaxation training in the "office" could be considered acquisition training, and the home practice could be considered application training. This would shift a focus to a demonstration of the relaxation method and maintenance of home practice behaviors. This would in turn limit the number of sessions required to train relaxation induction.

Future Directions

The current trend toward shorter, more effective treatment provides justification for further examination of the skill development process. The research design examining this skill development could be made more effective by taking into account the discussed limitations. Utilizing these considerations in combination could provide a significant outcome. For example, a population of individuals presenting with math anxiety could be matched with a stress induction technique of mental math.

Careful consideration of specific outcome measures would also be important when considering a clinical population. For example, individuals with high blood pressure could learn to induce a relaxation response and decrease their blood pressure. The skill may be better conceptualized as the ability to decrease and control his/her blood pressure. Therefore, the treatment outcome measure would involve measures of blood

pressure as well as measures of heart rate and finger temperature. This would provide a focus an the clinically significant problem, a decrease in blood pressure.

Another example is individuals presenting with social anxiety. The stressor would be a speech presentation with the outcome measure of avoidance behaviors. Again with a focus of the individual using relaxation training to control the presenting problem. This would provide a study that is clinically significant. The stress induction procedures would also approximate "real -life" situations.

Again, consideration of the importance of home practice in "real-life" situations with effective planning of population, outcome measures, stress induction techniques, and theoretical assumptions could provide a challenge to the question of the skill development process. A combination of these considerations would provide for an appropriate design and further examination of this topic could yield valuable insights into the variables responsible for therapeutic change.

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APPENDIXES

APPENDIX A:

Stages of Relaxation Training Procedures

Progressive Relaxation (PRT; Jacobson, 1938)

Stage One: Recognition of Muscle Tonus

The first stage of training involves the recognition of muscle tonus of specific muscle groups. Initially, the individual is told to tense and hold a muscle for several minutes using the specific exercise for that muscle group. The individual attends to any sensations from this tensed muscle group and then the muscle tension is released. The individual attends to these sensations for several minutes and compares these sensations to those noted in the tense muscles. This tense-release cycle is repeated and a process of diminishing tensions is introduced. The individual systematically provides less tension in that muscle group with each cycle and identifies the muscle sensations. This process continues until (s)he can identify even the slightest tension in that muscle region.

Stage Two: Active Relaxation

When the individual is able to identify the muscle tension of the specific muscle group (s)he practices to relax the tension by a process of release only. This process involves the release of any recognized tension in the muscle group without the initial muscle contractions. The individual continues to practice the release only process until (s)he becomes proficient in relaxing this muscle group. When proficiency in the initial muscle group is demonstrated, training of the next muscle group in the sequence begins. Therefore, the individual first learns to recognize muscle tonus of a specific muscle group, then learns how to relax any perceived tension in this muscle group. When the

individual is trained in the recognition and relaxation of all eight muscle groups, the individual is shifted to stage three of training.

Stage Three: Application of Skills

The preliminary training of stages one and two prepares the individual for this final stage of training. The goal of automatic relaxation of unneeded tension is achieved through a process of differential training. This is training in the skill of relaxing the muscles not required for a specific activity while simultaneously keeping the muscles required for the activity adequately tense. For example, a person may be taught to sit and read a book using only the muscles required while recognizing and relaxing any unneeded tension. This training continues with different situations. The individual also practices the application of these skills in every day situations. Through continued practice in the application of these skills, the individual is able to reach the ultimate goal of training.

Abbreviated Progressive Relaxation Training

(APRT; Bernstein & Borkovec, 1979)

Stage One: Recognition of Muscle Tonus

Stage one involves tense-release cycles of 16 muscle groups in the following sequence: 1) dominant hand and forearm; 2) dominant upper arm; 3) non dominant hand and forearm; 4) non dominant upper arm; 5) forehead; 6) upper checks and nose; 7) lower face; 8) neck; 9) chest, shoulders, and upper back; 10) abdomen; 11) dominant upper leg; 12) dominant calf; 13) dominant foot; 14) non dominant upper leg; 15) non dominant calf; and 16) non dominant foot.

Training begins with the individual tensing the first muscle group for 5 -7 sec and attending to the sensations of this tense muscle group. (S)he is then instructed to release the tension and relax for 30 to 40 seconds while attending to these sensations and comparing them to the sensations of the tense muscles. The tense-release cycle is then repeated for the same muscle group. However, the individual maintains the relaxation for 45 to 60 sec while attending to the sensations. The individual can move to the next muscle group in the sequence when (s)he self reports that the previous muscle group is relaxed. This tense-release cycle continues for each of the sixteen muscle groups. The individual is then asked to self-report whether all muscle groups are relaxed and (s)he is allowed to continue to relax for 2-3 more min. The entire process for all sixteen muscle groups are implemented within one session.

After about three sessions of the initial training, the sixteen muscle groups are combined into seven groups: (1) dominant hand, forearm, and upper arm; (2) non dominant hand, forearm, and upper arm; (3) all facial muscles; (4) neck; (5) chest, shoulders, upper back, and abdomen; (6) dominant upper leg, calf, and foot; (7) non dominant upper leg, calf, and foot. Tense-release cycle are repeated in the session for these combined groups. Some individuals will find it difficult to achieve a relaxation response using the combined muscle groups (Bernstein & Given, 1984). In this case, the trainer should identify the troublesome muscle groups and they should be temporarily divided until the individual gains the skill needed to relax these muscle groups.

Further combination of the muscle groups is accomplished if the individual demonstrates an ability to relax with the seven muscle groups. The seven muscle groups are combined into four muscle groups: (1) both arms and both hands; (2) face and neck; (3) chest, shoulders, back, and abdomen; (4) both legs and feet. Tense-release cycles are repeated for these muscle groups. This final step of stage one should take about ten min to complete. When the individual demonstrates an ability to relax by using the four muscle groups, they are ready to move to the last stage in training.

Stage Two: Active Relaxation

The goal of this method of relaxation is to be able to relax tense muscles by cognitive recall. The procedure involves the trainer instructing the individual to relax by recalling the sensations involved in the releasing of the muscles in the previous exercises. This is similar to the process of release only, described in the procedure of PR, and does

not involve tensing of the muscles. Each of the four muscle groups are relaxed separately in the sequence described above. The individual relaxes the muscle group for 30 to 45 sec. The individual moves to the next muscle group when (s)he self-reports that the previous muscle group is relaxed. The mastery of this stage is important as it is these skills that are used in real life situations. The trainer encourages maintenance of these skills by encouraging further continued practice.

Stretch-Based Relaxation

(SBR; Carlson & Collins, 1986)

Phase One: Basic Muscle Stretching.

The goal of the first phase of training is for the individual to learn to relax 14 muscle groups in sequence: 1) right lower leg; 2) left lower leg: 3) right upper leg; 4) left lower leg; 5) right buttock and lower back; 6) left buttock and lower back; 7) stomach; 8) chest; 9) forehead; 10) eyes; 11) jaw; 12) neck; 13) upper arms; and 14) lower arms. In each exercise the individual is told to lightly stretch each muscle group and is given a full description of how this is accomplished. The entire sequence takes about thirty min to complete. This first phase includes the first two stages of training, the recognition of muscle tonus and active muscle relaxation.

Stage one: Recognition of muscle tonus. In the first stage of training, the individual learns to recognize muscle tonus by the process of muscle stretching. The individual lies on the floor and begins to stretch a muscle groups until (s)he feels resistance. Only a slight stretch is required. The stretch is held for a period of 15 sec and the individual attends to the sensations of the stretched muscle. The muscle is then relaxed for a period of one min and the individual attends to the sensations of the relaxed muscle. To facilitate the recognition of muscle tonus, the individual records his/her tension level daily on a tension record form. This form allows for hourly reports of muscle tension and helps the individual identify patterns in tension levels in real life situations.

Stage two: Active relaxation. The act of stretching the muscle group helps the individual to physically relax that muscle group (Carlson, Ventralla, & Sturgis, 1987). Therefore, the individual is able to experience a relaxation response from the onset of this training procedure. When the individual discontinues the stretch and relaxes this muscle group, (s)he facilitates the relaxation response by cognitively focusing on that muscle group and "telling it" to relax. After the individual relaxes the muscle group for one minute, (s)he begins to stretch the next muscle group in the sequence. The training of the fourteen basic muscle stretches continues over four weekly sessions, then the individual is trained in advanced relaxation skills.

Phase Two: Advanced Training.

In the second phase, the trainer teaches application skills and relaxation procedures. The process of basic muscle stretching is continued in this phase. However, the individual seated rather than lying down and it includes only eight muscle groups: 1) stomach; 2) chest; 3) forehead; 4) eyes; 5) jaw; 6) neck; 7) upper arms; and 8) lower arms. This phase includes the last two stages of training, the enhancement of basic skills and the application of the skills learned to real life situations.

Stage three: Enhancement of basic skills. Theoretically, the individual will have acquired the basic skills of relaxation. To further enhance this skill, additional training is introduced. The individual is taught the process of postural changes, breathing regulation, and stretching of tense muscles (PBS). In this process, the individual is seated upright in a chair and postures himself/herself in the most relaxed position. (s)he then

begins to slow down his/her breathing to a slow, regular pattern. As the individual begins to relax, (s)he mentally scans his/her muscles for tension and locates the three most tense muscle groups. Once identified, the individual is asked to relax these muscle groups by stretching and actively relaxing them. The trainer continues to use the process of PBS and shortened muscle stretch exercises. The trainer discusses other procedures to enhance the relaxed state including methods to help cope with thought intrusions, such as using of patter, "letting go" of thoughts, thought switching, and focusing on internal sensations. The final session makes use of mental imagery to enhance the relaxation response.

Stage four: Application of skills. Throughout the advanced training phase the individual is encouraged to practice the advanced procedures in real life situations. For example, if the individual recognizes tension (s)he could use the PBS process to relax. The advanced training results in a shorter latency to achieve a relaxation response in a seated position more applicable to everyday life. The importance of maintaining the skills learned is discussed and continued practice is encouraged.

Behavioral Relaxation Training

(BehRT; Poppen, 1988)

Stage One: Acquisition

Before training begins, the individual is assessed using the Behavioral Relaxation Scale (BRS). Refer to the assessment section of this paper for a description of this behavioral method of assessment. The individual is then presented with an acquisition stage to teach the relaxed behaviors. After an objective pre-assessment, the individual is trained in the method of behavioral relaxation. The acquisition stage includes four steps: 1) labeling; 2) description and modeling; 3) imitation; and 4) feedback. In the first step, the trainer labels each behavior with a one-word label (i.e., Hands, Head, Mouth, etc.). In the second step, the trainer describes and models the ten relaxed behaviors for the individual. In the third step, the individual imitates each behavior. In the final step, the trainer gives the individual feedback about his/her behavior.

The four steps are followed for each of the ten behaviors. For example, the trainer follows each step for the hands: 1) the trainer labels the hands; 2) the trainer describes and models the relaxed posture of the hands; 3) the individual imitates the relaxed posture of the hands; and 4) the trainer provides feedback to the individual. Then the trainer moves to the next behavior in the sequence. Again, this acquisition stage takes place in the first session only.

Stage Two: Active Relaxation

After the individual learns the relaxed behaviors, (s)he is further trained in the proficiency of behavioral relaxation. During this stage of training the trainer gives further instruction to the individual, observes and records the relaxed and unrelaxed behaviors, and gives verbal feedback to the individual about the behaviors. While the individual relaxes all ten areas, (s)he is to concentrate on the sensations of the relaxed state. This stage usually takes place over several sessions, with the individual practicing between sessions. To facilitate maintenance of the behaviors learned, the individual is encouraged to continue to practice these behaviors regularly.

Biofeedback Relaxation Training

(BioRT; Budzynski & Stoyva, 1984; Stoyva, 1979)

Stage One: Recognition of Muscle Tonus

Before training begins, the individual is assessed using the Physiological Stress Profile (PSP). Refer to the assessment section of this paper for a description of this physiological method of assessment. Training begins with the individual learning an abbreviated form of progressive relaxation. This is done specifically to facilitate the recognition of muscle tonus and prepares the individual for further training (Budzynski & Stoyva, 1984). The individual continues to practice this process during a week of twice daily home practice. After the initial training in recognition of muscle tonus, the individual is then connected to sensors to monitor their forearm extensor electromyograph (EMG), frontal EMG, finger temperature, and electrodermal response (EDR). Initially, the individual practices controlling the muscle tension through tense-release cycles while initially receiving feedback from the forearm extensor EMG only.

Stage Two: Passive Relaxation

In stage one, the primary purpose of the tense-release cycles is to facilitate recognition of muscle tonus. However, the individual also learns to relax by concentrating on the muscle in the release step of the cycle. Important in biofeedback relaxation training is the shift from a process of "active striving" to a process of "passive volition" (Budzynski & Stoyva, 1984; Budzynski, Stoyva, & Peffer, 1980; Shellenberger & Green, 1986; Stoyva, 1979). "Active striving" is defined as the cognizant and active

focus on the task of relaxation, for example the process of tensing and releasing of muscles in progressive relaxation. "Passive volition" involves a process of "letting go." This passive process is similar to that used in autogenic training. The process of "active striving" is taught initially to help the individual recognize and attempt to control their muscle tonus. The shift is then made to "letting go" while the individual listens to feedback from forearm extensor EMG. The individual continues to practice the use of "passive volition" at home.

As the training continues, the biofeedback apparatus is used in such a way as to gradually require a greater change in muscle tension for a given unit of feedback signal. This shapes the individual into responding more effectively. As the individual demonstrates an ability to relax muscle tension as recorded by the frontal extensor EMG, a process of progressive multiple feedback is initiated. The individual begins to receive feedback from a second system, the frontal EMG. This ensures that the individual can generalize his/her relaxation skills to other muscle groups (Stoyva, 1979). After criteria is met with the frontal EMG, the individual receives feedback from a third system, skin temperature. Through passive suggestions of hand warmth, the individual is able to effect this system. The individual is encouraged to continue home practice of passive suggestions.

Stage Three: Application of Skills

In certain cases such as when the individual is experiencing anxiety in real life situations, systematic desensitization is employed. The final phase of biofeedback

relaxation training facilitates the use of the acquired skills. A hierarchy of fear or stress scenes, from the least disturbing to the most disturbing, are created for the individual. The individual is then asked to relax and then imagines each scene in the hierarchy. Attention is given to any indications of a disruption in the relaxed state. The individual uses the triple feedback system to return to a relaxed state. When this is accomplished the individual can move to the next image on the hierarchy. Eventually, with continued home application practice and systematic desensitization, the individual should be able to apply the skills learned.

Clinically Standardized Meditation

(CSM; Carrington, 1978)

Stage One: Decrease of Muscle Tension

The training begins with the individual sitting in a quiet environment and postured in a comfortable position. It is important that the individual is in an environment with few distractions. The individual may lie down, recline in a chair, or sit in a lotus position. When the individual is relaxed, (s)he begins to relax passively.

Stage Two: Passive Relaxation

The individual begins passive relaxation. The individual concentrates on his/her mantra while "letting go" of distracting thoughts. In CSM, the individual repeats a mantra in a passive manner. If the individual's thoughts begin to wander, (s)he is to let these thoughts flow and not force a return to concentration on the mantra. Eventually the individual returns to the mantra. This process is analogous to a leaf floating in a river. The procedure is less structured than others described and the level of concentration is low. The clinician may need to take into account individual differences that may be better served by a more or less structured method. This procedure requires repeated practice for the individual to become proficient in meditation. The process of meditation should be practiced once or twice daily for a period of 20 minutes. Maintenance of these skills is facilitated by further practice.

Yogic Training

(YT; Patel, 1984)

Stage One: Active Relaxation

Stage one includes two steps: training in rhythmic diaphragmatic breathing and systematic deep-muscle relaxation. The individual learns how to control his/her breathing by taking deep breaths in and out using his/her diaphragm. The individual attends to the breathing but does not slow it purposefully. Deep-muscle relaxation training includes developing a posture that induces both muscle relaxation and prevents the individual from sleeping. This is often the lotus position, but can be a reclined position. Most importantly, the midline of the individual's body must be centered and his/her body must lack any movement.

When the individual is in a comfortable position, (s)he is asked to become aware of the muscle sensations in a specific muscle group (e.g., toes, hand, etc.) and consciously relax that muscle group. This continues with seven muscle groups: 1) the right foot; 2) the left foot; 3) the right hand; 4) the left hand; 5) the spine; 6) the face; and 7) the chest. When the individual is finished actively relaxing all seven muscle groups (s)he is asked to continue the relaxation process while concentrating on his/her breathing.

Stage Two: Passive Relaxation

In stage two the individual simply "lets go" of his/her thoughts and becomes a passive recipient of his/her thoughts. The individual is then taught meditation proper. Patel (1984) suggests that the type of meditation used should be appropriate for that

individual, such as CSM, and ROM. Along with these forms of meditations, Patel (1984) mentions simple meditation on breathing, and devotional mediation (i.e., prayer). Once specified, the individual continues to practice meditation until (s)he becomes proficient. As the individual becomes skilled in meditation, (s)he is taught to apply these skills in every day life.

Stage Three: Application of Skills

In the final stage, the individual is encouraged to practice these skills during specific events that tend to contribute to stress. For example, the individual would practice his/her meditation skills every time (s)he stops to wait on a red traffic light, before an important public speaking event, every time (s)he looks at his/her watch, etc. This process helps the individual integrate the relaxation response into his/her life. In order to facilitate maintenance, Patel (1984) suggests periodic follow-up sessions and regular practice twice daily.

APPENDIX B:

Tables and Figures

Table 1

Relaxation Training Studies: Examining Components of Effective Relaxation Training.

Study	Number of Sessions	Live vs. Taped	Home Practice
Appelbaum et al. (1990)	3 sessions	Taped	Yes
Forbes & Pekala (1993)	1 session	Live	No
Jacob et al. (1992)	5 sessions	Taped	No
Lucic, Steffen, Harrigan, & Stuebing (1991)	1 session	Taped	No
Hoelschler, Lichstein, Fisher, & Hegarty (1987)	4 sessions	Lived training with supplemented tape vs. no tape home practice	Yes
Pekala & Forbes (1990)	1 session	Live	No
Scogin, Rickard, Keith, Wilson, & McElreath (1992)	4 sessions	Taped	No
Stefanek & Hodes (1986)	2 sessions	Taped vs. Live (between subjects)	Yes
Werstein & Smith (1992)	1 session	Taped	No

Table 2

Summary of Relaxation Procedures

Relaxation Procedure	Training Process	Application Training Provided	Training Goal
Progressive Relaxation Training (Jacobson, 1938)	1. Recognition of muscle tonus 2. Active relaxation 3. Application of skills	Yes	Global relaxation in all situations
Abbreviated Progressive Relaxation Training (Bernstein & Borkovec, 1973)	1. Recognition of muscle tonus 2. Active relaxation	No	Use of relaxation skills in appropriate situations
Stretch-Based Relaxation (Carlson & Collins, 1986)	1. Recognition of muscle tonus 2. Active relaxation 3. Enhancement of basic skills 4. Application of skills	Yes	Use of relaxation skills in appropriate situations
Behavioral Relaxation Training (Poppen, 1988)	1. Acquisition of specific behaviors (1st session) 2. Active relaxation	No	Use of relaxation skills in appropriate situations
Biofeedback Relaxation Training (Budzynski & Stoyva, 1984; Stoyva, 1979)	1. Recognition of muscle tonus 2. Passive relaxation 3. Application of skills	Yes	Use of relaxation skills in appropriate situations
Clinically Standardized Meditation (Carrington, 1978)	1. Decrease of muscle tonus 2. Passive relaxation	No	Global relaxation in all situations
Yogic Training (Patel, 1984)	1. Active relaxation 2. Passive relaxation 3. Application of skills	Yes	Use of relaxation skills in appropriate situations

Table 3

Hypothesis One: Comparison of AA/MS and AA/LS. Means and Standard Deviations of Post-Treatment Measures

	AA/MS		AA/LS	
Measure	M	SD	M	SD
Behavioral Measure				
Behavioral Relaxation Scale	28.875	18.286	32.813	12.117
Psychophysiological Measures				
Heart Rate	1.283	36.953	- 11.830	12.618
Finger Temperature	0.842	1.945	- 1.9129	15.629
Self-Report Measures				
Relaxation Inventory	180.875	23.523	167.188	19.542
EAS - Anxiety sub-scale	6.750	3.733	9.500	4.993

Table 4

Hypothesis Two: Comparison of AO/MS and AA/MS. Means and Standard Deviations of Post-Treatment Measures

	AO/MS		AA/MS	
Measure	M	SD	M	SD
Behavioral Measure				
Behavioral Relaxation Scale	28.688	16.712	28.875	18.286
Psychophysiological Measures				
Heart Rate	- 9.870	14.641	1.283	36.953
Finger Temperature	- 2.016	15.416	0.842	1.945
Self-Report Measures				
Relaxation Inventory	173.313	23.548	180.875	23.523
EAS - Anxiety sub-scale	8.438	5.253	6.750	3.733

Table 5

Hypothesis Three: Comparison of AO/LS and AA/LS. Means and Standard Deviations of Post-Treatment Measures

	AO/LS		AA/LS	
Measure	M	SD	M	SD
Behavioral Measure				
Behavioral Relaxation Scale	27.688	17.696	32.813	12.117
Psychophysiological Measures				
Heart Rate	- 3.553	12.411	- 11.830	12.618
Finger Temperature	1.4321	3.545	- 1.913	15.629
Self-Report Measures				
Relaxation Inventory	164.875	28.528	167.188	19.542
EAS - Anxiety sub-scale	7.750	4.405	9.500	4.993

Figure 1. Total score of the Relaxation Inventory as a function of Treatment Group [Acquisition Only (AO), & Acquisition plus Application (AA)] by Assessment Period (Pre-treatment, Mid-treatment, & Post-treatment). This figure illustrates the increase in self-reported relaxation across time. . The main effect of time was sh own to be significant, $F(1,66) = 7.54$, $p = 0.009$.

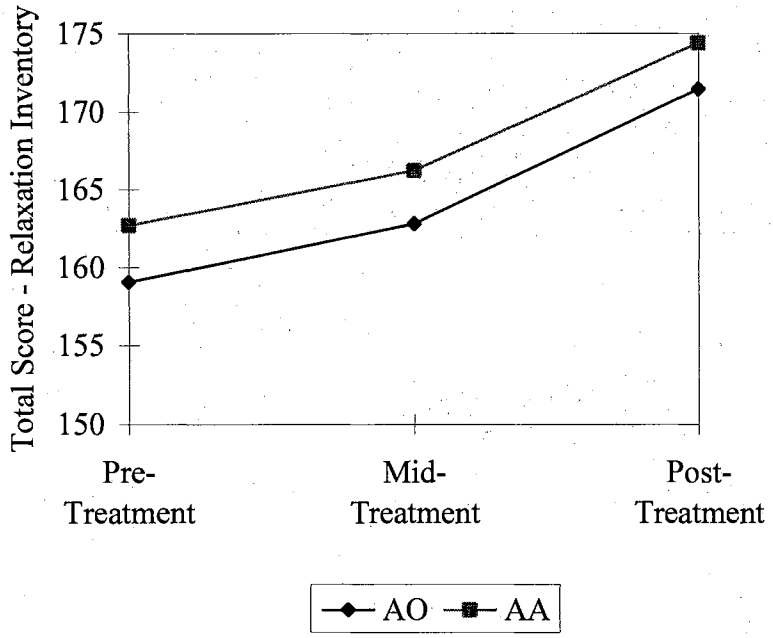

Total Score - Relaxation Inventory
175
170
165
160
155
150
Pre-
Treatment
Mid-
Treatment
Post-
Treatment
AO
AA

Figure 2. Anxiety sub-scale score as a function of Treatment [Acquisition Only (AO), & Acquisition plus Application (AA)] by Assessment Period (Pre-treatment, Mid-treatment, & Post-treatment). This figure illustrates the decrease in self-reported anxiety across time. The main effect of time was shown to be significant, $F(1,66) = 7.18$, $p = 0.009$.

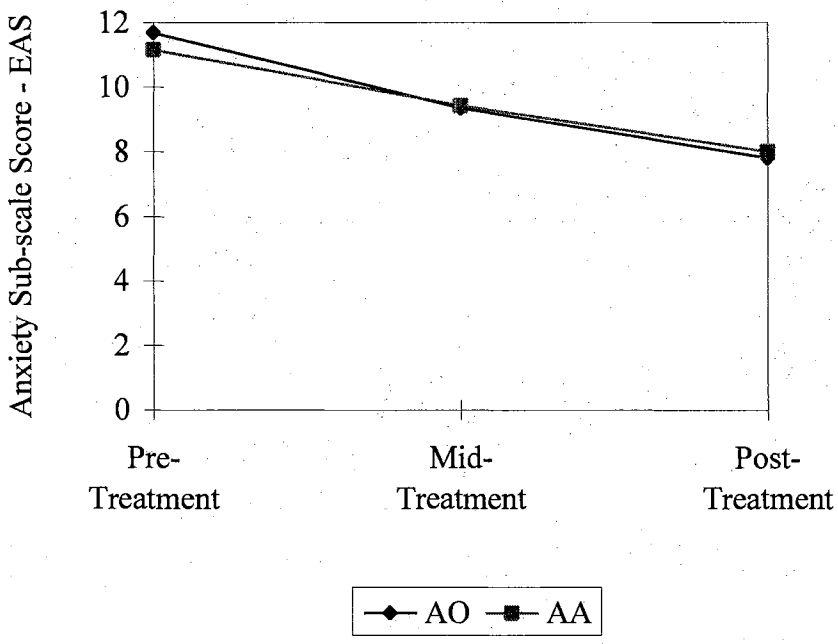

Anxiety Sub-scale Score - EAS
12
10
8
6
4
2
0
Pre-
Treatment
Mid-
Treatment
Post-
Treatment
AO
AA

Figure 3. Total score of the Relaxation Inventory as a function of Treatment Group Treatment [Acquisition Only (AO) & Acquisition plus Application (AA)] by Relaxation Skill Level [Least Skilled (LS) & Most Skilled (MS)]. The highlighted areas represent the Hypothesis One comparison of subjects in AA/LS and AA/MS cells. A one-tailed t-test was calculated for this comparison. This figure illustrates the significant difference between AA/LS and AA/MS, t (30) = - 1.79, p = 0.042.

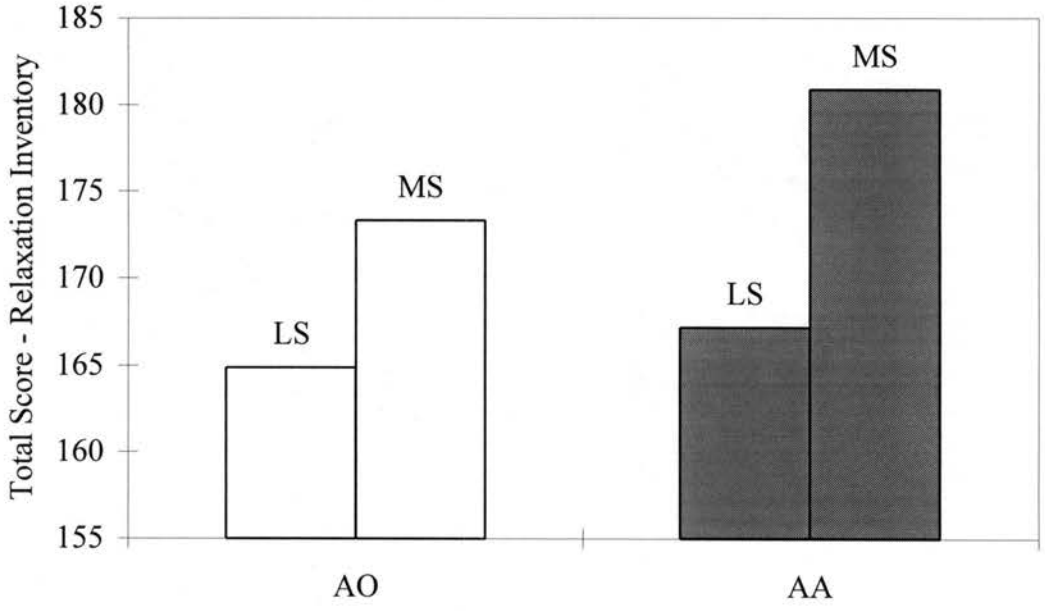
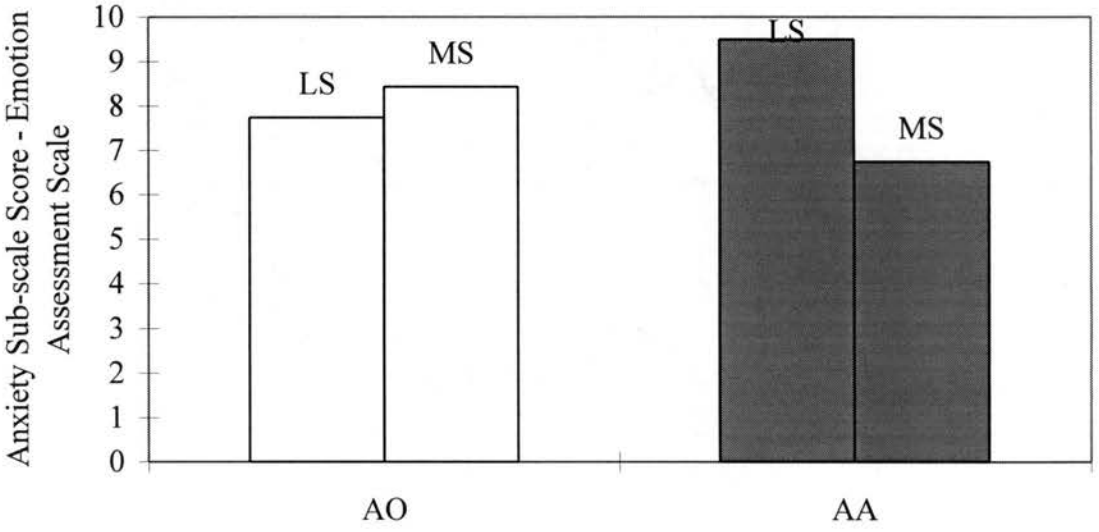

Total Score - Relaxation Inventory
185
180
175
170
165
160
155
LS
MS
LS
MS
AO
AA

Figure 4. Total score of the Anxiety sub-scale of the Emotion Assessment Scale (EAS) as a function of Treatment Group Treatment [Acquisition Only (AO) & Acquisition plus Application (AA)] by Relaxation Skill Level [Least Skilled (LS) & Most Skilled (MS)]. The highlighted areas represent the Hypothesis One comparison of subjects in AA/LS and AA/MS cells. A one-tailed t-test was calculated for this comparison. This figure illustrates the significant difference between AA/LS and AA/MS, t (30) = 1.76, p = 0.044.


Anxiety Sub-scale Score - Emotion Assessment Scale
10
9
8
7
6
5
4
3
2
1
0
LS
MS
LS
MS
AO
AA

APPENDIX C:

Forms and Mental Math Script

Evaluation of Relaxation Training
Frank L. Collins, Ph.D. & Robert P. Trombley, M.S.

I, _____, hereby authorize or direct Dr. Frank Collins or associates/assistants of his choosing, to perform the following treatment or procedure:

This project will examine the efficacy of a relaxation training program. Your participation in the project will include attending relaxation training sessions and assessment sessions. In the relaxation training sessions, you will be taught effective measures to relax with other participants. In the assessment sessions, you will be asked to relax after participating in math computations. Although the training sessions include a group of participants, you will participate in the assessment sessions individually. We will videotape the process, take psychophysiological measures (i.e., heart rate and finger temperature), as well as paper and pencil measures of emotion and relaxation. All data, including videotapes, will be identified by subject number only. Your name will not be included on the data. All data will be kept in a locked cabinet located in a locked room. Only authorized representatives of the project director will be able to examine the data. Each training session will take about an hour of your time and each assessment session will take about 30 minutes. If you agree, we will save all data collected during the project under a code name. This will allow our research staff to analyze your behavior without knowing your name. If we publish findings from these analyses, you will not be identified. At any point during the research, you may withdraw from the project.

I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project director. I may contact Dr. Frank Collins at telephone number (405) 744-6027 should I wish further information about the research, I may also contact Jennifer Moore, University Research Services, 001 Life Sciences East, Oklahoma State University, Stillwater, OK 74078; Telephone: (405) 744-5700.

I certify that I am 18 years of age or older and that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date:_____ Time:_____ Signed:_____

I certify that I have personally completed all blanks in this form and explained them to the subject before requesting the subject to sign it.

Signed:_____
Project Director or His Authorized Representative

Script for Mental Math Stressor

"We are ready to begin the Math Computations. I will give you a four digit number. You will mentally subtract by thirteen and tell me your answer. Then you will subtract by thirteen from that answer and so on. Work as quickly as you can. I will correct you when you give the wrong answer. Continue until I say stop. The first number is ...."
(Give first number on the list for 45 sec)
(Wait for 15 sec)

"The next number is ..."
(Give second number on the list for 45 sec)
(Wait for 15 sec)

"The next number is ..."
(Give third number on the list for 45 sec)
(Wait for 15 sec)

"The next number is ..."
(Give fourth number on the list for 45 sec)
(Wait for 15 sec)

"I want you to spend this time relaxing any way you know how."
(Leave the room)

Post Relaxation Period Script

"Now I would like for you to continue relaxing but please place your hand on the arm rest and keep your fingers as still as possible."

PRE ASSESSMENT

3495	7367	4218	6862
3482 _____	7354 _____	4205 _____	6849 _____
3469 _____	7341 _____	4192 _____	6836 _____
3456 _____	7328 _____	4179 _____	6823 _____
3443 _____	7315 _____	4166 _____	6810 _____
3430 _____	7302 _____	4153 _____	6797 _____
3417 _____	7289 _____	4140 _____	6784 _____
3404 _____	7276 _____	4127 _____	6771 _____
3391 _____	7263 _____	4114 _____	6758 _____
3378 _____	7250 _____	4101 _____	6745 _____
3365 _____	7237 _____	4088 _____	6732 _____
3352 _____	7224 _____	4075 _____	6719 _____
3339 _____	7211 _____	4062 _____	6706 _____
3326 _____	7198 _____	4049 _____	6693 _____
3313 _____	7185 _____	4036 _____	6680 _____
3300 _____	7172 _____	4023 _____	6667 _____
3287 _____	7159 _____	4010 _____	6654 _____
3274 _____	7146 _____	3997 _____	6641 _____
3261 _____	7133 _____	3984 _____	6628 _____

Subject_____

MID ASSESSMENT

2857	4922	7528	5596
2844 _____	4909 _____	7515 _____	5583 _____
2831 _____	4896 _____	7502 _____	5570 _____
2818 _____	4883 _____	7489 _____	5557 _____
2805 _____	4870 _____	7476 _____	5544 _____
2792 _____	4857 _____	7463 _____	5531 _____
2779 _____	4844 _____	7450 _____	5518 _____
2766 _____	4831 _____	7437 _____	5505 _____
2753 _____	4818 _____	7424 _____	5492 _____
2740 _____	4805 _____	7411 _____	5479 _____
2727 _____	4792 _____	7398 _____	5466 _____
2714 _____	4779 _____	7385 _____	5453 _____
2701 _____	4766 _____	7372 _____	5440 _____
2688 _____	4753 _____	7359 _____	5427 _____
2675 _____	4740 _____	7346 _____	5414 _____
2662 _____	4727 _____	7333 _____	5401 _____
2649 _____	4714 _____	7320 _____	5388 _____
2636 _____	4701 _____	7307 _____	5375 _____
2623 _____	4688 _____	7294 _____	5362 _____

Subject_____

POST ASSESSMENT

8287	3492	4973	7335
8274 _____	3479 _____	4960 _____	7322 _____
8261 _____	3466 _____	4947 _____	7309 _____
8248 _____	3453 _____	4934 _____	7296 _____
8235 _____	3440 _____	4921 _____	7283 _____
8222 _____	3427 _____	4908 _____	7270 _____
8209 _____	3414 _____	4895 _____	7257 _____
8196 _____	3401 _____	4882 _____	7244 _____
8183 _____	3388 _____	4869 _____	7231 _____
8170 _____	3375 _____	4856 _____	7218 _____
8157 _____	3362 _____	4843 _____	7205 _____
8144 _____	3349 _____	4830 _____	7192 _____
8131 _____	3336 _____	4817 _____	7179 _____
8118 _____	3323 _____	4804 _____	7166 _____
8105 _____	3310 _____	4791 _____	7153 _____
8092 _____	3297 _____	4778 _____	7140 _____
8079 _____	3284 _____	4765 _____	7127 _____
8066 _____	3271 _____	4752 _____	7114 _____
8053 _____	3258 _____	4739 _____	7101 _____

APPENDIX D:

Institutional Review Board Human Subjects Review

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 06-02-95 **IRB#:** AS-95-062

Proposal Title: THE PROCESS OF RELAXATION TRAINING: AN EXAMINATION OF APPLICATION TRAINING

Principal Investigator(s): Frank Collins, Robert P. Trombley

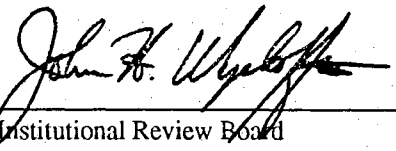
Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Provisions received and approved.

Signature:  Date: July 24, 1995

Chair of Institutional Review Board

VITA

Robert Paul Trombley

Candidate for the Degree of

Doctor of Philosophy

Dissertation: THE PROCESS OF SKILL DEVELOPMENT IN RELAXATION TRAINING

Major Field: Clinical Psychology

Biographical:

Personal Data: Born in Albuquerque, New Mexico, on December 9, 1965, the son of James and Paula Trombley.

Education: Graduated from Poteau High School, Poteau, Oklahoma in May 1984; Received Bachelor of Science Degree in Psychology from the University of Oklahoma, Norman, Oklahoma in May 1991; Received Master of Science in Psychology from Oklahoma State University, Stillwater, Oklahoma in July 1992. Completed the requirements for the Doctor of Philosophy degree with a major in Psychology in December, 1997.

Experience: Practicum experiences at: Oklahoma City Veterans Affairs Medical Center, Oklahoma City, Oklahoma; Edwin Fair Community Mental Health Center, Stillwater, Oklahoma; Jim Thorpe Rehabilitation Center, Oklahoma City, Oklahoma; Griffin Memorial State Hospital, Norman, Oklahoma. Clinical Psychology Internship at Biloxi Veterans Affairs Medical Center, Biloxi, Mississippi.

Professional Memberships: American Psychological Association