THE RELATIVE EFFECTS OF SELF-INSTRUCTED AND THERAPIST-DIRECTED RELAXATION TRAINING

by

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THE RELATIVE EFFECTS OF SELF-INSTRUCTED AND

THERAPIST-DIRECTED RELAXATION TRAINING

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ABSTRACT

An increase in the incidence of stress-related disorders suggests that many people are dealing ineffectively with environmental stressors. Increased physiological reactivity to stressors has been implicated as a causative factor in stress disorders. The relaxation response has demonstrated effectiveness in counteracting the effects of stress reactions. There is general support for instruction in relaxation as a way of acquiring the ability to relax automatically. Traditionally, relaxation training has been conducted under professional direction. Recently, self-instructional relaxation training, an alternative to therapist-directed training, has been suggested as an effective medium for providing relaxation training to a greater number of people. This study investigated the comparative effectiveness of self-instructional and therapist-instructional relaxation training over a five week training period.

Sixty-six participants (26 males and 40 females; ages ranging from 18 to 54 years, with a mean age of 30.7 years) were assigned either to a self-instructional, therapist-instructional, or delayed treatment control group. More than two-thirds of the participants were students. Self-report questionnaires, including the Institute for Personality and Ability Testing Self-Analysis Form (IPAT) and the State-Trait Anxiety Inventory (STAI) and psychophysiological measures

were administered pre and posttreatment to determine treatment efficacy. The STAI and IPAT self-analysis forms were used as self-report measures. Frontal EMG, peripheral skin temperature, skin resistance, and heart rate measured under relaxation and stressor conditions, constitute the physiological dependent measures. In addition, participants in the treatment groups self-monitored heart rate, peripheral skin temperature, rate of respiration before and after each daily practice session in relaxation, as an index of intra session change as well as change across the five week training period.

Analysis of variance for repeated measures indicated no group differences on self-report measures of anxiety or measures of physiological reactivity. Participants in the treatment groups reported increased ability to relax and control stress reactions, but these reports were not confirmed by the dependent measures. Reliable pre-postpractice decrements were observed on all self-monitored home practice measures indicating the potential usefulness of this procedure in gauging progress in home relaxation practice. However, an increase in peripheral skin temperature among participants in the therapist-instructional group, was the only self-monitored physiological measure differentiating the treatment groups. Implications and future research directions are presented.

DEDICATION

To my wife, Dale, who fanned the flames of persistence during this extraordinary undertaking. Special thanks is also accorded to each of my friends Justin, Martin, Elizabeth, Albert, Rick, Marlene, Karen, Bob, and Joan.

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CHAPTER 1

> Men are are not worried by things, but by their ideas about things. When we meet with difficulties, become anxious or troubled, let us not blame others, but rather ourselves, that is, our ideas about things.
>
> Epictetus (c. 60 A. D.)

There is substantial evidence attesting to the increase in the incidence of anxiety and other stress-related problems in our society (Abbondanza, Allen, Hermenmeyer, Hiebert, Pappaport, & Shellonberger, 1978; Albrecht, 1979; Behnke & Carlile, 1971; Bowersock, 1974; Lamott, 1975; Lang, 1981). The severity of stress-related problems is manifested in varying degrees throughout society. Lang (1981) cites recent studies showing evidence that stress-related physical, mental, emotional, and social problems (e.g., cardiovascular disease, ulcers, colitis, hypertension, lower back pain, eye strain, marital disharmony, alcoholism, drug addiction, mental depression and suicide) have almost reached epidemic proportion in the dental professional alone. According to Albrecht (1979), many general practitioners report that nearly 85% of their patients have stress-related disorders. He reports that each year over one million Americans suffer heart attacks and that there is an increasing number of people who sustain heart attacks before reaching 65 years of age. He also reports that over 300,000 people die each year from cerebralvascular

disease (e.g., stroke) and that this number is increasing. Though Albrecht (1979) recognizes the important role of other factors (e.g., age, diet, general health status, genetic predisposition) in contributing to the causation of disorders, he nevertheless emphasizes that chronic, unrelieved stress is a factor of major importance in causing these disorders. There is an estimated 25 million Americans believed suffering from essential hypertension (i.e., high blood pressure from which there is no known organic cause), a condition that has been implicated in the deaths of over 60,000 people each year and which is believed to lead directly to other degenerative diseases, e.g., kidney and liver failure, stroke (Albrecht, 1979; Lamott, 1975). Albrecht (1979) believes that there may also be a strong relationship between stress and cancer. He reports that over 300,000 people die each year from cancer and that the disease is diagnosed in over 650,000 new patients each year. Albrecht (1979) estimates that 4 billion dollars a year are spent on prescription drugs, specifically Valium, Darvon, and Librium, for reducing "stress signals" of the body, and an even larger amount of money is spent each year in alcohol consumption. Albrecht (1979) has also found a parallel increase in cigarette smoking. An increase in alcohol consumption and cigarette smoking may reflect attempts in dealing with stress reactions or producers of them.

This evidence clearly suggests that there are an increasing number of people who are coping less effectively with the stressors

they encounter in their daily lives. Most of the published data suggest that the main reason why people experience inappropriate stress reactions is that they have failed to acquire appropriate strategies for coping effectively with environmental stressors (cf. Abbondanza et al., 1978; Malmo, 1975; Meichenbaum & Turk, 1976 ; Lang, 1981).

A critical factor that has been implicated in the etiology of stress disorders is increased physiological reactivity to stressors (Budzynski & Peffer, 1980; Corson, Schneider, Biondi, & Meyers, 1980; Lacey, Bateman, & Van Lehn, 1953; Lacey & Lacey, 1958). Increased sympathetic arousal, besides increasing susceptibility to disease, may also debilitate learning and performance (Spielberger, 1975). Currently, there is support for the view that stress reactions are learned (Wolpe, 1958, 1978; Spielberger, 1972). If stress reactions are learned, acquiring an alternative competing response, namely a relaxation response, for counteracting the effects of stress reactions becomes an attractive possibility.

An effective way of acquiring the ability to relax has been through instruction in relaxation techniques (Benson, Greenwood, & Klemchuk, 1975; Budzynski & Peffer, 1980; Jacobson, 1938). Progressive muscle relaxation training (Jacobson, 1938) has been a widely accepted technique for acquiring relaxation skills. Through learning how to relax using this method, it may be possible to acquire the ability to relax automatically in stressful situations.

Progressive relaxation training (Jacobson, 1938) has demonstrated effectiveness in reducing muscle tension. Though the underlying mechanisms have not been clearly understood, along with reduced muscle tension, there is frequently an associated reduction in other levels of autonomic activity (Benson et al., 1975; Budzynski & Peffer, 1980; Corson et al., 1980; Lacey et al., 1953). Progressive muscle relaxation has been used widely in remediating stress disorders (Borkovec & Grayson, 1980; Borkovec, Grayson, & Cooper, 1978; Luiselli, Marholin, Steinman, & Steinman, 1979; Shoemaker & Tasto, 1975). If the remediation of stress disorders involves learning to reduce sympathetic arousal through relaxation, it follows that controlling tension levels in stressful situations, through in vivo application of relaxation skills, may serve an important preventive function in disease and may have, in addition, a facilitative effect on learning and performance.

Relaxation training has been conducted traditionally under professional direction. At present, there appears to be an increasing trend towards using self-instruction as a medium for acquiring skills, including relaxation skills (Glasgow & Rosen, 1978). An important issue that has emerged is whether self-instruction is as effective as therapist-directed training in relaxation. One important implication of using self-instruction as a medium for learning relaxation skills is the provision of a training program that could be made available to many people who would most benefit from relaxation training.

The Problem

There is a proliferation of self-help manuals on the market purporting to teach specific skills. Few of these self-instructional manuals provide persons with any guidelines for assessing whether or not the skills have been acquired. Few of the self-help manuals report any data that people who use their manual do acquire any skills, or that using the skills results in the resolution of the target problem. Both of these concerns are important to address. If the focus of the self-instructional manual is a particular target problem, there should be evidence that the problem is less severe. There should also be evidence indicating that the skill has been acquired and used so that the target problem resolution can be attributed to using the skills and not to other nonspecified experimental variables. What this means in controlling stress reactions, is that there should be evidence of stress reduction and evidence that the skill for controlling stress reactions has been acquired.

Hiebert (1980) has developed a manual, Self-relaxation: Learn it, use it, intended for use as a self-instructional relaxation training guide. In the process of compiling the manual, review was solicited from practicing psychologists, experts in the area of stress management, and lay people with little psychological background, in an attempt to compose a handbook that was substantively accurate and also easily readable by the "average person on the street." A pilot field

test (Hiebert, 1981) of Self-relaxation: Learn it, use it indicated that people can acquire skill in deep relaxation within a self-instructional context. Given the initial pilot test results suggesting that people perceive themselves acquiring the relaxation skill, questions still remain as to whether physiological variables also indicate skill acquisition, whether stress decrements also occur, and whether a self-instructed relaxation approach is as effective as traditional therapist training. The present investigation was designed to address these questions.

Overview

In this thesis, documentation is presented of an investigation conducted to address the above problem. In Chapter Two a detailed discussion of related theoretical issues is presented focusing on stress, relaxation, self-instruction and the interface between these concepts. In the third chapter the research design is discussed and treatment procedures are outlined. In Chapter Four the data analysis and resulting conclusions are presented. In Chapter Five there is a discussion of implications arising from this study and directions for future research are suggested.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Stress, relaxation, and self-instruction are terms that are used frequently and imprecisely. It is difficult to comprehend the meaning of these terms because of the various ways in which they are used. For example, the term stress in psychology and medicine was adopted from physics and engineering, where the term means an externally directed force applied to alter the structure of an object or system (Woolfolk & Richardson, 1978). In psychology, stress is used less precisely to refer to environmental demands requiring behavioral adjustment (Benson, 1975). Physiologically, stress is defined in terms of the body's response to any demand (Selye, 1980). Furthermore, the meaning of stress is often obscured when the term is used interchangeably with stressor to describe a phenomenon. Similarly, relaxation and self-instruction are both subject to the same degree of ambiguity because of various meanings associated with these terms. Therefore, it is necessary to discuss the notion of these terms underlying this study, and to indicate how the terms are interrelated. The purpose of this chapter is to provide such a theoretical structure. The discussion of the related literature is organized into six major divisions in the following order: (a) stress, (b) relaxation, (c) self-instruction, (d) self-instruction and relaxation, (e) self-instruction and therapist-instruction, and (f) physiological measures and relaxation.

Stress

The Stress Response

Stress is a difficult term to define because of the various meanings associated with the term, and the lack of consensus on any particular meaning. Despite the controversial nature of stress, there appears to be general agreement among researchers that stress may be defined meaningfully in terms of a complex process, according to which various components may be distinguished (Albrecht, 1979; Budzynski & Peffer, 1980; Carver & Blaney, 1977; Corson, Schneider, Biondi, & Meyers, 1980; Coyne & Lazarus, 1980; Glass, 1980; Howard, Cunningham, & Rechnitzer, 1978; Hurst, Jenkins, & Rose, 1976; Lamott, 1975; Lang, 1971; Lazarus, 1961; Spielberger, 1971, 1975; Wolpe, 1978; Woolfolk & Richardson, 1978). One process component is the stress response, which Selye (1980) defines as the body's nonspecific response to any demand made upon it. By "nonspecific," he means that regardless of the stressor the body is exposed to, the body will respond in a physiologically stereotypic manner and in the direction of heightened arousal. Another process component is the stressor, which is conceptualized as an internal or external event that precipitates a stress response. Another process component is a self-assessment of the ability to handle the event competently. This component determines the intensity and type of emotional response precipitated. In addition, stressors can produce arousal on several different, though interrelated, levels: cognitive, behavioral, emotional,

physiological. Finally, when events are appraised as threatening, there are attempts to deal with the threat which may be adaptive or maladaptive.

A stress response is usually regarded as having physiological, cognitive and behavioral characteristics. The stress response, which is generally believed to have evolved as an emergency reaction to physical danger, is held to be initiated by cortically generated "alarm" signals activating the hypothalamus, which in turn produce increased activity in the sympathetic branch of the autonomic nervous system (Budzynski & Peffer, 1980). Increased activation of physiological systems in response to stressors may include increased oxygen consumption, heart rate, rate of respiration, and increased skeletal muscle blood flow (Benson, Greenwood, & Klemchuk, 1975; Wallace & Benson, 1972). Other patterns of physiological change which may be precipitated by stressors may include dryness of the mouth, change in skin resistance, reduction in peripheral skin temperature, nausea, diarrhea, frequent urination (Bootzin & Max, 1980), increased gastric secretions (Lazarus, 1961), heart palpitation, sweating, and disturbances in breathing (Woolfolk & Richardson, 1978). In experimentally induced stress reactions, physiological indices that have been utilized to measure the strength of a stress response have included changes in heart rate, blood pressure, muscle action potential, electroencephalogram, skin resistance, peripheral skin temperature, and rate of respiration (Spielberger, 1975). On a

cognitive level, a stress response is reported to be accompanied by verbal reports of apprehension, danger, inability to concentrate, feelings of tension, expectations of being unable to cope, and performance deficits on complex cognitive tasks (Bootzin & Max, 1980; Lazarus, 1961; Spielberger, 1972, 1975; Glass, 1980; Woolfolk & Richardson, 1978). On a behavioral level, a stress response is often accompanied by avoidance of a stressful situation, impaired speech and motor coordination, and inhibition of behavior (Bootzin & Max, 1980; Spielberger, 1975; Glass, 1980; Lazarus, 1961).

Thus, a stress response may be conceptualized as producing increased activity in physiological, cognitive, and behavioral response channels. Although the response systems are interrelated and interactive, Lang (1971) maintains that they do not correlate perfectly, suggesting that a stress response is not unitary. This lack of correlation is referred to as response desynchrony. However, it appears that with an increase in the intensity of a stress response, an increased correlation may be observed among the response systems, based on the notion that the increase in intensity will be experienced as aversive, and the person will engage in cognitive and behavioral maneuvers to reduce the discomfort. According to Spielberger (1972, 1975), stressors precipitating a reaction may be reappraised, which results in identifying coping mechanisms, or alternatively, avoiding the situation or using other defenses aimed at reducing the discomfort. Moreover, stress reactions are believed to

be maintained by cognitive reappraisals which may impact on the intensity and persistence of the stress reaction (Spielberger, 1972).

In addition to response desynchrony, in which low correlations are observed among cognitive, behavioral, and physiological response channels, individual differences in physiological reactivity to stressors have also been reported (Lacey et al., 1953; Budzynski & Peffer, 1980; Corson et al., 1980). Although stressors produce a general increase in the level of physiological activity, the same degree of change is not evident in all physiological systems. The tendency to respond consistently to stressors with heightened activity in one or more physiological systems is referred to as stereotypical responding, and has been observed frequently in experimentally induced stress reactions (Budzynski & Peffer, 1980; Corson et al., 1980; Lacey et al., 1953). For example, if an individual reacts to a stressor with increased muscle tension, there will be a tendency for that person to react consistently with increased muscle tension across all stressors. Corson et al. (1980) have shown that besides response characteristics, e.g., magnitude, "time course" differences in response to stressors (i.e., differences in response lag across the physiological response patterns often differentiating normal from clinical subjects), and biological systems involved in the stress response, which tend to vary from person to person, there are also intraindividual variations in responding across different stressors.

Stress Response and Dysfunction

Stress reactions are implicated as contributing factors in the etiology of disorders such as essential hypertension, kidney and liver failure, arteriosclerosis, atherosclerosis, migraines, digestive disorders (e.g. colitis, spastic colon, gastritis, ulcers, chronic diarrhea and constipation), cerebrovascular diseases (e.g., stroke), and insomnia (Albrecht, 1979; Benson et al., 1975; Budzynski & Peffer, 1980; Lacey & Lacey, 1958; Wallace & Benson, 1972).

Etiology of stress disorders. The development of stress-related disorders may be due to an increased predisposition to demonstrate autonomic response stereotypy (Budzynski & Peffer, 1980; Corson et al., 1980; Lacey et al., 1953; Lacey & Lacey, 1958). According to Budzynski and Peffer (1980), persons suffering from stress disorders demonstrate hyperreactivity in a particular physiological system and irrespective of the stressor, the person with the disorder will respond maximally with the same system. They mention further that, although the nature of a disorder may be determined by hyperreactivity in a specific physiological system, a chronic pattern of sympathetic arousal may also dispose to a stress disorder. Lacey and Lacey (1958) contend that an increased tendency towards stereotyped responding may be detected prior to the onset of a disorder.

Studies investigating response stereotypes and disease lend support to the position that response stereotypes may characterize a specific disease process (Anderson, 1981; Corson et al., 1980; Martin

& Srouffe, 1970; Rappaport & Katkin, 1972). Corson et al. (1980) have demonstrated that migraine patients exhibit greater response stereotypy to a variety of stressors than a matched sample of normal subjects; angina patients were also shown to exhibit different cardiovascular changes than controls; and children with recurring abdominal pain and children with ulcerative colitis were found to respond differentially to different stressors. Corson et al. (1980) observed differences in response to stressors and disease with a procedure for monitoring physiological systems during two baselines and a stressor phase. There were no observed differences between normal children and children with ulcerative colitis in the initial baseline, or in response amplitude to a stressor. There were, however, major differences in the post-stressor recovery time, demonstrating that the ulcerative patients took longer to recover. Budzynski and Peffer (1980) have also found that, beside demonstrating hyperreactivity in a particular physiological system in response to various stressors, persons suffering from stress disorders take longer to return to prestimulation levels (baseline) after exposure to stressors.

Persons experiencing varying levels of anxiety may also be differentiated on the basis of their response patterns to stressors (Martin & Srouffe, 1970). There were differences found in physiological response patterns between high and low anxious subjects during anticipation, presentation of stressors, and recovery period.

In normal subjects, peak response to a stressor was found to occur sooner and recovery was more rapid than in high anxious subjects. In anxious subjects, there were increased changes in the level of physiological activity during stressor presentation, and further increases in the level of physiological activity were also apparent following the termination of the stressor. In comparison with low anxious subjects, high anxious subjects demonstrated slower reactions, greater maximum reactivity to stressors, and slower recovery to baseline.

To summarize, stress may be understood as a complex process with distinguishable components. The stress response may be inferred on the basis of data from cognitive, behavioral, and physiological response systems. Response desynchrony among response systems, stereotypical response patterning, as well as individual differences in reactivity to stressors, have all been observed. Stress reactions have also been linked to the disease process and finally, there is evidence demonstrating that persons with presenting symptoms may be differentiated from normal subjects on the basis of their physiological response patterns to stressors.

Modifying the Stress Response

It appears evident that stressors produce increased physiological arousal, and when a pattern of increased sympathetic arousal dominates

the autonomic nervous system, there is increased susceptibility to disease (Benson et al., 1975; Borkovec, Grayson, & Cooper, 1978; Budzynski & Peffer, 1980; Stuart & Brown, 1981; Wallace & Benson, 1972). Wolpe (1978) contends that behavioral patterns, adaptive as well as maladaptive, are learned, and in order to change a maladaptive pattern, it is necessary to learn more adaptive patterns which may require "emotional reconditioning, motor reconditioning, cognitive correction, or all three of these" (p. 444).

Since a stress response may be conceptualized as a learned response to perceived danger, it may be considered adaptive in circumstances where there is threat of physical danger, and maladaptive when the response is elicited inappropriately (Benson et al., 1975). If a stress response is learned, it appears theoretically possible to acquire an alternative, incompatible response to offset the effects of a stress response. A relaxation response is frequently used as an alternative incompatible response to stress.

Wolpe (1978) maintains that modifying a stress response should be based on a determination of whether the response is cognitively based or due to autonomic conditioning. He reasons that since stress reactions frequently involve both modes, "adequate" treatment would therefore require "emotional reconditioning" and "cognitive correction." Since the response systems--cognitive, physiological, and behavioral--are interrelated and interactive, a treatment approach aimed at modifying the stress response through muscle relaxation

training, would be expected to have some effect on other component systems. A bidirectional view of causation (Meichenbaum & Butler, 1980), according to which changes in cognition can produce changes in affect and vice versa, would seem to lend some support to the hypothesis that treatment focusing on one system, would tend to produce some beneficial changes in other response systems not directly addressed.

Relaxation

Relaxation Response

In contrast to the sympathetic system, the parasympathetic component of the autonomic nervous system, also controlled by the hypothalamus, is implicated in mediating the relaxation response. The relaxation response is believed to function as a protective mechanism for counteracting stress reactions by restoring the body to balanced physiological functioning (Benson et al., 1975; Wallace & Benson, 1972). Benson et al. (1975) have conceptualized the relaxation response as an "integrated," "hypometabolic," and "wakeful state" characterized by reduced physiological activity (e.g., reduced oxygen consumption, carbon dioxide elimination, rate of respiration, arterial blood lactate, heart rate, blood pressure, and muscle tension). Other measurable changes that are reported to occur during relaxation, include increased skin resistance, peripheral skin temperature, and frequency of alpha with occasional theta wave activity. Based on

apparently different characteristics, it would seem that stress and relaxation responses may be conceptualized as diametricallly opposed response patterns that may be influenced by physical and psychological factors (Benson et al., 1975; Benson, Kistch, Grassweller, & Greenwood, 1977; Greenwood & Benson, 1977; Wallace & Benson, 1972).

Relaxation Training

There are several approaches for inducing relaxation currently in practice. In the medical treatment of stress-related disorders, a pharmacological approach is frequently the only approach utilized. This approach may be conceptualized as a more passive method of inducing relaxation through an inhibitory effect on sympathetic arousal. Notwithstanding the salutary effects of prescribed drugs as a temporary measure in promoting a state of physiological quiescence during a time of crisis, prolonged drug intervention is increasingly being resisted because of the potential hazards associated with this mode of treatment. The occurrence of side effects and toxic reactions (e.g., drug dependence, self-poisoning, altered perceptual-motor coordination, mood changes) associated with drug intervention are well-documented in the medical literature (Matheson & Davidson, 1972; Montgomery, Perkins, & Wise, 1975; Stern, 1975; Wesson & Smith, 1977). Non-pharmacological strategies of producing relaxation, though procedurally different from each other and varying in theoretical rationale, that have been found effective for inducing relaxation

include meditation, hypnosis, autogenics, biofeedback training, and progressive muscle relaxation. Since progressive relaxation has demonstrated an effectiveness equivalent to other strategies in producing deep muscle relaxation, and for bringing relaxation more directly under voluntary control, this review will therefore be concerned primarily with progressive relaxation, and other strategies that are used in conjunction with progressive relaxation training will be mentioned where it is appropriate to do so.

Elaborate procedures are considered unnecessary for learning to relax (Benson et al., 1975; Wallace & Benson, 1972). Benson et al. (1975) found that a simple set of procedures were effective in producing a relaxed state. They found that after having established a set of antecedent stimulus conditions, whose major characteristics included the person assuming a comfortable position, usually sitting up, and environmental stimulation purposefully reduced to create a relaxing atmosphere, subjects could achieve a deep state of relaxation in twenty minutes by focusing attention on an object (e.g., word or sound, gazing at a symbol, concentrating on a particular feeling), while maintaining a passive attitude (i.e., allowing thoughts, imagery, and feelings to drift into awareness without concentrating on them, and without being concerned with how well one is doing). The patterns of physiological activity that were recorded while following this procedure were found to be consistent with reduced sympathetic arousal. Moreover, they also discovered that the patterns of

physiological activity among naive subjects and yogis with several years of relaxation experience were identical. Some of the implications of these findings are that relaxation instructions are necessary for producing deep relaxation, that simple relaxation techniques may be preferred to elaborate procedures in learning to relax, and that training time for achieving relaxation may be abbreviated. In order to counteract the effects of stress reactions, Benson et al. (1975) have emphasized the necessity of daily relaxation through two-20 minute practice sessions. They have recommended that these practice sessions be conducted under benign environmental conditions, without providing directions for using the relaxation skill in stressful situations.

Progressive muscle relaxation. Jacobson's (1938) progressive muscle relaxation technique is a somatically-oriented technique emphasizing the recognition of physiological sensations, particularly muscle tension in contrast with relaxation (Lehrer, Schoicket, Carrington, & Woolfolk, 1980). There are two procedures involved in progressive relaxation training: tension-release of major muscle groups, and attention focusing on the resulting physiological sensations. The primary goal of progressive relaxation training is to provide the person with a skill for discriminating tension levels throughout the body, and to eliminate unnecessary tension. Associated with this procedure is reduction of sympathetic activity and the

elicitation of a parasympathetic state of relaxation (Borkovec & Grayson, 1980; Jacobson, 1938).

The way in which progressive muscle relaxation reduces muscle tension, or how a reduction in muscle tension appears related to changes in other autonomic indices, is undetermined. There is support, however, for the position that a general relationship exists between progressive muscle relaxation and reduced autonomic activity (Jacobson, 1938). According to Sime and DeGood (1977), progressive muscle relaxation training is effective in increasing subjective awareness of tension, and there appears to be a relationship between an awareness of tension and the ability to reduce tension. Shoemaker and Tatso (1975) provide evidence supporting a general relationship among physiological indices by demonstrating that there is reduced blood pressure associated with reduced muscle tension. They hypothesize that muscle relaxation may have the effect of lowering blood pressure through producing vasodilation in the circulatory system. They reason that vasodilation would then decrease peripheral resistance, and a reduction in peripheral resistance would have the effect of lowering blood pressure.

Greenwood and Benson (1977) argue against the effectiveness of muscle relaxation <u>per se</u> in reducing arousal. Instead, they postulate that the reduction in autonomic arousal that occurs in association with using progressive muscle relaxation may be attributed to other factors such as the shifting of attention toward internal events,

focused or restricted attention, narrow and monotonous stimulus input, or suggestions of the ease of relaxation with training. The controversy regarding whether the technique alone induces relaxation, or whether relaxation occurs as a function of reduced stimulus conditions through using the technique, is unresolved. What is known, however, is that physiological change occurs associated with progressive relaxation training, and this change, which may or may not be accompanied with verbal reports of relaxation, is in the direction of reduced sympathetic arousal.

An increase in awareness of tension levels throughout the body may not always be therapeutically effective. Borkovec and Grayson (1980) mention that instructing subjects to focus their attention on sensations produced by tensing and relaxing major muscle groups may have the effect of increasing tension levels in high tension subjects. In these instances, progressive muscle relaxation training may be of limited value. With persons for whom an increased awareness of internal sensations may produce an exacerbating effect, Borkovec and Grayson (1980) recommend that attention be directed to pleasant imagery in between tension-relaxation cycles.

Jacobson's (1938) progressive muscle relaxation technique, in abbreviated form, has been widely adopted as an effective relaxation-induction procedure. It has especially been recommended for people who have never received relaxation training before (Hiebert, 1980). Acquiring the skill to relax involves learning to discriminate between

tension and relaxation through sequentially tensing and relaxing major muscle groups. Since learning to relax is considered a skill, regular practice sessions are emphasized.

Under therapist-directed training conditions, relaxation training may be conducted live or by audiotape. Paul and Trimble (1970) have noted the potential advantages of automated training in terms of ensuring replicability of procedures across investigations, and increasing the efficient use of therapist time, but have expressed concern regarding whether efficiency of training under automated conditions may compromise treatment efficacy. Riddick and Meyer (1973) found that automated relaxation with feedback was as effective as live training, and both were superior to an attention-placebo procedure. Israel and Beiman (1977) demonstrated that live progressive relaxation training, taped progressive relaxation training in which progression to the next muscle group was not contingent on subject report of complete muscle relaxation in the current muscle group being trained, and self-relaxation (subjects were told to relax without being instructed how to relax), produced significant in-session reduction of physiological arousal (heart rate, rate of respiration, muscle tension) in tense subjects. There were no group differences with respect to physiological indices of arousal. All treatments were reported to have produced significant reductions in subjective tension, with live relaxation producing significantly greater reductions in subjective tension than taped and

self-relaxation. In another related study (Beiman, Israel, & Johnson, 1978), subjects suffering from tension were assigned to live progressive relaxation, taped training in which progression was not contingent on reports of complete relaxation, self-relaxation (subjects were told to relax but not to fall asleep), and electromyogram (frontal EMG) biofeedback. Live relaxation training was found to be superior to taped training in producing in-session and across session relaxation. Live training produced significant reductions in autonomic arousal (galvanic skin response frequency, heart rate, and muscle tension) and subjective tension across five training sessions. In the taped conditions, there were increases in GSR frequency and heart rate. During training, self-relaxation was superior to biofeedback in reducing autonomic arousal. The results from these studies seem to suggest that for persons with presenting symptoms, live relaxation training may be more beneficial at the beginning. Paul and Trimble (1970) suggest that the ineffectiveness of recorded relaxation may be attributable to the "loss of response-contingent progression."

There is support for the hypothesis that instruction in relaxation may be critical for learning deep muscle relaxation, and for acquiring the ability to relax at will (Reinking & Kohl, 1975; Lader & Mathews, 1970). An important aspect of progressive muscle relaxation is the phasing out of the muscle contractions and the practice of passive relaxation (King, 1980). When the person has

learned to produce deep muscle relaxation by progressively tensing and releasing each muscle group and focusing attention on the resulting sensations, the next phase in training involves producing relaxation more quickly. Induction procedures begin to be phased out. The sequence of tensing-releasing is eliminated. More suggestive methods of relaxation are used, e.g., autosuggestion, autogenic, emphasizing more rapid relaxation induction.

Uses of Progressive Relaxation

Cue-controlled relaxation. An important goal of relaxation training is acquiring the ability to relax under stressful situations (Burish & Schwartz, 1980). Transfering relaxation from training sessions to in vivo application may be accomplished by training procedures for establishing cue-controlled relaxation and phasing out the relaxation tape. While in a relaxed state, a relaxation cue is presented, and through frequent contiguous pairings of cue and relaxed state, the cue is supposed to acquire relaxation eliciting properties so that eventually, simply using the cue will elicit a relaxation response. Regular relaxation practice sessions are considered necessary to ensure that the cue will retain its power to elicit relaxation. When the relaxation cue has been well-developed, it is alleged to be effective in controlling tension precipitated by stressful events.

The effectiveness of cue-controlled relaxation has not yet been

firmly established. In a comparative study assessing the effects of cue-controlled relaxation and systematic desensitization for treating self-reported test anxiety and state anxiety, there were no significant differences found between treatment procedures on any of the dependent measures (Russell, Wise, & Stratoudakis, 1976), suggesting that since cue-controlled relaxation does not involve elaborate procedures, it may be as effective as systematic desensitization under certain conditions. In an earlier study (Russell, Miller, & June, 1975), cue-controlled relaxation and systematic densensitization were found to be equally effective in reducing self-reported anxiety. Others (Barrios & Shigetomi, 1979) have also provided evidence demonstrating that cue-controlled relaxation and systematic desensitization produce equivalent treatment effects.

Cue-controlled relaxation has been used alone or in combination with other procedures for the treatment of specific problem areas (e.g., snake phobias, speech and test anxiety, seizures, fear of driving, migraine, pervasive anxiety), and has been found therapeutically effective. Much of the evidence supporting the therapeutic effectiveness of cue-controlled relaxation is derived from case studies, single group uncontrolled studies, and studies including no-treatment conditions. Controlled studies have demonstrated that cue-controlled relaxation and placebo procedures are equally effective (Grimm, 1980). Earlier, Marchetti, McGlynn, and Patterson (1977) also

found that the effects of cue-controlled relaxation did not exceed those of the placebo treatment, or no treatment, on self-report measures of test anxiety or psychophysiological indices (heart rate, skin conductance) of arousal during testing of test-anxious college subjects. Marchetti et al. (1977) therefore question the value of teaching students to lower their autonomic arousal through cue-controlled relaxation during testing, but they nevertheless support the use of cue-controlled relaxation as a procedure to be used in treating persons demonstrating many stimulus-controlled anxieties, for whom specific deconditioning procedures would be laborious and time consuming.

Although cue-controlled relaxation has demonstrated therapeutic effectiveness in many problem areas, and is supported as a procedure for achieving or maintaining a quiescent state in stressful situations, there are several theoretical issues that remain to be resolved. One issue is concerned with demonstrating whether or not a subvocalized verbal stimulus does in fact acquire relaxation-eliciting properties (Grimm, 1980). According to Grimm (1980), if it is demonstrated that a subvocalized verbal stimulus does acquire the power to elicit relaxation, then the optimal number of contiguous pairings of relaxation and cue, the depth of relaxation achieved during cue-word pairings, the "fragility" of the eliciting properties of the verbal stimulus, and the level of anxiety at which the cue-word will be effective, need to be documented.

Active coping. There is increasing support for using relaxation skills as active coping in stressful situations (King, 1980; Sherman & Plummer, 1973; Barrios & Shigetomi, 1979). In treating persons for whom it is difficult to identify specific stimuli that may precipitate stress reactions, or for whom stimuli may be too numerous for employing desensitization procedures effectively, relaxation training aimed at dealing with the emotional reactions rather than with the stimuli per se, may be the more effective strategy to use (Lewis et al., 1978). Bandura (1977) claims that the in vivo application of coping skills produce more substantial changes in behavior than does symbolic desensitization. He has found that comparatively, performance desensitization eliminates autonomic responses to imagined and actual threats more rapidly than the amount of time it requires for extinguishing arousal to symbolic representation of threats.

Achieving control over stress reactions, through using relaxation skills in an active coping manner, is supported as an effective way of preventing stress disorders (Barrios & Shigetomi, 1979; King, 1980; Wilson & Wilson, 1970; Lewis et al., 1978; Sherman & Plummer, 1973; Bandura, 1977). Barrios and Shigetomi (1979) remark that in psychotherapy, concern with self-control, limitations of traditional behavior therapy approaches, and prevention, have generated an interest in coping-skills training. They believe that since many people experience stress reactions in numerous situations, teaching people an active skill for coping with stress reactions could

"maximize preventive effects, reduce multiple anxiety reactions, and minimize treatment duration" (p. 493). Presenting progressive muscle relaxation as an active in vivo coping skill is estimated to be a more effective approach than simply training in relaxation without application training (King, 1980).

Thus, active coping involves acquiring control over stress reactions. Thomas (1980) conceptualizes self-control as the ability for directing and regulating behavior "flexibly" and "realistically" in a situation. He reasons that in acquiring self-control through the process of self-monitoring, self-determination and administration of reinforcement, there is a transfer of responsibility from an external agent to "self-agency." He says further that behaviors that are maintained through self-control may be more resistant to extinction than behaviors acquired through externally directed methods. The availability of a coping response in a stressful situation may not only function in reducing the threatening aspects of the situation (Wilson & Wilson, 1970), but may also alter the person's perception of his/her ability in handling stressful situations through actively using coping skills (Bandura, 1977).

Differential relaxation. A further adaptation of Jacobson's (1938) progressive muscle relaxation procedure is learning to be differentially relaxed. Differential relaxation refers to selectively relaxing muscle groups that are not being used in the execution of an

immediate task. Learning to selectively relax muscle groups that are not being used while engaging in an activity may represent an efficient use of the skeletal musculature. Through regular practice sessions, it is possible for the person to be differentially relaxed in various settings and activity levels (Jacobson, 1938; King, 1980).

To summarize, Jacobson's (1938) progressive muscle relaxation technique has demonstrated effectiveness as a procedure for producing deep muscle relaxation, and is especially recommended for persons who have never had training before. The training sequence begins with tensing and releasing each major muscle group and focusing attention on the resulting physiological sensations. Learning to relax involves developing an increased sensitivity to proprioceptive cues associated with tension and relaxation. Next, a passive form of relaxation is used to produce relaxation more quickly, and techniques for deepening relaxation are included. Transferring relaxation from one setting to another may be accomplished by establishing cue-controlled relaxation. Presenting relaxation training within an active coping framework is supported as an effective means of acquiring control over stress reactions and preventing stress disorders. When relaxation skills have been acquired and maintained through regular practice, it is then possible to develop the ability to be differentially relaxed across various situations, positions and activity levels.

Therapeutic Application of Relaxation

A relaxed state appears to be a necessary precondition for promoting optimum performance in many areas of human endeavor. The use of relaxation training in therapy is supported (Reinking & Kohl, 1975), because increased physiological activity has frequently been found to be associated with stress-related disorders, and the identification of increased sympathetic arousal and its subsequent reduction has been demonstrated to be therapeutically effective (Benson et al., 1975; Borkovec & Grayson, 1980; Borkovec & Hennings, 1978; Budzynski & Peffer, 1980; Corson et al., 1980; Greenwood & Benson, 1977; Jacobson, 1938; Spielberger, 1972, 1975; Wallace & Benson, 1972). A further impetus for using relaxation training stems from an increasing emphasis on client-control in behavior therapy (Borkovec & Grayson, 1980). An increased emphasis on client-control, which translates into reduced therapist-control in treatment and the person assuming a more active role, seems to have had an effect in renewing interest in the therapeutic application of relaxation (Borkovec & Grayson, 1980).

As a single treatment, and as a component treatment in multi-faceted treatment programs, progressive muscle relaxation training has demonstrated therapeutic effectivenss in remediating general tension (Borkovec & Grayson, 1980; Borkovec, Grayson, & Cooper, 1978); essential hypertension (Shoemaker & Tasto, 1975; Luiselli, Marholin, & Miller, 1978); insomnia (Montgomery et al., 1975); test anxiety

(Luiselli et al., 1979; Bedell, 1976; Bedell, Archer, & Rasmann, 1979; Allen, 1973; Deffenbacher, 1976; Deffenbacher & Hohnloser, 1981); sexual dysfunction (Luiselli et al., 1979), and in reducing autonomic arousal in alcoholics (Parker, Gilbert, & Thoreson, 1978). According to King (1980), since relaxation training is symptom-oriented, relaxation training as a single component may be of limited usefulness in treating many problem areas. He reasons that in instances where stressors are virtually uninfluenced by treatment aimed at reducing sympathetic arousal, other treatment approaches, with or without a relaxation component, may be more appropriate.

In the treatment of general tension and sleep disturbance (Borkovec & Grayson, 1980; Borkovec et al., 1978), progressive muscle relaxation was found effective in reducing general tension and improving sleep disturbance (i.e., reduced latency to sleep onset) among treated subjects during counterdemand periods, relative to untreated subjects. Group differences obtained during the counter-demand periods were attributed to tension-release, a hypothesized active ingredient in progressive muscle relaxation, and therapeutic improvement was believed uninfluenced by demand, expectancy, and/or their interaction with treatment.

An abbreviated version of Jacobson's (1938) progressive muscle relaxation technique appears to have been the most widely adopted, stress-inhibiting response in Wolpe's (1958) systematic desensitization (Greenwood et al., 1977), a procedure for the

treatment of phobias. Procedurally, once relaxation has been achieved through progressive relaxation, the person is exposed to a graded hierarchy of fear-eliciting stimuli, and progress through the hierarchy is made contingent on remaining relaxed while imagining phobic items. A relaxed state seems to function in inhibiting sympathetic arousal.

The effectiveness of relaxation training in systematic desensitization has not been definitively established. To begin, the necessity of therapist involvement in reducing fear has been questioned, in view of evidence confirming the effectiveness of automated desensitization in reducing fear behavior (Cotler, 1970; Marshall, Press, & Andrews, 1976). Muscle relaxation is believed to facilitate the production of vivid phobic imagery which appears necessary to produce desensitization (Wade & Molloy, 1982). Imagining objects or situations that pose a threat is frequently associated with increased sympathetic arousal, and the effectiveness of desensitization would lie in the direction of reducing the arousal (Edelman, 1970; Greenwood et al., 1977; Laxer and Walker, 1970). However, if systematic desensitization exerts its therapeutic effectiveness by increasing the vividness and hence, the functional exposure to phobic stimuli, which is believed critical in facilitating fear extinction (Borkovec & Grayson, 1980), the treatment procedure may be of limited value to persons who are unable to visualize stimuli. There is some evidence suggesting a relationship between visual ability and autonomic arousal

associated with phobic stimuli (Davis, McLemore, & London, 1970). Davis et al. (1970) found that subjects with more visual imagery exhibited greater fear in response to symbolically presented stimuli that did subjects with less visual imagery, but that subjects with less visual imagery experienced greater fear when the feared object was present, than did subjects with high visual imagery. They believe that for high visual imagers, fear may be mediated primarily by the imagination, whereas for low visual imagers, fear may be sensory-based.

The critical treatment components of systematic desensitization have not been firmly established. The basic underlying treatment assumptions of systematic desensitization are that the presentation of fear-eliciting stimuli precipitates a stress response, that relaxation training produces a response characteristically opposite to a stress response, and that relaxation inhibits autonomic arousal to fear-eliciting stimuli (Aponte & Aponte, 1971). Aponte and Aponte (1971) tested the assumption that simultaneously pairing deep muscle relaxation and phobic stimuli were necessary and sufficient for reducing anxiety in test anxious subjects. There were no significant differences found between the group receiving the traditional systematic desensitization procedure, and subjects for whom the treatment components were rearranged (e.g., treatment rationale-scene visualization-relaxation training).

Relaxation training has demonstrated effectiveness in reducing

test anxiety (Deffenbacher, 1976; Deffenbacher & Hohnloser, 1981). In assessing the effects of using relaxation in an in vivo treatment of test anxiety (Deffenbacher, 1976), subjects were presented with various relaxation training techniques (e.g., progressive relaxation training, tension discrimination training, deepening and accelerating relaxation induction; cue-controlled relaxation; breathing procedures, e.g., deep chest, breath tracing, deep stomach, stomach fatiguing; counting procedures; tension-release for problem areas) and received guided practice combining techniques under simulated stressful conditions. The combined procedures were practiced daily in non-stressful situations to determine which were more effective. Subjects then selected the most effective procedures and coordinated them in a self-instructional format. Subjects who applied their personalized relaxation program in an in vivo treatment of test anxiety demonstrated significant reduction in test anxiety. In another related study (Deffenbacher & Hohnloser, 1981) for the treatment of test-anxious subjects, self-instructional training, aimed at replacing "task-irrelevant" cognitions with task-oriented self-instruction, and relaxation training were combined into one treatment package. The results indicated that combined self-instruction and relaxation training were more effective in reducing test anxiety than either component alone. These findings seem to support relaxation training as an adjunctive component for the treatment of a focused problem area. However, a combined treatment approach may be

considered excessive treatment elaboration, under circumstances where the treatment focus is training non-clinical subjects how to relax.

In summary, progressive muscle relaxation training has demonstrated therapeutic effectiveness in remediating a wide range of clinical problems. Although the necessity of muscle relaxation training as a treatment component of systematic desensitization has not been established, it has nevertheless been the most widely adopted technique, believed to exert its effectiveness through increasing functional exposure to phobic stimuli, and in reducing autonomic arousal elicited by these stimuli. Relaxation training through self-instruction was also found effective in an in vivo treatment of test anxiety. Since relaxation training under therapist direction has been effective in the treatment of many circumscribed problem areas, it follows that such training may be usefully employed as prevention. An alternative approach to preventing stress-related disorders than through therapist-directed training may be through self-instructional relaxation training. An important feature of self-instructional training is that it allows the person to choose techniques that can be combined into an effective, personalized treatment package.

Self-Instruction

The proliferation of self-help programs on the market provides evidence of the increasing recognition of the potential value of self-instruction as an effective medium for acquiring skills. Despite the presence of many treatment programs that can be self-administered, few of these programs have been empirically validated as effective treatments (Glasgow & Rosen, 1978). Although many of the programs are based on treatment procedures that have been found effective within the context of therapist-directed treatment, translating them into self-administered threatment programs does not necessarily make them appropriate for self-administration. Many evaluations of the clinical efficacy of self-help programs have been based largely on professional opinion (Glasgow & Rosen, 1978). According to Glasgow and Rosen (1978), self-help programs that have been empirically validated would be supported by a data base illustrating what populations, under what conditions, and the degree to which a particular program effectively produces desired behavior change.

Operational Characteristics

Self-instruction as self-teaching can be differentiated from learning that is otherwise externally directed, and from self-instruction as self-speech. Theoretically, self-instruction and therapist-directed instruction may be distinguishable only on the basis of the medium of learning, since all learning may be

conceptualized as learning that occurs through self-instruction. Under self-instructional treatment, the person learns to apply a procedure towards the attainment of some end, without any external intervention. According to Glasgow and Rosen (1978), under self-instructional treatment there can be contact with an outside agent, but if such contact involves providing procedural direction relating to treatment, the treatment loses its wholly self-instructional character as it combines with therapist-directed treatment.

Self-instruction as self-speech typically refers to internalized or covert speech according to which preformulated, positive self-statements are implemented by the person in specifically targeted areas for improving performance and reducing anxiety (Meichenbaum & Cameron, 1974). Self-instruction as self-speech has been combined with standard behavior procedures (e.g., operant and aversive conditioning, modeling, desensitization) yielding results indicating greater treatment efficacy, more generalization, and greater persistance of treatment effects (Meichenbaum & Cameron, 1974). Meichenbaum and Cameron (1974) have reported that self-instruction in treatment has demonstrated effectiveness with clinical populations for remedying the absence of self-statements, and for increasing self-awareness of maladaptive, anxiety-eliciting self-statements, and for training in producing incompatible self-statements and behaviors. In this thesis, self-instruction refers explicitly to treatment procedures that are self-administered.

Levels of Treatment

In their review of self-help programs, Glasgow and Rosen (1978) emphasize the need for standardization in the meaning of the terms self-administered, therapist-administered, therapist-directed, and minimal contact, to avoid confusion in communicating research findings of comparative studies employing these terms. Accordingly, they have recommended that these terms, which appear to distinguish between various levels of treatment, be explicitly defined. Thus, self-administered treatment is defined as treatment that is based on a written program which the person applies in an exclusively self-directed manner. Under therapist-administered conditions, the person self-administers a treatment program under therapist direction. The person is provided with a written program and there is formal contact at specified times. In contrast with self-administered treatment, under therapist-directed conditions there is no written program to which the person can refer, and treatment is under direct therapist control. Under minimal therapist contact, the person self-administers treatment that is supplemented with telephone contact and/or infrequent face to face contact. Comparative studies assessing the relative effects of self-instruction and therapist-instruction appear to have emphasized these various gradations of therapist-client interaction, but have failed to establish conclusively which procedures can be administered more effectively under conditions of variable therapist contact.

Self-Instruction

As a medium for conducting treatment, self-instruction has demonstrated a positive effect in several programs addressing various targeted areas including phobias (Glasgow & Rosen, 1978; Kirsch & Henry, 1979; Marshall et al., 1976; Philips, Johnson, & Geyer, 1972; Rosen, Glasgow, & Barrera, 1976); obesity (Glasgow & Rosen, 1978; Lindstrom, Balch, and Reese, 1976); study skills (Glasgow & Rosen, 1978); sexual dysfunction (Glasgow & Rosen, 1978; McMullen & Rosen, 1979); assertiveness (Rakos & Schroeder, 1979); insomnia (Alperson & Biglan, 1979; Mitchell & White, 1977); nailbiting (Glasgow, Schafer, & O'Neill, 1981); and relaxation (Lewis, Biglan, & Steinbeck, 1978). Generally, these studies support self-instruction in treatment, but they do not appear overwhelmingly in favor of a self-instructional medium of delivery. With few exceptions, the studies cited favor self-instruction in treatment under reduced or minimal therapist contact for a more effective treatment approach.

Procedures that have been conducted under conditions of reduced or minimal therapist contact have often yielded equivocal treatment results. Glasgow and Rosen (1978) report that the treatment of obesity using self-help manuals under minimal contact or therapist-administered conditions have consistently shown that weight loss is only temporary. Whether treatment effects under self-administered conditions would demonstrate greater stability is still uncertain. In the treatment for smoking cessation, three treatments (two self-help

manuals and a minimal treatment program) were assessed under therapist and self-administered conditions (Glasgow et al., 1981). The results indicated that all treatments produced "modest" changes in smoking behavior, and that relapse rates were equivalent for all groups at follow-up. These results appear consistent with those of other studies (Glasgow & Rosen, 1978), in which single and multi-component treatment approaches for smoking cessation were unsatisfactory in producing permanent abstinence.

Self-administered treatment has demonstrated effectiveness for certain sexual dysfunctions (e.g., premature ejaculation, primary orgasmic dysfunction) under minimal contact conditions (Glasgow & Rosen, 1978) and self-administered treatment (McMullen & Rosen, 1979). In the treatment of primary orgasmic dysfunction (McMullen & Rosen, 1979), self-administered procedures consisting of videotape modeling and instructions, were effective in developing orgasmic potential in masturbation and intercourse. More than one-half of the women who had become orgasmic during masturbation, were able to transfer their orgasmic potential to intercourse, and at follow-up one year later, more women were found to have become orgasmic through intercourse. In other areas, there is support for totally self-administered systematic desensitization (Glasgow & Rosen, 1978; Marshall et al., 1976; Phillips et al., 1972; Rosen et al., 1976), and procedures for improving study behavior (Glasgow & Rosen, 1978).

Problems of Assessment

Although there appears to be increasing support for self-instruction as a medium of treatment, there have been major difficulties associated with assessing the effectiveness of various treatment procedures conducted through self-instruction. Some of the problems reported have been: difficulties encountered in monitoring treatment progress (Allen, 1973), high attrition rate and lack of follow-through on programs (Glasgow & Rosen, 1978; Lewis et al., 1978; Allen, 1973). Motivational factors have been implicated in attrition and failure to follow through on program requirements (Glasgow & Rosen, 1978; Lewis et al., 1978).

Despite problems associated with self-administered treatment, there are advantages that have been reported which may enhance the usefulness of self-instruction as a treatment medium. Glasgow and Rosen (1978) contend that self-control procedures are superior to therapist-directed conditions with regards to maintenance of treatment gain. Besides the potential advantages of self-administered treatment in promoting greater maintenance and generalization of treatment effects, self-administered treatment represents cost effective treatment, and may promote more efficient use of therapist time (Glasgow et al., 1981; Glasgow & Rosen, 1978; Frankel & Merbaum, 1982). Through self-instructional treatment, persons receive potentially greater exposure to treatment procedures (Glasgow et al., 1981; Grankel & Merbaum, 1982), and many more people may receive

treatment through self-instruction, who may not otherwise receive the help that they need, especially if there is a reluctance to seek help from a therapist. Since self-instruction has demonstrated effectiveness in many areas, it seems logical to attempt using self-instruction as a medium for acquiring relaxation skills in the control of stress reactions.

Self-Instruction and Relaxation

The widespread occurrence of stress-related disorders reflected in an increasing sale of benzodiazepine antianxiety agents (Borkovec et al., 1978), suggests that many people would probably benefit from more effective stress control strategies. Since there is evidence suggesting that stress disorders occur in response to many stimulus configurations, remedial intervention of such targeted area is considered impractical and ineffective. A single intervention aimed at effectively preventing a wide range of difficulties and available to many, is increasingly being supported (Barrios & Shigetomi, 1979; Barrios, Ginter, Scalise, & Miller, 1980).

Relaxation Training as Prevention

Progressive muscle relaxation training (Jacobson, 1938) has demonstrated effectiveness in producing change in autonomic activity. Increased sympathetic arousal has been strongly implicated as a contributing factor in the etiology of stress disorders. Since

progressive relaxation has been therapeutically effective in treating these disorders through a reduction in sympathetic arousal, it follows that using relaxation training in cultivating a condition of low physiological arousal would be effective in preventing stress disorders. Preventing stress disorders on a widespread basis may be accomplished by providing relaxation training through self-instruction.

Role of expectancy. Bandura (1977) has differentiated between two levels of expectancy: efficacy expectations, according to which people believe they can successfully execute specific behaviors to produce desired outcomes; and outcome expectancy, which refer to a person's estimate that a specific behavior will lead to certain outcomes. Bandura (1977) claims that the basis for generating expectations of self-efficacy lies in the direction of acquiring coping skills. He postulates that the next step involves strengthening and generalizing expectations of self-efficacy through successful reductions in stress reactions. He reasons that experiences based on successful performance, besides increasing and strengthening the level of efficacy expectations, may determine whether coping behavior will be initiated, how much effort will be expended, and how long such effort will be sustained.

Efficacy expectations represent only one critical variable in determining behavior (Bandura, 1977). Bandura (1977) maintains that

skills and incentives are also necessary for producing a desired outcome. He insists that without adjunctive skills or incentives, expectations of self-efficacy will influence performance, but will not produce the desired behavior. Accordingly, if the skills for executing the behavior and the incentives are also present, Bandura (1977) predicts that self-efficacy will be a major determinant in executing the behavior, the amount of effort that will be expended, and the length of time effort will be sustained in dealing with stressful situations. Since stressful situations are frequently found to engender emotional arousal, which can have a debilitating effect on performance, achieving control over emotional arousal may result in perceiving stressful situations as less threatening (Bandura, 1977).

There is evidence that generating positive expectancy of improvement is associated with changes in behavior. Lewis et al. (1978) found that subjects assigned to self-administered and client-devised relaxation who predicted that the program would help them to relax, were significantly more improved on state and trait anxiety, and their daily rating of tension. Borkovec (1972) also found that regardless of treatment condition subjects were assigned to, subjects who were given therapeutic instructions designed to foster a positive expectancy of improvement demonstrated more significant improvement on treatment variables than subjects in the neutral expectancy condition.

Self-Instructional Relaxation

Self-instruction procedures that have been developed for enabling persons to acquire control over their stress reactions have three features in common. These include a self-control rationale, training in relaxation induction, and training in the application of relaxation in stressful situations (Deffenbacher & Payne, 1977; Deffenbacher & Shelton, 1978; Denney, 1980; Hiebert, 1980; King, 1980; Goldfried, 1971). The self-control rationale emphasizes that the purpose of treatment is to receive training in effective procedures for actively coping with stress reactions, and that relaxation training is a method of bringing relaxation under voluntary control. It is emphasized further that with practice, there is an increase in the proficiency of voluntarily inducing relaxation, and with this increased proficiency in relaxing automatically there is an increased ability for controlling stress reactions in stressful situations. Progressive muscle relaxation has been the most commonly used method of relaxation induction. There are techniques included for shortening relaxation induction (e.g., autosuggestion, autogenic relaxation) and for deepening relaxation (e.g., breathing, imagery). Techniques used in application training of relaxation have included cue-controlled and differential relaxation.

A distinguishing characteristic of many self-control training techniques is the relative emphasis placed on guided rehearsal in the course of training (Deffenbacher, 1976; Deffenbacher & Shelton, 1978;

Denney, 1980; Goldfried, 1971). In guided rehearsal, subjects are presented with stressful stimuli. Subjects imagine a stressful scene, and when they begin experiencing tension, they focus their attention on the feeling of tension with respect to intensity and location. Then, subjects are instructed to use their coping skills to reduce the feelings of tension, to persist until these feelings are eliminated and a relaxed state has been restored. The objectives of guided rehearsal are tension cue discrimination training and the opportunity for practicing coping skills in dealing with tension (Denney, 1980).

Relaxation training, presented as a coping skill for acquiring control over stress reactions, has demonstrated therapeutic effectiveness. In a comparative assessment of the effects of relaxation as self-control and modified self-control desensitization in the treatment of communication apprehension (Deffenbacher & Payne, 1977), there were no significant differences found between the two procedures. Both were effective in significantly reducing communication apprehension, fear of negative evaluation, and increasing assertiveness relative to control subjects. Goldfried and Trier (1974) also found that relaxation training presented within a self-control context was consistently more effective than an attention-placebo procedure emphasizing that relaxation exercises would "more or less" automatically reduce subjects' anxiety. They also found that subjects in the self-control condition continued improving following training. Based on these findings, they conclude

that unless subjects are given application training emphasizing how and when to use the relaxation skill, relaxation training alone is ineffective beyond training sessions.

Recently, a self-instructional relaxation program (Hiebert, 1980) has been developed and pilot tested. The self-instructional relaxation manual provides an explanation of stress and relaxation emphasizing the reciprocal effects of stress and relaxation responses. There are instructions for self-monitoring heart rate, rate of respiration, and finger temperature as physiological indices of relaxation. There are also procedures for training a relaxation response involving making an audio cassette tape of a relaxation sequence and using the tape as a training aid in daily practice. Four relaxation scripts are suggested and appended. Progressive relaxation training is recommended as the starting point, branching to one of the three scripts after two weeks of practice with progressive relaxation. Appropriate check lists and monitoring sheets are also included to sustain motivation. There are five ways suggested for using relaxation after a reasonable level of skill acquisition has been achieved (after 4-5 weeks), and guidelines are furnished for choosing the uses of relaxation ad tailoring them to particular stressors. One important feature of the program are guidelines for combining various components into an individualized relaxation program. A critical component of the self-instructional program, which distinguishes it from many other self-help programs, is the provision of a mechanism

for gauging progress through training and for determining in the end whether or not relaxation skills have been acquired.

Early in the self-instructional program, guidelines are presented for measuring various indicators of relaxation. The importance of monitoring these indicators of relaxation before and after each practice session is in providing an objective means of gauging progress through training so that in the end there is a way of determining the extent to which relaxation skills have been acquired. Knowing that skills have been acquired may have the added effect of promoting an increased confidence in one's ability to use the relaxation skills for dealing with problem areas (e.g., chronic tension, insomnia, fear) and transferring skills from one situation to another.

There are several essential ingredients comprising the self-instructional program--basic relaxation, deepening exercise, reward for relaxing, and relaxation cue--which can be carefully orchestrated for maximizing the learning and transferring of relaxation to many settings. The basic relaxation technique may be selected from four relaxation programs to suit individual preferences, but Hiebert recommends that relaxation training begins with progressive muscle relaxation, adapted from Jacobson (1938) and Wolpe (1958), because of its demonstrated effectiveness in producing deep muscle relaxation, and its appropriateness as a training procedure for people with no history of previous relaxation training (Hiebert, 1980). As a

follow-up to progressive muscle relaxation, autosuggestive, or autogenic relaxation, adapted from Fuller (1977) and Luthe (1977) may be used for inducing relaxation more quickly. A fourth relaxation program that may be incorporated is guided imagery, which enlists the imagination in producing a feeling of relaxation, along with suggestions for increased coping ability. From the four programs, an individualized relaxation program may be fashioned and recorded in the person's own voice, with the added advantage of the recording bringing the relaxation response more directly under the person's control (Hiebert, 1980).

The deepening exercise following relaxation induction consists of counting numbers on a wall while imaginally strolling along side of it, each number suggesting deeper relaxation. The reward for having relaxed well, which is intended to strengthen relaxation, may take the form of verbal praise or imagining a particularly rewarding or relaxing scene. The cue to bring relaxation under stimulus control occurs at the end of relaxation induction and may consist of two four-count breaths (e.g., inhaling to the count of four, exhaling to the count of four), or repeating the word "calm" or "relax" while fully relaxed.

The self-instructional relaxation program is approximately four to six weeks in length. There are three stages of training, and guidelines are presented for making the transition from one stage to the next. Briefly, Stage One involves practicing progressive

relaxation seven to ten days, once or twice daily, with each practice session lasting from 20 minutes to one-half hour. When the ability to relax deeply and to identify these feelings of deep relaxation has been acquired, the next training phase, Stage Two, focuses on producing the feeling of relaxation more quickly. After training for an additional two weeks using autosuggestive or autogenic relaxation techniques, transfer training of relaxation in Stage Three begins. The ultimate goal of the self-instructional program is aimed at producing a relaxation response whenever and wherever it is needed (Hiebert, 1980).

Once the ability to differentiate proprioceptive cues of tension and relaxation has been developed, training focuses on strengthening the relaxation cue by using it in a step wise progression, from less demanding to more demanding circumstances (Hiebert, 1980). An increased ability in detecting even more subtle levels of tension and relaxing them away provides the basis for learning to be differentially relaxed across many settings and activity levels, thus promoting a more efficient use of the skeletal musculature. When the ability to relax muscle groups selectively has been well-developed through observing the recommended principles of working from less demanding to more demanding situations, and from large to small muscle groups, the ability to relax automatically has been acquired (Hiebert, 1980).

Self-Instruction and Therapist-Instruction

Many treatment procedures have been shown to lend themselves to a self-instructional format. Although concern has been expressed with respect to the therapeutic effectiveness of an exclusively self-instructional approach to treatment, there does not appear to be any solid evidence demonstrating the superiority of one treatment medium above the other. However, advantages to self-instructional treatment, mentioned elsewhere (cf. p. 41 - 42), appear to establish self-instruction as an efficient and effective medium for acquiring many skills.

Comparative Efficacy

Treatment procedures conducted under self-administered and therapist-directed conditions have frequently yielded equivalent results. Rosen et al. (1976) found that self-referred, highly anxious snake phobics who self-administered desensitization did not differ significantly from subjects receiving therapist-directed desensitization on any treatment outcome index--behavioral approach, self-report, and heart rate. In a follow-up, self-administered desensitization subjects demonstrated further treatment gains, whereas subjects in the therapist-directed condition only maintained treatment gains achieved earlier. However, one-half of the subjects in the self-administered treatment did not progress beyond the relaxation component of their programs.

Frankel and Merbaum (1982) found that the treatment of nailbiting under conditions of self-administered, therapist-directed, and minimal treatment contact did not yield results differentiating one mode of treatment as superior to the other. There were significant increases in nail length and appearance across all treatment conditions. Although abstinence rate at posttest and at follow-up tended to favor the therapist-directed condition, the results in this condition were not significantly different from the other groups.

Other studies comparing the effects of self-instruction and differential levels of therapist contact in the treatment of various targeted areas including public-speaking anxiety (Marshall et al., 1976), smoking (Glasgow et al., 1981), snake phobia (Clark, 1973), and acrophobia (Baker, Cohen, & Saunders, 1973) have consistently demonstrated that self-instructional treatment and therapist-directed treatment are equally effective in producing positive change in targeted areas at posttest, but that there tends to be greater generalization of treatment effects at follow-up among subjects who have received self-administered treatment. However, subjects receiving therapist-directed treatment have tended towards maintaining treatment gains. Although both treatment mediums frequently have been shown to be equally effective in producing desired behavior change, higher attrition and lack of adherence to program requirements have been identified as major problems associated with self-instructional treatment. One important implication of these findings is that

failure to make satisfactory progress in treatment through self-instruction may increase client resistance towards this mode of treatment if attempted in later therapeutic situations (Glasgow & Rosen, 1978). If, in addition to resisting self-instructional treatment, there is resistance towards seeking therapist intervention, the person may never receive the treatment required.

Physiological Measures and Relaxation

Measuring Relaxation

Generally, stressors have been found to produce changes in the level of physiological activity in the direction of increased sympathetic arousal (Budzynski & Peffer, 1980; Carver & Blaney, 1977; Corson et al., 1980; Coyne & Lazarus, 1980; Hurst et al., 1976; Lang, 1971; Lazarus, 1961; Woolfolk & Richardson, 1978), and relaxation training has demonstrated effectiveness in producing physiological changes consistent with reduced sympathetic arousal (Benson et al., 1975; Benson et al., 1977; Budzynski & Peffer, 1980; Greenwood & Benson, 1977; Wallace & Benson, 1972). Physiological measures have been used frequently in assessing treatment outcome and may be considered a critical component of assessment procedures for measuring the effectiveness of relaxation-induction techniques. Since physiological measures have demonstrated utility as indicators of relaxation under therapist-directed conditions, it seems feasible to include some mechanism for charting physiological measures as indices of progress through self-instructional relaxation training.

There have been some objections raised against the use of physiological measures in assessing treatment outcome, however. Lader and Matthews (1970) believe that physiological measures are of limited usefulness because of the problem of individual differences in response to stressors and response desynchrony among the various measures. They argue further, that these measures may also be of limited usefulness because of floor effect, that is, if physiological indices indicate low arousal at the beginning, relaxation training may not produce any measurable physiological effects.

A procedure that has been used in assessing relaxation under therapist-directed conditions is the psychophysiological stress profile (Budzynski & Peffer, 1980). The stress profile (PSP) consists of three phases--relaxation, stressor presentation, and recovery. During the administration of the PSP, several physiological parameters (e.g., muscle tension, skin conductance level, heart rate, blood pressure, peripheral skin temperature) are monitored simultaneously. Altogether, the three phases may represent the person's level of physiological functioning at strategic points--while relaxing, during the presentation of stressors, and during recovery.

There is support for the use of the psychophysiological stress profile in assessing treatment outcomes (Budzynski & Peffer, 1980; Corson et al., 1980), but some procedural issues have been identified which may potentially undermine its usefulness. One problem is in relation to the use of stressors. According to Corson et al. (1980),

if stressors that are used do not produce a large enough response in the physiological systems that are being monitored, it may be difficult to produce an accurate assessment of treatment. Corson et al. (1980) have found evidence strongly suggesting that there are intraindividual differences in physiological response patterning as a function of season and time of day. To minimize the potentially confounding influence of non-specific treatment factors, they have also recommended that the final assessment procedures parallel those administered initially in terms of time of day and season.

Self-monitoring. The PSP may represent a potentially powerful technique for obtaining a detailed assessment of physiological functioning during various phases of monitoring. Since sophisticated instrumentation (e.g., polygraph) and trained personnel are required, the procedure is usually administered in the context of therapist-directed training. For self-administered relaxation training, there are simpler procedures for measuring relaxation. For example, it is possible to teach people to monitor pulse rate, rate of respiration, and hand temperature. When the client records these indicators before and after each training session, he/she is provided with a simple method that may be useful for monitoring progress through relaxation training (Hiebert, 1980; Lamott, 1975). Therefore, the use of physiological measures in the context of self-instructional relaxation training may represent not only a useful means of gauging training

progress, but also a way of determining whether or not the relaxation skill has been acquired.

Summary

Counselling offered through self-administered procedures represents an efficient medium for extending professional services to many people who could benefit from them. Despite the proliferation of self-help programs currently available, the clinical efficacy of many of these programs still remains to be established. The assumption that a treatment procedure that has been validated under therapist-directed conditions is still therapeutically effective when the treatment is translated into self-administered treatment, without first validating the treatment under self-administered conditions, seems indefensible. The critical issue, therefore, may not be self-instruction per se, but whether or not a specified treatment procedure retains its clinical effectiveness under differential conditions of administration.

Self-administered treatment has been supported as an efficient vehicle for reaching many people requiring counselling. Where there is need of more intensive counselling, self-administered treatment adjunctive to therapist-directed procedures may combine into a powerful treatment strategy. Besides promoting a more efficient use of therapist time and expertise, self-therapy has been considered an inexpensive form of treatment. In addition, behavioral procedures

lend themselves to being translated into self-help strategies, because they are understandable and can be specified. Despite the positive attribute of self-administered programs, there is evidence of high attrition and a lack of program adherence under self-administered treatment conditions. The reasons for high attrition rates and failure to follow-through on program activities have not been definitively established. However, it may be that in the absence of any evidence demonstrating treatment gains, that the motivation for sustained commitment is circuited. The present program provides a means for measuring treatment gains.

In this review, there has been a strong emphasis placed on acquiring and using relaxation skills in an active coping manner as a means of gaining control over stress reactions. It has also been suggested that acquiring these skills through self-instruction represents a potentially effective alternative to therapist-directed training. Acquiring coping skills through self-instruction may be effective in remediating and preventing stress-related disorders. In remediating problem areas, minimal therapist contact may represent a powerful treatment strategy, more efficient use of therapist time and expertise, and substantial savings for the person. For self-therapy to be successful, it seems imperative that the program include a method of assessing treatment gains during treatment. In the absence of any means for charting such programs, it is impossible to determine whether or not any skills have been acquired; and in the absence of

any indications of progress, the justification for maintaining a sustained effort may cease.

Hypotheses

The above considerations can be formulated as testable hypotheses.

1. Persons receiving self-instructional relaxation training will experience an anxiety decrement, as evidenced by pretreatment-posttreatment score comparisons on paper-and-pencil measures of anxiety, relative to the no contact control.
2. Persons receiving therapist-directed relaxation training will experience an anxiety decrement, as evidenced by pretreatment-posttreatment score comparisons on all measures of anxiety, relative to the no contact control.
3. Self-instructional relaxation training and therapist-directed relaxation training will be equally effective in producing an anxiety decrement, as evidenced by intergroup comparison of pretreatment-posttreatment measures of anxiety.
4. Persons receiving self-instructional relaxation training will demonstrate change in pretreatment-posttreatment measures of physiological activity, relative to no contact control.

5. Persons receiving therapist-directed relaxation training will demonstrate change in pretreatment-posttreatment baseline measures of physiological activity, relative to no contact control.
6. Decrements in physiological activity for persons receiving self-instructional and therapist-directed relaxation will be similar, as evidenced by intergroup comparisons.

CHAPTER 3

DESIGN AND METHODOLOGY

Sample

There were initially 66 participants in the relaxation project. Participants were recruited from advertisements in the Simon Fraser University campus newspapers, posters displayed in prominent places, and announcements made in large undergraduate lecture halls. Of the 66 participants who were pretested, 26 males and 40 females, 49 were posttested. This represented an attrition rate of 25.7%. Attrition occurred in two ways: (1) voluntary withdrawal from the program, and (2) excluding from data analysis the data from participants who failed to meet the criterion level of a minimum of 30 home practice relaxation sessions over a period of five weeks. The ten participants who withdrew voluntarily from the program claimed that other activities they were engaged in were demanding greater time commitments than they had previously anticipated. Data from seven participants were incomplete and were therefore excluded from analysis.

The participants' ages ranged from 18 to 54 years with a mean age of 30.7 years. A detailed demographic breakdown of the sample by treatment group is provided in Table 1. Table 1 also contains information regarding participants' previous participation in relaxation training and their self-assessed anxiety levels.

Table 1

Demographic Data for 49 Participants According to Treatment Condition

Demographic Descriptors		Number of Persons per Group			Summary	
Variable		Self Instruction	Therapist-Instruction	Control	Total	%
Group Size		14	17	18		
Age	18-25	5	6	4	15	30.6
	26-33	5	7	7	19	38.8
	34-41	2	1	6	9	18.4
	42-49	2	1	0	3	6.1
	50-57	0	2	1	3	6.1
	Mean	30.0	30.8	31.4		
Sex	Male	6	9	4	19	38.8
	Female	8	8	14	30	61.2
Occupation	Student	11	13	15	39	79.6
	SFU Staff	2	3	3	8	16.3
	Other	1	1	0	2	4.1
Highest Degree Completed	Grade School	1	1	0	2	4.1
	High School	9	8	9	26	53.0
	Community College	1	2	5	8	16.3
	Bachelor's Degree	2	4	3	9	18.4
	Master's Degree	1	2	1	4	8.2

Table 1 (Continued)

Demographic Descriptors		Number of Persons per Group			Summary	
Variable		Self Instruction	Therapist-Instruction	Control	Total	%
Previous Participation in Relaxation Training	Yes	2	5	2	9	18.4
	No	12	12	16	40	81.6
Self Assessed Anxiety Level	Very Anxious					
	4	1	1	1	3	6.1
	3	4	6	5	15	30.6
	2	3	7	8	18	36.7
	1	5	2	3	10	20.5
	Not Anxious at all					
	Mean Anxiety Level	1.9	2.3	2.1		

Research Design

Participants were assigned sequentially, to one of three groups by a receptionist, in a 3 x 2 repeated measures design. The three treatment levels were: self-instructed relaxation training, therapist-instructed relaxation, and a delayed treatment control group. Participants were scheduled to be tested individually. All dependent measures were administered at pretest, after which participants were assigned to their respective treatment program. Participants were scheduled for posttesting one week following completion of the five week relaxation program. Scheduling of appointments for posttesting paralleled the pretesting schedule in order to control for effects related to the time of day of testing. All dependent measures were again administered at posttest.

Dependent Measures

Two types of dependent measures were used in the study: self-report questionnaires, including the Institute for Personality and Ability Testing Self-Analysis Form (IPAT) (Cattell, 1957), and the State-Trait Anxiety Inventory (STAI) (Spielberger, 1968); and a psychophysiological stress profile, including frontal muscle tension (EMG), heart rate (HR), skin resistance (SR), and peripheral skin temperature (PST), all of which were measured under baseline and stressor conditions.

IPAT Self-Analysis Form

The IPAT is a 40 item inventory designed to measure anxiety level, whether or not it is situationally determined (Cattell & Scheier, 1963). The instrument has demonstrated adequate reliability (Guilford, 1959; Krug, Scheier, & Cattell, 1976) and validity (Cattell & Scheier, 1963; Cohen, 1965; Krug et al., 1976). Test-retest reliability coefficients of the IPAT are high, ranging from .82 to .93. Internal consistency coefficients are also high and range from .78 to .92 (Krug et al., 1976). Evidence for the validity of IPAT has been derived in three ways. (1) Using a factorial validity approach with data obtained from 491 college students, 128 neurotic adults, and 107 normal adults, IPAT scale scores were correlated with the "pure anxiety factor" derived from five independent factorial analyses. Coefficients ranged from .84 to .94 (Krug et al., 1976). (2) IPAT scores were correlated with clinically judged anxiety level, with a total of 156 subjects in four studies. Coefficients ranged from .17 to .95. When adjusted for the unreliability of clinical judgement, the coefficient was found to be approximately .90 (Krug et al., 1976); (3) Concurrent validity is available for over 2800 subjects, most of whom were undergraduate college students involved in 16 studies. The median correlations of the IPAT scale with the Taylor Manifest Anxiety Scale (Taylor, 1953) was found to be .70 (Krug et al., 1976) and with the Eysenck Personality Inventory N Scale (Eysenck & Eysenck, 1964) it was .79 (Krug et al., 1976), both representing moderately high

correlations. The IPAT was chosen for this study because IPAT scores tend to correlate significantly with physiological measures of anxiety (Cohen, 1965; Smith, 1973).

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) is a 40 item self-evaluation questionnaire designed to measure and distinguish between stable individual differences in anxiety proneness (STAI-T) and transitory anxiety reactiveness (STAI-S) (Spielberger, Gorsuch, & Lushene, 1970). There are 20 items to which participants respond according to how they generally feel (STAI-T items), and 20 items to which participants respond according to how they feel right now (STAI-S items). Both forms were used in this study. This scale has been used extensively in anxiety research (e.g., D'Angelli, 1974; Leal, Baxter, Martin, & Marx, 1981; Martuza, 1974; Spielberger, 1975; Townsend, House, & Addario, 1975) and demonstrates adequate reliability (Kendall, Finch, Auerbach, Hooke, & Mikeulka, 1976; Spielberger et al., 1970) and validity (Kendall et al., 1976; Martuza, 1974; Spielberger, 1975; Spielberger et al., 1970). Test-retest stability coefficients tend to be low for the STAI-S scale of the STAI (median r= .32) which is expected with a measure designed to reflect situational influences at the time of testing (Spielberger et al., 1970). Test-retest stability coefficients for the STAI-T scale of the STAI are high, ranging from .73 to .86 (Spielberger et al., 1970).

Internal consistency is high and ranges from .83 to .92 (Spielberger et al., 1970). Evidence for the construct validity of the STAI-S scale in a normal and exam condition is available for 977 undergraduate college students. Mean scores for state anxiety were "considerably higher in the EXAM condition than in the NORM condition for both males and females" (Spielberger et al., 1970, p. 11). Evidence for the concurrent validity of the STAI-T scale is available for 206 college students and 112 psychiatric patients. The correlation between STAI-T scores and IPAT (Cattell, 1957) is moderately high, ranging from .75 to .77 (Spielberger et al., 1970).

Psychophysiological Stress Profile

After completing the paper and pencil measures participants were escorted into an adjoining room containing the physiological recording equipment. Here, participants were given an overview of the stress profile procedures and were shown the monitoring equipment. They were told that the study was investigating what happens to people's bodies when they relax and when they engage in different kinds of mental tasks, and in order to determine these differential effects it was necessary to prepare and connect recording sensors to monitor the body's functioning. Participants were then seated in a comfortable recliner and the appropriate skin preparation was begun. Four channels of physiological data were recorded using a Coulbourn Modular Instrument System. Frontal EMG data was obtained through surface

electrodes (two recording electrodes one inch above the eyebrows with a ground electrode equidistant between the recording electrodes). Electrode impedences of 30,000 ohms or less were maintained throughout the recording as recommended by the manufacturer. Skin resistance was measured using lead strips wrapped around the medial phalanx of the first and third fingers of the left hand with clips attached to the lead strips of the palmar surface of each finger in the manner described by the equipment manufacturer. Peripheral skin temperature was measured with a Yellow Springs series 700 thermilinear temperature probe attached with porous tape to the distal phalanx of the middle finger of the left hand. Heart rate was measured with a photo-densitometric pulse monitor attached to the thumb of the left hand. After attaching surface electrodes the stress profile was begun. Participants were told to relax as much as possible for 12 minutes using whatever strategy they usually used to relax (initial baseline). They were given 30 seconds to get comfortable in the recliner before recording was started. The initial 12 minute baseline relaxation period was followed by a three minute serial 7's task, a two minute recovery period, a three minute reading comprehension task followed by another two minute recovery period and a final 12 minute poststress baseline relaxation period.

The serial 7's task required participants to subtract 7s sequentially from the number 1000. Participants were instructed to subtract silently and as rapidly as they could in the three minutes

allowed for completing the task (See Appendix A). At the end of the three minute interval the experimenter recorded the number participants had reached when they were instructed to stop subtracting. The second cognitive stressor was composed of two reading tasks from the Gilmore Oral Reading Test (Gilmore, 1968). Forms C-9 and C-10 were used for the pretest, Forms D-9 and D-10 for the posttest (See Appendix A). The format for administering the reading task consisted of participants reading two selections silently and answering a standardized series of questions at the end of each selection.

Pretraining Survey

In addition to the dependent measures discussed above, participants completed a pretraining survey before beginning treatment. The pretraining survey contained 16 items intended to determine reasons participants enrolled in the study, past experience with relaxation training, self-assessed anxiety level, self-assessed relaxation skill level, outcome expectancy level and current use of prescription drugs, cigarettes, caffeine, and alcohol. A major purpose for administering the pretraining survey was to assess potential differences in outcome expectancy between treatment groups and control group at pretesting. Five items in the survey -- self-assessed anxiety level (Q5), self-assessed relaxation skill level (Q7), and three outcome expectancy items (Qs 6, 8, 9) were designed to assess expectancy variables (see Appendix A).

Post Five Week Survey

At the time of posttesting all participants completed a post five week survey in addition to the dependent measures discussed above. The post five week survey required participants in self-instructional and therapist-instructed groups to indicate how closely they had followed the treatment program, the degree to which the treatment program had fulfilled their expectations, what they considered to be the most beneficial aspects of the program, and what changes they would recommend for improving the program. The survey for delayed treatment control participants was similar, the only difference being that questions relating to the treatment program were omitted (see Appendix B, C, and D).

Equipment and Facilities

Pretesting and posttesting, including all therapist-mediated sessions in relaxation, were conducted in separate adjoining rooms in the laboratory. In relaxation training for the therapist instructed group and during administration of the psychphysiological stress profile, all participants were comfortably seated in soft reclining chairs. While participants were completing their stress profile, the physiological parameters were monitored using a Coulbourn Modular Instrument System. Muscle tension (EMG) was monitored with a High Gain Bioamplifier/Coupler S75-01 (90-1000 Hz, 30,000 gain). Skin resistance was monitored with the modular unit S71-20 (gain was set at

10 mV/K ohm for maximum sensitivity). Heart rate was measured with the S71-40 photo-densitometric "pseudoplethysmometer." Peripheral skin temperature was measured with a Yellow Springs series 700 thermilinear temperature probe. Data collection was fully automated, using the RZZ-10, 10-channel microprocessor based printing counter and a NP-7 printer.

Staff

The therapist was a male, senior masters student in counseling psychology, who had completed two counseling practica. The therapist administered the stress profile, monitored the self-instructed group (see Appendix E) and conducted the therapist-instructed training group. The receptionist, also male, was an undergraduate student with no clinical background. The receptionist's chief responsibilities involved answering the telephone and scheduling participants for testing in the initial phases of the program, telephoning participants to remind them of their appointments, administering the paper and pencil measures and coding all the data for keypunching.

Treatment Procedures

Participants were assigned sequentially by the receptionist to three treatment conditions -- therapist-instructed, self-instructed, and one delayed treatment control group. After reading the information sheet (see Appendix F), signing the consent form (see

Appendix G) and completing the pretesting phase of the relaxation project, participants were informed of the treatment condition they were assigned to and received information appropriate to their respective group assignment (see Appendix H).

Self-Instructed

Participants assigned to a self-instruction condition were given a copy of Self-relaxation: Learn it, use it (Hiebert, 1980), a relaxation tape, a finger thermometer to measure peripheral skin temperature, a relaxation monitoring sheet (see Appendix I) and a relaxation checklist covering the sequence of activities to be completed during the five weeks of the program. Each participant was instructed to check off the items as they were completed thus providing a useful indication of the progress that had been made to date. In addition, a monitoring procedure was set up whereby participants were contacted once a week by telephone to determine their progress through the program (see Appendix E). In the event that procedural issues were raised during the telephone calls, participants were referred to appropriate sections of the manual which they had been given. In addition, participants were reminded to turn in their completed monitoring sheets weekly and at a prearranged location and to pick up a new monitoring sheet (the manual contained instructions for self-monitoring peripheral skin temperature, heart rate, respiration rate, as indices of relaxation). A standard format

for the telephone contacts was formulated in advance and followed by the therapist when monitoring participants' progress through the five week training program. Data submitted by any person who was found not fulfilling the program requirements were excluded from the analysis.

Therapist-Instructed

Participants in the therapist-instructed group followed the same relaxation training program as participants in the self-instruction group, except that the program was delivered by a trained therapist (the author) rather than a self-instructional manual. Participants met individually with the therapist for one hour a week for five weeks. The following is a session by session outline of the relaxation training program (see Appendix J for lesson plans).

Session one began with a discussion of stress with emphasis on the physiological effects of stress as characterized by increased heart rate, rate of respiration, sweat gland activity, muscle tension, decreased hand temperature and stomach motility. This discussion was a paraphrase of the description given in the self-instructional manual. Participants were informed that people develop their own idiosyncratic way of responding to stressors, such that if a person reacts to stressors with increased palmar perspiration the reaction to stressors on all occasions will be identical regardless of the

stressor. Participants were also informed that there is increasing evidence supporting the position that our seemingly automatic stress reaction is learned and that it has assumed the character of automaticity through frequent elicitation. Since the stress reaction is automatic in all appearances, one is likely to endorse the misconception that it is unlikely that an alternative mode of reacting can be acquired. The implications of this position for relaxation training, then, become evident. If it is true that one learns to react stressfully, it then becomes possible to learn to become more relaxed in stressful situations.

The relaxation response was defined in terms of a general slowing down of the body's physiology as evidenced particularly in a decrease in heart rate, rate of respiration, sweat gland activity, muscle tension and an increase in hand temperature resulting from vasodilation of the peripheral vascular system. Participants were instructed how to measure and produce the relaxation response. The therapist demonstrated the correct method of measuring heart rate, rate of respiration, and peripheral skin temperature. Participants were instructed to take these measures which were then recorded on a relaxation monitoring sheet. After each measure was recorded the therapist indicated the usual range for each measure and how they were affected by relaxation. Participants listened to a progressive relaxation tape with headphones and followed instructions designed to

produce deep muscle relaxation through progressive tensing and relaxing of all major muscle groups (see Appendix K for a script of the tape). At the end of the relaxation participants were instructed to take the three measures again and these were recorded in a column adjacent to the measures recorded earlier. The differences in magnitude in pre and post relaxation measures, also recorded, were shown to participants to illustrate the effects that relaxation has on the body's functioning. The procedure used to measure and record responses was carried out in all training sessions with the therapist and during home practice sessions. Participants were given the monitoring sheet and a finger thermometer and were instructed to go through the relaxation as best they could from memory, once or twice a day, from 20 to 30 minutes for each session. Participants were told that relaxation training is a skill and to acquire the skill it was necessary to practice regularly at least once a day. The salient features of the relaxation tape were briefly reviewed and the session ended with making an appointment for the second training sessions.

In the second session participants returned the completed relaxation monitoring sheet and their reactions to the home practices were solicited. Any questions or problems that had surfaced in the course of the home sessions were dealt with at this time. Further emphasis was placed on the need to practice regularly to acquire the relaxation skill. Since participants had practiced deep muscle

relaxation using progressive rexation, the transition was made to autosuggestive relaxation (see Appendix L) and the explanation given to them was that since now they knew what it felt like to be relaxed they could now focus on deepening the feeling of relaxation. The concept of inoculation was introduced in terms of relaxation providing an immunity against stress reactions by reducing the body's general level of tension and correspondingly diminishing the body's reactivity to stressors (Benson, 1975; Blanchard & Epstein, 1978; White & Fadiman, 1976). The inoculation or immunization effect is produced through regularly practicing relaxation. The regular practice of relaxation has an effect of lowering baseline tension levels and maintaining them at a lower level which can then function in counteracting the effects of stress reactions. Participants listened to the autosuggestive relaxation tape and were instructed to continue their home practices using this script as a follow-up to progressive relaxation.

In the third session data sheets were collected and participants were encouraged to talk about their home practice sessions. The notion of using a relaxation cue to "mini-relax" (Hiebert, 1980) was introduced. This conditioned relaxation inducing stimulus was introduced to facilitate achieving relaxation in stressful situations (cf. Burish & Schwartz, 1980) and for relaxing several times a day

(i.e., a mini-relax). Participants learned that the relaxation cue they were introduced to earlier as the "10-second relaxation exercise" functions as a mechanism triggering the relaxation response. Participants listened to the autosuggestive tape for the final time and they were instructed to practice using the relaxation cue several times a day to mini-relax.

In session four the data sheet was collected and any concerns that had emerged in the course of practicing the relaxation skills were discussed. The relaxation cue and the notion of using relaxation as a means of acquiring immunity against stress were also reviewed. This review was for the purpose of underscoring the importance of continuing to practice the relaxation skills. Participants were instructed how to use the relaxation cue in an active coping manner. They learned to monitor their own tension level and to begin using the relaxation cue as soon as they felt themselves becoming tense. Participants went through the relaxation exercise without the tape and were instructed to signal the therapist with their fingers when they had finished. At the end of the relaxation exercise participants practiced using the relaxation cue and were instructed to continue practicing the cue at home.

In the final session the major components of the relaxation program were reviewed. Stress and relaxation were reviewed by

focusing on their contrasting characteristics; inoculation and active coping were reexamined in terms of their facilitative effect in producing relaxation in stressful situations; and covert modeling was introduced as an additional technique participants could use to help them rehearse being relaxed in situations they would encounter as stressful (Kazdin, 1976). After the relaxation exercise, which participants went through without using the tape, participants were instructed to continue practicing their relaxation skills regularly to ensure their effectiveness in dealing with stress reactions. Participants made appointments to return for posttesting one week following the completion of their training program.

Delayed Treatment Control

Participants in this group were posttested five weeks after pretesting, otherwise they had no therapist contact. Participants were assigned to a self-instructional treatment level immediately following posttesting.

CHAPTER 4

DATA ANALYSIS AND CONCLUSIONS

Two types of data were obtained from participants in this study: paper-and-pencil measures (STAI-S, STAI-T, and IPAT); and measures of physiological reactivity: frontal muscle tension (EMG), heart rate (HR), skin resistance (SR), and peripheral skin temperature (PST), all of which were measured under baseline and stressor conditions. Physiological data were also obtained from participants in the self-instructional and therapist-directed treatment groups who self-monitored their heart rate, peripheral skin temperature, and rate of respiration during at-home practice sessions in relaxation. The research hypotheses, results of statistical analyses and conclusions are presented in this chapter. For purposes of achieving clarity, the hypotheses are presented in two separate groups. The first group of hypotheses pertains to the paper-and-pencil measures of anxiety. The second group of hypotheses is related to the physiological measures of reactivity obtained during the administration of the psychophysiological stress profile. Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

Missing Data

Missing data occurred in several ways. One source of missing data occurred when a participant in the therapist-instructed group neglected to complete the Trait side of the STAI anxiety inventory at posttest, thus necessitating the exclusion of the participant's pretest anxiety score from data analysis. Another source of missing data is related to equipment malfunctioning. At various times the equipment monitoring skin resistance malfunctioned and it became necessary to exclude all galvanic skin resistance (GSR) data from analysis. Lastly, several monitoring sheets participants had submitted documenting home practice sessions in relaxation were incomplete. In accounting for the missing data points from these monitoring sheets, group means and standard deviations on weekly home practice sessions were computed only on the number of daily relaxation sessions for which both prepractice and postpractice measures were documented.

Hypotheses

Hypothesis #1

Persons receiving self-instructional relaxation training will experience an anxiety decrement, as evidenced by pretreatment-posttreatment score comparisons on paper-and-pencil measures of anxiety, relative to the delayed treatment control.

Hypothesis #2

Persons receiving therapist-directed relaxation training will experience an anxiety decrement, as evidenced by pretreatment-posttreatment score comparisons on measures of anxiety, relative to the delayed treatment control group.

Hypothesis #3

Self-instructional relaxation training and therapist-directed relaxation training will be equally effective in producing an anxiety decrement, as evidenced by intergroup comparison of pretreatment-posttreatment measures of anxiety.

Results. Data from the paper-and-pencil measures of anxiety were analyzed using a two-way analysis of variance with repeated measures on one factor (see Appendix M for summary of two-way analysis of variance for STAI-S, STAI-T, and IPAT). The between subjects factor was Group (self-instruction, therapist-instruction, delayed treatment control) and the within subjects factor was Time (pretest, posttest). There were no significant main effects for Group on the three dependent variables. There was, however, a significant main effect for Time on STAI-S, F (1,46) = 13.50, p = .001, indicating that the three groups experienced an increase in state anxiety from pretesting to post- testing. There was also a significant main effect for Time on IPAT, F (1.46) = 17.69, p = .001, indicating that the three groups

experienced a decrement in anxiety from pretesting to posttesting. There were no statistically significant main effects found on STAI-T, nor were there any significant interaction effects found on the three dependent variables (see Table 2).

Conclusions. There was no evidence supporting the hypotheses that self-instructional and therapist-instructional training in relaxation were differentially effective in reducing anxiety, relative to the delayed treatment control.

Hypothesis #4

Persons receiving self-instructional relaxation training will demonstrate change in pretreatment-posttreatment measures of physiological activity, relative to the delayed treatment control.

Hypothesis #5

Persons receiving therapist-directed relaxation training will demonstrate change in pretreatment-posttreatment measures of physiological activity, relative to the delayed treatment control.

Hypothesis #6

Decrements in physiological activity for persons receiving self-instructional and therapist-directed relaxation will be similar, as evidenced by intergroup comparisons.

Table 2

Mean STAI-S, STAI-T, and IPAT Scores

for 49 Participants

Measure	Group	n	Time		Marginal
			Pretest	Posttest	
STAI-S	Self-Instruction	14	36.86 (8.93)	44.00 (10.97)	40.43 (9.87)
	Therapist-Instruction	17	43.59 (11.91)	47.82 (8.49)	45.71 (10.10)
	Control	18	39.89 (6.02)	43.78 (9.86)	41.83 (8.17)
	Column Marginals		40.31 (9.43)	45.25 (9.55)	
STAI-T	Self-Instruction	14	34.00 (12.39)	36.29 (10.23)	35.14 (11.01)
	Therapist-Instruction	17	35.69 (12.83)	40.81 (11.70)	38.25 (12.16)
	Control	18	37.06 (9.46)	38.56 (8.56)	37.81 (8.80)
	Column Marginals		35.71 (11.35)	38.65 (10.12)	
IPAT	Self-Instruction	14	36.43 (14.63)	29.07 (10.55)	32.75 (12.83)
	Therapist-Instruction	17	40.29 (11.86)	35.00 (12.83)	37.65 (12.28)
	Control	18	36.44 (10.62)	32.22 (9.98)	34.33 (10.23)
	Column Marginals		37.78 (12.18)	32.29 (11.22)	

Note. Numbers in parentheses in this and all other tables indicate standard deviation.

Results. Physiological data were analyzed using a three-way analysis of variance with repeated measures on two factors (see Appendix N for summaries of three-way analyses of variance for EMG, HR, and PST). The between subjects factor was Group (self-instruction, therapist-instruction, and delayed treatment control). The within subjects factors were Time (pretest, posttest) and Stress Profile Condition (four conditions). There were no significant main effects for Group on the three dependent variables (see Tables 3, 4, and 5). There were significant main effects found for Condition on EMG, F (3, 108) = 23.23, p = .001; peripheral skin temperature, F (3, 135) = 5.36, p = .002, and heart rate, F (3, 117) = 12.15, p = .001. Scheffe post hoc analysis of means on Condition for EMG indicate significant increases in frontal muscle tension from baseline 1 to stressor 1, [Sch (3,108) = 6.32, $p < .05$], from baseline 1 to stressor 2, [Sch (3,108) = 17.83, $p < .05$]. and from stressor 1 to stressor 2, [Sch (3,108) = 2.92, $p < .05$]. Post hoc analyses also indicate significant differences in means between stressor 1 and baseline 2, [Sch (3, 108) = 5.08, $p < .05$], between stressor 2 and baseline 2, [Sch (3, 108) = 15.70, $p < .05$]; all differences indicated heightened arousal under stressor conditions. There were no significant differences between baseline 1 and baseline 2 for EMG.

There was a significant Group x Time x Condition interaction effect on EMG, F (6, 108) = 2.20, $p < .05$ (See Figure 1). Post hoc analysis indicate a significant difference in EMG level between

Table 3

Group Means and Standard Deviations

for EMG[a]

Group	n	Pretest Profile Condition B1	S1	S2	B2	Total	Posttest Profile Condition B1	S1	S2	B2	Total	Grand total
Self-Instruction	14	2.67 (0.90)	3.59 (2.32)	3.11 (1.00)	2.42 (0.35)	2.95 (1.38)	2.14 (0.54)	2.98 (1.37)	3.78 (2.14)	2.65 (0.72)	2.98 (1.43)	2.92 (1.39)
Therapist-Instruction	17	2.09 (0.61)	2.91 (0.85)	3.25 (1.02)	2.07 (0.67)	2.58 (0.94)	2.00 (0.52)	2.66 (0.60)	3.30 (1.01)	2.14 (0.65)	2.53 (0.87)	2.55 (0.90)
Control	18	2.15 (0.87)	2.49 (0.68)	3.07 (0.90)	2.28 (0.86)	2.50 (0.88)	2.34 (0.72)	2.54 (0.69)	2.99 (0.80)	2.24 (0.58)	2.53 (0.74)	2.51 (0.81)
Total		2.26 (0.81)	2.93 (1.37)	3.15 (0.95)	2.23 (0.69)		2.16 (0.61)	2.70 (0.88)	3.31 (1.33)	2.31 (0.66)		
Pretest Total		2.64 (1.06)					Posttest Total		2.62 (1.01)			

[a]EMG Units of measurement are microvolts.

[b]The stress profile conditions are Baseline 1, Stressor 1, Stressor 2, and Baseline 2.

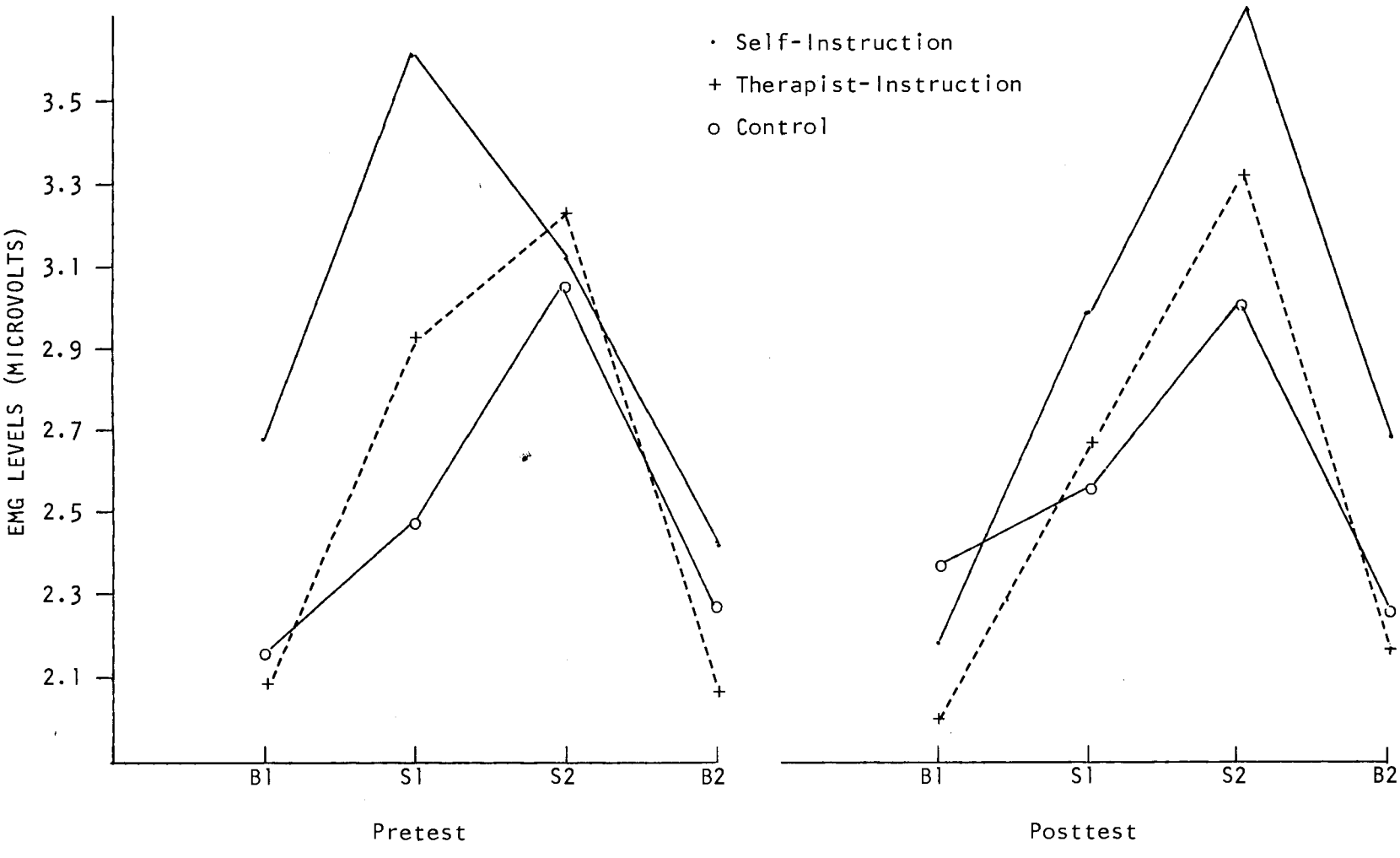

Figure 1. Group by Time by Stress Profile Condition Interaction, EMG.

Table 4

Group Means and Standard Deviations

for Peripheral Skin Temperature[a]

Group	n	Pretest Profile Condition[b] B1	S1	S2	B2	Total	Posttest Profile Condition B1	S1	S2	B2	Total	Grand total
Self-Instruction	14	33.17 (2.38)	32.83 (2.36)	32.40 (2.39)	32.45 (2.57)	32.71 (2.38)	32.92 (2.70)	32.85 (2.57)	30.66 (7.46)	32.69 (2.80)	32.28 (4.38)	32.50 (3.52)
Therapist-Instruction	17	33.49 (2.87)	33.61 (2.12)	33.34 (2.11)	32.36 (2.57)	33.20 (2.43)	34.87 (1.55)	34.56 (1.86)	31.34 (8.54)	34.13 (2.12)	33.72 (4.68)	33.46 (3.72)
Control	18	31.41 (3.66)	32.08 (2.62)	31.48 (2.77)	31.42 (2.78)	31.60 (2.93)	34.07 (2.17)	33.83 (2.23)	33.56 (2.24)	33.56 (2.39)	33.75 (2.22)	32.68 (2.81)
Total		32.66 (3.13)	32.84 (2.41)	32.42 (2.52)	32.05 (2.63)		34.02 (2.25)	33.80 (2.28)	31.92 (6.60)	33.51 (2.45)		
Pretest Total		32.49 (2.68)					Posttest Total		33.31 (3.92)			

[a]Units of measurement are ^{o}C

Table 5

Group Means and Standard Deviations

for Heart Rate[a]

Group	n	Pretest Profile Condition B1	S1	S2	B2	Total	Posttest Profile Condition B1	S1	S2	B2	Total	Grand total
Self-Instruction	14	68.73 (13.10)	73.43 (13.98)	71.46 (16.36)	68.00 (12.42)	70.40 (13.70)	68.31 (13.46)	71.86 (12.85)	71.21 (13.03)	66.79 (10.75)	69.54 (12.30)	69.97 (12.95)
Therapist-Instruction	17	64.08 (7.62)	71.14 (10.58)	69.29 (8.32)	62.91 (7.53)	66.85 (9.09)	70.48 (12.53)	75.03 (14.23)	67.87 (19.38)	70.58 (13.77)	70.99 (15.08)	68.92 (12.58)
Control	18	68.53 (9.40)	77.11 (13.46)	71.65 (12.57)	63.89 (10.91)	70.30 (12.36)	70.16 (10.32)	73.99 (9.20)	74.56 (9.37)	68.24 (7.52)	71.74 (9.29)	71.02 (10.91)
Total		66.78 (9.85)	73.73 (12.47)	70.65 (11.99)	64.57 (10.10)		69.81 (11.83)	73.85 (12.16)	70.97 (14.97)	68.81 (11.07)		
Pretest Total		68.93 (11.61)					Posttest Total		70.86 (12.63)			

[a]Units of measurement are [b]eats/minute

stressor 1 and baseline 2 at pretest for self-instruction, in the direction of decreased EMG, [Sch (6, 108) = 2.95, $p < .05$], at baseline 2. Post hoc comparison of means also indicate a significant increase in EMG from baseline 1 to stressor 2, [Sch (6, 108) = 5.70, $p < .05$], and a significant decrease in EMG from stressor 2 to baseline 2, [Sch (6, 108) = 2.69, $p < .05$], at posttest for self-instruction (see table 3).

Post hoc analysis indicate a significant increase in EMG level from baseline 1 to stressor 2 at pretest for the therapist- directed group, [Sch (6, 108) = 4.32, $p < .05$], and significant reductions in EMG levels from stressor 1 to baseline 2, [Sch (6, 108) = 2.25, $p < .05$], and from stressor 2 to baseline 2, [Sch (6, 108) = 4.43, $p < .05$], for the therapist-directed group at pretest. A significant increase in EMG was observed in a comparison of means at baseline 1 and stressor 2 at posttest, [Sch (6, 108) = 5.43, $p < .05$], for this treatment group (see Table 3). Post hoc comparison of means between stressor 2 and baseline 2 at posttest indicate a significant reduction in EMG levels for the therapist-directed group, [Sch (6, 108) = 4.29, $p < .05$].

A post hoc analysis of the interaction data on EMG for the delayed treatment control indicate a significant increase in EMG level from baseline 1 to stressor 2 at posttest, [Sch (6, 108) = 2.50, $p < .05$]. This was the only statistically significant post hoc comparison found on EMG for the delayed treatment control (see Table 3).

Post hoc intergroup comparisons of EMG levels revealed a

significantly greater increase in EMG from baseline 1 to stressor 1 for self-instruction than for the delayed treatment control group at pretest, [Sch (6, 108) = 3.05, p < .05]. There were no other significant post hoc intergroup comparisons found on EMG.

Heart rate. Post hoc comparisons of means for Condition on heart rate indicate a significant increase in heart rate from baseline 1 to stressor 1, [Sch (3, 117) = 6.66, p < .05]. There were significant decreases observed in heart rate from stressor 1 to baseline 2, [Sch (3, 117) = 11.12, p < .05], and from stressor 2 to baseline 2, [Sch (3, 117) = 3.75, p < .05]. There were no other statistically significant changes found on heart rate.

Peripheral skin temperature. There was a significant main effect found for Time on peripheral skin temperature, F (1,45) = 4.76, p < .03, indicating an increase in temperature from pretest to posttest across all three groups (see Table 3). There was also a significant Group x Time interaction effect, F (2, 45) = 4.86, p < .01, but post hoc analyses of interaction data did not reveal any significant differences in temperature. Post hoc analyses of means on Condition indicate significant decreases in peripheral skin temperature from baseline 1 to stressor 2, Sch (3, 135) = 3.95, p < .05], and from stressor 1 to stressor 2, [Sch (3, 135) = 3.81, p < .05] (see Table 6).

There was also a significant Time x Condition interaction effect, F (3, 135) = 3.01, p < .03 (see Table 4). Although post hoc analyses

Table 6

Means and Standard Deviations of Temperature

for Group x Condition

Group	n	B1	S1	S2	B2	Total
Self-Instruction	14	33.05 (2.50)	32.84 (2.42)	31.53 (5.51)	32.57 (2.64)	32.50 (3.52)
Therapist-Instruction	17	34.18 (2.38)	34.08 (2.02)	32.34 (6.21)	33.24 (2.49)	33.46 (3.72)
Control	18	32.74 (3.25)	32.96 (2.56)	32.52 (2.70)	32.49 (2.78)	32.68 (2.81)
Total		33.34 (2.80)	33.32 (2.38)	32.16 (4.97)	32.78 (2.63)	
Grand Total		32.90 (3.38)				

did not indicate any significant differences in temperature across the four stress profile conditions at pretest, there were, however, significant decrements in temperature from baseline 1 to stressor 2, [Sch (3, 135) = 5.58, $p < .05$], and from stressor 1 to stressor 2, [Sch (3, 135) = 4.48, $p < .05$] at posttest. A significant increase in temperature from stressor 2 to baseline 2 was also observed at posttest, [Sch (3, 135) = 3.18, $p < .05$]. Additional post hoc analyses indicate significant increases in temperature from pretest to posttest at baseline 1, [Sch (3, 135) = 2.33, $p < .05$], and at baseline 2, [Sch (3, 135) = 2.68, $p < .05$] (see Table 3).

Conclusions. The self-instructional and therapist-directed treatment groups exhibited significant reduction in EMG from stressor 1 to baseline 2 at pretest. This was the only pattern of physiological change that appeared common to both treatment groups at pretest. The therapist-directed and delayed treatment control groups exhibited a similar pattern of increased EMG reactivity from baseline 1 to stressor 2 at pretest. Similar patterns of EMG activity were observed in self-instructional and therapist-directed treatment groups at posttest. The treatment groups demonstrated significant increases in EMG from baseline 1 to stressor 2, and significant reductions in EMG from stressor 2 to baseline 2. There were no significant changes observed in EMG for the delayed treatment control at posttest.

There was no support found for the hypothesized differential

treatment effects of self-instructional and therapist-instructional relaxation training relative to the delayed treatment control. Inter-group comparison of change in EMG levels suggests that the self-instructional and therapist-directed groups exhibited equivalent decrements in physiological activity. The results also indicate that the cognitive stressors functioned as stressors but that they were not consistent in producing increased physiological reactivity.

Additional Analyses

Self-Monitored Physiological Data

Participants in the self-instructional and therapist-directed groups were provided with monitoring sheets for documenting at-home practice sessions in relaxation. Participants were instructed to measure heart rate, rate of respiration, and peripheral skin temperature before and after each relaxation session and to record these data in spaces provided on the monitoring sheet. Participants were also instructed to calculate the differences between prepractice and postpractice measures and to record the difference scores obtained in the appropriate spaces provided for these calculations. At the end of each week of the five-week relaxation program, participants were required to turn in their monitoring sheet and to pick up another sheet from a predetermined location for documenting the following week's practice sessions in relaxation.

The self-monitored physiological data were analyzed using a

three-way mixed effects analysis of variance, with repeated measures on two factors. The between subjects factor was Group (self-instruction, therapist-directed training). The two within subjects factors were Pre/Postpractice and Time (five weeks). (See Appendix O for summary of three-way analysis of variance for heart rate, peripheral skin temperature, and rate of respiration).

Results. There were no significant main effects for Group on heart rate and rate of respiration. There was, however, a significant main effect found for Group on peripheral skin temperature, F (1, 28) = 10.64, p <.003, indicating that the therapist-group had warmer hands than the self-instructional group (see Table 7). But because these differences existed at pretest, they cannot be attributed to the treatment.

There were significant differences found in prepractice and postpractice measures of heart rate, F (1, 28) = 146.24, p .001, rate of respiration, F (1, 28) = 82.87, p = .001, and peripheral skin temperature, F (1, 28) = 38.32, p = .001, indicating significant decrements in heart rate and rate of respiration, and a significant increase in peripheral skin temperature (see Tables 8, 9, 7).

There was also a significant main effect for Time on rate of respiration, F (4, 112) = 8.05, p = .001, but post hoc comparison of means did not reveal any significant differences in rate of respiration over the five-week training period. There were no significant interaction effects found in the self-monitored data on

Table 7

Group Means and Standard Deviations for Self-Monitored

Peripheral Skin Temperature Over Five-Week Training Period

Group	n	Prepractice Monitoring					Total	Postpractice Monitoring					Total	Grand total
		W1	W2	W3	W4	W5		W1	W2	W3	W4	W5		
Self-Instruction	14	86.76 (5.06)	87.12 (5.89)	87.10 (4.82)	88.33 (4.91)	88.14 (4.75)	87.48 (5.00)	89.07 (4.28)	88.57 (5.19)	89.09 (4.75)	90.73 (2.91)	91.08 (3.59)	89.89 (4.19)	88.69 (4.75)
Therapist-Instruction	17	91.72 (2.37)	90.29 (3.85)	91.31 (3.34)	91.87 (3.95)	91.97 (3.22)	91.43 (3.37)	92.62 (1.94)	93.03 (1.79)	92.52 (3.39)	93.84 (1.64)	94.05 (1.48)	93.21 (2.20)	92.32 (2.97)
Total		89.48 (4.51)	88.86 (5.05)	89.41 (4.54)	90.27 (4.69)	90.31 (4.34)		91.02 (3.63)	91.47 (4.06)	90.97 (4.35)	92.44 (2.75)	92.76 (2.96)		
Prepractice Total		89.66 (4.61)						Postpractice Total				91.72 (3.63)		

Table 8

Group Means and Standard Deviations for Self-Monitored Heart Rate

Over Five Week Training Period

Group	n	Prepractice Monitoring					Total	Postpractice Monitoring					Total	Grand total
		W1	W2	W3	W4	W5		W1	W2	W3	W4	W5		
Self-Instruction	14	73.43 (9.84)	73.68 (10.00)	73.32 (10.40)	72.86 (10.90)	73.59 (9.98)	73.37 (9.93)	67.53 (9.35)	68.22 (9.51)	66.63 (8.62)	66.88 (9.68)	66.70 (9.57)	67.10 (9.09)	70.29 (9.98)
Therapist-Instruction	17	68.89 (9.51)	69.21 (10.33)	71.37 (8.64)	70.46 (9.70)	71.31 (9.42)	70.25 (9.36)	63.68 (7.63)	64.75 (9.52)	65.97 (7.74)	65.68 (8.62)	66.71 (8.18)	65.36 (8.24)	67.80 (9.13)
Total		70.94 (9.77)	71.23 (10.27)	72.25 (9.36)	71.55 (10.16)	72.30 (9.57)		65.42 (8.53)	66.31 (9.52)	66.27 (8.02)	66.22 (8.98)	66.71 (8.65)		
Prepractice Total		17.65 (9.72)						Postpractice Total			66.18 (8.65)			

Table 9

Group Means and Standard Deviations for Self-Monitored Rate of Respiration Over Five Week Training Period

Group	n	Prepractice Monitoring W1	W2	W3	W4	W5	Total	Postpractice Monitoring W1	W2	W3	W4	W5	Total	Grand total
Self-Instruction	14	15.00 (3.23)	14.20 (3.63)	13.64 (3.48)	13.74 (3.85)	13.94 (4.27)	14.11 (3.62)	11.56 (2.72)	10.92 (3.13)	10.43 (3.05)	11.16 (3.63)	10.53 (3.62)	10.93 (3.17)	12.52 (3.75)
Therapist-Instruction	17	16.42 (4.38)	15.37 (2.93)	15.94 (3.90)	15.24 (3.75)	15.05 (3.57)	15.60 (3.68)	14.50 (4.73)	13.25 (3.81)	13.44 (3.48)	13.26 (3.83)	12.72 (3.87)	13.43 (3.91)	14.52 (3.94)
Total		15.78 (3.91)	14.85 (3.26)	14.90 (3.84)	14.56 (3.81)	14.57 (3.86)		13.17 (4.17)	12.19 (3.66)	12.08 (3.58)	12.31 (3.83)	11.77 (3.86)		
Prepractice Total		14.93 (3.72)						Postpractice Total				12.31 (3.80)		

heart rate, rate of respiration, and periphal skin temperature. (See Tables 10, 11, and 12 for pre/postpractice means and standard deviations for self-monitored data.)

Conclusions. The results indicate that major change in physiological activity occurred consistently in prepractice and post-practice measures of relaxation. The findings suggest that self-monitoring of physiological indices either through self-instructional or therapist-directed training may have practical utility in gauging progress through relaxation training.

Reliability of self-monitored data. A reliability test of participants' self-monitored data was conducted following completion of the five-week training program. Participants in self-instructional and therapist-directed training were instructed at posttesting to monitor their heart rate, rate of respiration, and peripheral skin temperature, in the manner corresponding to the procedures they followed in their home practice sessions. While participants monitored their heart rate and peripheral skin temperature, these physiological indices were simultaneously monitored electronically. The experimenter (the author) monitored participants' chest movement visually as a reliability check for participant-monitored rate of respiration. Pearson product moment correlations between self-monitored and electronically-experimenter monitored data were computed. The reliability coefficient for heart rate was .94, for

Table 10

Group x Time Means and Standard Deviations

for Self-Monitored Peripheral Skin Temperature

Group	n	W1	W2	W3	W4	W5	Total
Self-Instruction	14	87.91 (4.74)	88.35 (5.59)	88.09 (4.80)	89.53 (4.14)	89.61 (4.39)	88.69 (4.75)
Therapist-Instruction		92.17 (2.18)	92.66 (3.27)	92.92 (3.37)	92.86 (3.14)	93.01 (2.68)	92.32 (2.97)
Total		90.25 (4.14)	90.16 (4.73)	90.19 (4.48)	91.35 (3.97)	91.54 (3.88)	
Grand Total		90.69 (4.27)					

Table 11

Group x Time Means and Standard Deviations

for Self-Monitored Heart Rate

Group	n	W1	W2	W3	W4	W5	Total
Self-Instruction	14	70.48 (9.88)	70.95 (9.97)	69.98 (9.97)	69.87 (10.56)	70.14 (10.21)	70.29 (9.98)
Therapist-Instruction	17	66.29 (8.89)	66.98 (10.04)	68.67 (8.53)	68.07 (9.36)	69.01 (9.00)	67.80 (9.13)
Total		68.18 (9.51)	68.77 (10.13)	69.26 (9.16)	68.88 (9.88)	69.50 (9.47)	
Grand Total		68.92 (9.58)					

Table 12

Group x Time Means and Standard Deviations

for Self-Monitored Rate of Respiration

Group	n	W1	W2	W3	W4	W5	Total
Self-Instruction	14	13.28 (3.42)	12.56 (3.72)	12.04 (3.61)	12.45 (3.90)	12.23 (4.25)	12.52 (3.75)
Therapist-Instruction	17	15.46 (4.59)	14.31 (3.52)	14.69 (3.86)	14.25 (3.87)	13.88 (3.85)	14.52 (3.94)
Total		14.48 (4.22)	13.52 (3.69)	13.49 (3.95)	13.44 (3.95)	13.17 (4.08)	
Grand Total		13.63 (3.98)					

rate of respiration .98, and for peripheral skin temperature .92. These high correlations sugggest strongly that participants were capable of monitoring physiological indices of relaxation reliably.

Pretraining Survey

A major purpose for administering the pretraining survey was to assess potential differences in outcome expectancy between treatment groups and control group at pretesting. A global expectancy score for each group was derived from five items in the survey questionnaire: self-assessed anxiety level (Q5), self-assessed relaxation skill level (Q7), and three outcome expectancy items (Qs 6, 8, 9).[1] A one-way analysis of variance did not reveal a significant difference among groups on outcome expectancy $F(2, 46) = 4.16$, p 7.05. (See Appendix P for response frequencies on survey items.)

Post Five-Week Survey

As part of the posttesting procedure, all participants were required to complete a survey questionnaire. (See Appendix P for response frequencies on posttraining survey items.) The survey for delayed treatment control participants was similar, with the exception that items relating to the treatment program were omitted.

[1]The global expectancy score for each group was derived mathematically in the following way: (Q5-Q6) + (Q8-Q7) + Q9.

Overall, these posttest frequencies seem to indicate that participants found that the relaxation program had been helpful in assisting them to aquire the ability to relax and control reactivity to stressors.

Intercorrelations of Dependent Measures

The three paper-and-pencil measures that were used to assess pretreatment and posttreatment levels of anxiety were IPAT, STAI-S, and STAI-T. Pearson product moment correlations were computed on participants' scores obtained from each of the three measures (see Table 13). As shown in Table 13, IPAT scores at pretest correlated significantly with STAI-S scores at pretest, STAI-S scores at posttest, and STAI-T scores at posttest. IPAT scores at posttest were found to correlate somewhat highly with STAI-S scores at posttest and with IPAT scores at pretest. STAI-T and STAI-S scores at posttest also tended to correlate somewhat highly.

Summary

Two types of data were obtained for assessing the treatment effects of self-instructional and therapist-directed relaxation training. The results indicate that the treatments were equivalent, but not superior in producing change in the three cognitive measures of anxiety, relative to the delayed treatment control. With the exception that the treatment groups were found to exhibit similar

Table 13

Intercorrelations Among Dependent Measures

Measure	STAI-S T1	STAI-S T2	STAI-T T1	STAI-T T2	IPAT T1
STAI-S T1					
STAI-S T2	.49**				
STAI-T T1	.21	.08			
STAI-T T2	.23	.61**	.15		
IPAT T1	.36**	.63**	.02	.37**	
IPAT T2	.52**	.73**	.27*	.54**	.69**

[1] n = 49
[2] T1 (pretest); T2 (posttest).
* $p < .05$
** $p < .01$

patterns of EMG reactivity at pretest and posttest, there was no evidence found to support the hypothesized differential treatment effects of self-instructional and therapist-directed relaxation training, in producing physiological change, relative to the delayed treatment control. The cognitive stressors were found to have been effective in producing increased reactivity in the physio- logical response channels monitored. Of methodological importance was the finding that the treatment groups were capable of reliably monitoring physiological measures of relaxation during training.

Discussion of these results, implications arising from the study, and some direction for future research in this area are offered in Chapter V.

CHAPTER 5

IMPLICATIONS AND FUTURE DIRECTIONS

Several important issues were addressed in this study. Earlier pilot test results (Hiebert, 1981) indicated that persons using a self-instructed training medium perceived themselves acquiring relaxation skills. The study was designed and conducted to determine whether physiological variables confirm skill acquisition, whether persons engaged in self-instructed training also experience a reduction in reactivity to stressors, and whether a self-instructed relaxation approach is as effective as traditional therapist-directed training. In this chapter, a summary of the results, implications, limitations of the study, and recommendations for future directions in relaxation research are presented.

Summary of Results

Two types of data were used in assessing the comparative efficacy of self-instructed and therapist-directed relaxation training. Self-report measures of anxiety and physiological measures of reactivity were used in assessing cognitive and physiological response domains, respectively. Self-monitored physiological measures of relaxation, obtained during daily, intra session relaxation practice, were also used as indicators for determining the training progress of participants in the treatment groups. An additional source of

information were participants' self-ratings of perceived program efficacy.

Consistency of Results

Statistical analyses of self-report measures of anxiety were not an accurate indicator of relaxation. There were no significant group and interaction effects observed on any of the self-report measures of anxiety. STAI-S scores indicated that the three groups were exposed to an increase in transient anxiety over the five week training period. A significant reduction in the level of anxiety among the three groups was also observed on the IPAT. In view of the moderately high correlation (.77) reported (Spielberger et al., 1970) between IPAT and STAI-T scores, suggests that since a reduction in STAI-T scores was not associated with a reduction in IPAT scores, the measures were not measuring the same thing.

Also, statistical analyses of physiological measures of reactivity were not an accurate indicator of relaxation. The three groups were not differentiated in terms of change in baseline level of relaxation and physiological reactivity to stressors in pretraining and posttraining administration of the psychophysiological stress profile. Statistical analyses supported the effectiveness of the cognitive stressors in producing increased activity in the physiological parameters that were monitored. Generally, it appears that relaxation training did not produce any change in the

physiological dependent measures, substantiating earlier claims (Lader & Mathews, 1970) that if physiological indices indicate low arousal, relaxation training may not produce any measurable physiological effects.

Support for Treatment

Statistical analyses of self-monitored physiological measures of relaxation indicated that the treatment groups learned to relax during five weeks of training. A consistent change observed in prepractice and postpractice measures indicated that participants were relaxing during intra session practice. Since the two treatment groups were differentiated only on one measure of physiological relaxation (peripheral skin temperature) indicates that self-instructed and therapist-directed relaxation were equally effective as training media.

Self-ratings were also found supporting the effectiveness of relaxation training. A visual inspection of participants' self-ratings of anxiety level from pretraining to posttraining, indicated a reduction in anxiety level and an increased ability to relax and control stress reactions. Overall, participants reported that they had encountered stressors during training, that relaxation had helped them to deal with the stressors and finally, that they would recommend the program to a friend.

The comparative efficacy of self-instructed and therapist-

directed relaxation training was not established by statistical analyses of cognitive measures of anxiety or physiological measures of reactivity. The two treatment groups were not superior to the delayed treatment control group on any of the dependent measures. On self-monitored physiological measures of relaxation, the only statistical difference between the two treatment groups was on self-monitored peripheral skin temperature indicating that the therapist-directed relaxation group generally had warmer hands than the self-instructed group. Since there were no significant group differences found on any other self-monitored physiological measures of relaxation, and no significant interaction effects, this suggest that self-instructed and therapist-directed relaxation training were equivalent as training media. This finding appears to further substantiate claims made in other studies (Baker et al., 1973; Clark, 1973; Frankel & Merbaum, 1982; Glasgow et al., 1981; Marshall et al., 1976; Rosen et al., 1976) that self-instructed and therapist-directed treatment are equally effective in producing positive change in targeted areas at posttest.

Implications

The evidence derived from the two types of dependent measures appeared to contradict participants' claims of increased ability to relax and control stress levels. Although statistical analyses did not indicate that relaxation training had exerted any statistically significant effect in reducing anxiety or in producing significant

change in measures of physiological reactivity, participants nevertheless reported a reduction in self-rated anxiety level and an increase in the ability to relax and control stress reactions. However, this apparent contradiction requires closer examination. First, participants were self-referred and demonstrated normal anxiety. The treatment focus was training participants to relax; the program was not advertised as an explicit treatment for anxiety. Since participants demonstrated normal anixety, it is not surprising that self-report measures of anxiety were unaffected by relaxation training. This suggests that self-report measures of anxiety may be insensitive to change produced by relaxation training in participants who already demonstrate normal anxiety. Therefore, in training normally anxious participants to relax, self-report measures of anxiety may be inappropriate instruments for detecting treatment effects and other more sensitive methods developed and substituted for detecting treatment effects. Self-ratings may also be of questionable validity since they are subject to error. For example, participants may have rated survey items favorably rather than admit that the benefits which they derived from the program were disproportional to the amount of time that they had invested in the program.

Thus, it appears that the contradiction can be resolved in terms of the evidence derived from self-monitored physiological measures of relaxation. The statistical analyses comparing prepractice and post-practice measures recorded over the five week training period,

demonstrate that participants were relaxing during their home practice sessions. These consistent changes imply strongly that participants had learned to relax but that they had not acquired the ability to generalize a relaxation response across stressful situations. The physiological measures of reactivity support this finding. A significant increase in transient anxiety also supports the notion that participants did not acquire the ability to relax across settings. Since participants demonstrated that they had acquired the ability to relax during intra session practice suggests that five weeks training is insufficient for acquiring the ability to relax automatically during exposure to stressors.

There are other implications that can be derived from the self-monitored data. Consistent change observed in prepractice and post-practice measures suggests that participants were capable of self-monitoring physiological measures. Further, this self-monitoring procedure may constitute an important method of gauging training progress, whether relaxation training is conducted through self-instructed or therapist-directed training, and may also provide an important source of motivation for sustaining commitment to program activities. Finally, incorporating a self-monitoring procedure, may provide an effective approach to resolving the problem of high attrition reported in other studies (Allen, 1973; Glasgow & Rosen, 1978; Lewis et al., 1978).

Limitations of the Study

There are some limitations in the study which appear to mitigate against formulating an accurate assessment of the comparative efficacy of self-instructed and therapist-directed relaxation training. These limitations are discussed in terms of credibility rating, adherence to program activities, assessment procedures, and discrepancy among measures.

Credibility Rating

Participants were asked to rate the relaxation program at two strategic points in the program: at pretest, in terms of how beneficial they expected the program to be in reducing their anxiety and again at posttest, to determine whether participants perceived that the program had been beneficial in helping them to reduce their anxiety levels. If additional ratings, and information explaining the reasons for the ratings, had been obtained at specific points during training, participants may have provided important feedback on the adequacy of the relaxation program in terms of the content and administration procedures. For example, personal reactions toward home practice sessions in terms of the length of time it takes for them to relax, monitoring procedures, reacting to change in self-monitored measures, concerns in relation to generalizing relaxation skills across various settings, may have been lost in consequence of waiting until the end of the training period before asking partici-

pants for feedback on the program.

Adherence to Program Activities

At posttest, participants in the treatment groups were asked to rate on a five point scale (1-5) how closely they had followed their program. The mean ratings were 3.9 for self-instructed training and 4.1 for the therapist-directed training group. Despite these high ratings suggesting that participants followed their program closely, whether these ratings reflect closely what participants did during their training is undetermined due to the subjective nature of these ratings.

An important innovation that was used in training, was a procedure for self-monitoring physiological measures of relaxation during home practice sessions. This procedure appears to be potentially useful as a way of gauging treatment progress and for determining whether relaxation skills have been acquired at the end of training. Several factors, however, may have undermined the potential value of the procedure. First, consistent change observed in pre-practice and postpractice measures of relaxation demonstrated that participants were relaxing during home practice sessions, provided that the data were accurate. The reliability check conducted on the self-monitored data indicated that participants were capable of monitoring physiological variables in a highly reliable manner, but this finding does not begin to address the issue whether the numbers

recorded on the monitoring sheets were, in fact, valid data. It is conceivable that occasionally participants may have recorded numbers on their monitoring sheets that merely approximated prepractice and postpractice measures documented in earlier practice sessions. It is also undetermined whether participants practiced relaxing each day, and for the entire twenty minutes which the program recommended. It is possible that participants practiced fewer times than they indicated but filled in false data on the monitoring sheet. Also, participants may not have always monitored their physiological measures in the manner prescribed in the training program. For example, there may have been a large time interval between measuring and recording data and practicing relaxation; these activities may not have occurred in proper sequence. Participants may also have neglected occasionally to monitor prepractice and postpractice measures of relaxation during their home practice sessions and then chose, simply, to record numbers resembling those obtained in earlier sessions. Alternatively, participants may have practiced infrequently and simply recorded numbers on their monitoring sheets. Therefore, unless participants use the self-monitoring procedure appropriately, the procedure cannot provide reliable information for gauging training progress.

Assessment Procedures

Self-monitored physiological measures. The assumption was made that consistent change in physiological measures of relaxation from prepractice to postpractice sessions indicated that participants were relaxing. These measures were used in assessing whether or not participants were learning to relax. However, these intra session measures provide an incomplete assessment of how well participants learned to relax. A comparison of the magnitude of differences between prepractice and postpractice measures across relaxation sessions may have provided more accurate information with respect to the rate of intra individual change. For example, larger differences between prepractice and postpractice measures would have been predicted during initial practice sessions, with differences in magnitude becoming gradually smaller as baseline levels of relaxation were lowered and began to stabilize. This information may have been useful in gauging how quickly participants learned to relax and may have provided a way that could be used for assessing the reliability of participants' self-monitored data.

Psychophysiological stress profile. The stress profile was used in assessing pretraining and posttraining change in physiological activity under four conditions. During the administration of the stress profile, several physiological parameters were monitored simultaneously at each of the three phases -- relaxation, stressor

presentations, and recovery -- each phase potentially representing participants' level of physiological functioning while relaxing, during the presentation of stressors, and during recovery. Corson et al. (1980) have indicated that one limitation undermining the usefulness of this procedure is related to the use of stressors. They have stated that if stressors that are used do not produce a large enough response in the physiological systems that are being monitored, an accurate assessment of treatment may be difficult to produce. However, there have not been any established criteria defining what constitutes "a large enough response" in the physiological systems that are monitored during stressor presentation.

It was hypothesized at the beginning of training that a significant change in measures of physiological activity from pre-treatment to posttreatment would constitute evidence of the effectiveness of relaxation training. However, assessing the effectiveness of training on the basis of global change in measures of physiological activity may provide a limited amount of information regarding how well participants have learned to relax, since it does not take into account the magnitude of change in these measures, nor the rate of recovery from stressor presentation to baseline level. Perhaps a more accurate assessment of the degree to which participants can relax during exposure to stressors would lie in the direction of taking into account the level of physiological activity during baseline and/or stressor presentation, the magnitude of deviation from

baseline during stressor presentation, and the rate of recovery to baseline following exposure to stressors.

Another limitation of the stress profile may have been in failing to control for response stereotypy. A major characteristic of response stereotypy is the tendency among persons to respond consistently to stressors with increased activity in one or more physiological systems. Participants were not prescreened for dominant reactive modality and consequently, if participants learned to relax, this training effect was not detected in data obtained on measures of physiological reactivity. One method of increasing the sensitivity of the stress profile to detect change would have been to prescreen participants for dominant EMG reactivity and then to assign participants to treatment and delayed treatment control conditions. After a fixed training period during which participants in the treatment condition had been practicing their relaxation using somatically-oriented relaxation procedures, the stress profile would be readministered to all participants. The statistically significant results would then likely indicate significant differences between the groups on frontal EMG, in the direction of a greater reduction in EMG for the treatment group. However, time constraints and limitations on resources may mitigate against launching a study of this magnitude.

Disrepancy Among Measures

A discrepancy was observed among cognitive, self-perceived, and physiological measures. Although participants reported increased ability to relax and control stress reactions, statistical analyses did not confirm that relaxation training had exerted any significant effect in reducing anxiety or in producing significant change in measures of physiological reactivity. There are two likely explanations which may account for the discrepancy among these measures. First, it must be recalled that all participants were within the normal range on the cognitive measures of anxiety. It is possible that these measures are not very sensitive to change within the normal range. Had there been a greater number of participants demonstrating high anxiety, the cognitive measures might have depicted some change. Secondly, it is undetermined whether participants used their relaxation skills during posttest administration of the psychophysiological stress profile. Though participants were instructed to relax during baseline and recovery periods using the skills which they had acquired, they were not asked after posttesting whether they had in fact used their skills. If participants used other strategies unrelated to those which they had acquired during training, this may account in part for the lack of differentiation among the three groups.

Future Research Directions

Physiological variables did not support participants' claims of increased ability to relax and control reactivity to stressors. Self-instructed and therapist-directed relaxation training were not superior to delayed treatment control. With the exception that the treatment groups were differentiated on one measure of physiological relaxation, the treatment media were equally effective in providing relaxation training.

The use of physiological measures in assessing relaxation training appears necessary because of response desynchrony that is often evident among the response channels. However, Lader and Mathews (1970) have cautioned against the use of physiological measures because of individual differences in response to stressors and response desynchrony among the various physiological measures. In addition, they believe that physiological measures may be of limited usefulness because of floor effect, that is, if physiological measures indicate low arousal at the beginning, relaxation training may not produce any measurable physiological effects. The absence of any measurable physiological effects would not constitute evidence, however, that participants had not acquired the ability to relax. It would mean, simply, that either the measures were insensitive to change or that there are definable limits to effects that can be produced by relaxation training. Thus, where a condition of low arousal is evident among the physiological variables of relaxation,

using the psychophysiological stress profile with stressor conditions appears warranted.

An additional procedure appears necessary for assessing relaxation skills. Although the statistical analyses of self-monitored physiological measures of relaxation demonstrated that participants had acquired the ability to relax during intra session practice, there was no evidence indicating that participants had acquired the ability to relax automatically during exposure to stressors. One procedure that could be used may involve participants listing stressors that are problematic, rank-ordering the stressors in terms of their frequency of occurrence and level of discomfort and by conducting daily ratings of tension associated with these stressors, provide a more veridical assessment of the degree to which participants acquired the ability to generalize relaxation across various settings.

In future, if the stress profile is to be used in assessing training efficacy, some additional criteria need to be examined. Establishing participants' most reactive modality prior to training, may provide a more sensitive method of detecting change due to training. Another criterion that appears necessary, is identifying stressors that will produce a sufficiently large response without subjecting participants to unnecessary discomfort, so that a change in the level of reactivity may provide both a quantitative and qualitative assessment of the effectiveness of training. Any signi-

ficant change in physiological activity that occurred during stressor presentation may provide more solid evidence of the degree to which participants had acquired the ability to relax during exposure to stressors. An additional indication of having acquired this ability may be demonstrated in participants' rate of recovery following exposure to stressors.

In conclusion, there are several recommendations that should be considered in future research directed towards assessing the relative efficacy of self-instructed and therapist-directed relaxation training. First, participants' most reactive physiological modality should be determined if the stress profile is to be used as an integral assessment procedure. Next, if physiological change is to be used as an index of training effectiveness, stressors should be identified that will produce a large enough response in the physiological parameters that are monitored. Finally, a list of stressors, frequency of daily exposure to these stressors, and daily ratings of tension should be generated as an additional way of gauging the degree of relaxation transfer.

Chapter 1 began with a quote from Epictetus which now can serve as a focal point for closing this thesis. The essence of his message was that it is inappropriate to blame others when we are stressed, and that we should turn to ourselves to provide the answers to our stress-related problems. The subjective reports of the participants in this

study suggest that learning to control one's physiological reaction to a stressor can be an important step in accepting this responsibility and learning to cope more effectively.

APPENDIX A

INSTRUCTIONS FOR SERIAL SEVENS TASK

PRETREATMENT AND POSTTREATMENT DATA COLLECTION FORMS

PRE-TRAINING SURVEY

INSTRUCTIONS FOR SERIAL SEVENS TASK

In a few moments I am going to tell you a number. I want you to subtract 7 from that number, and then subtract 7 from that answer, and then subtract 7 again, and keep on subtracting 7 until I tell you to stop. Do not say your answers out loud. Do all the subtracting silently. After 3 minutes I will tell you to stop and give me the number you have reached. Are you ready? O.K. The number is 1000, go ahead and start subtracting.

TREATMENT DATA FORM

Name _____

Date _____

Pretest _____ Posttest _____

1. Answer from serial 7's. _____

2. Form C-9

   a. How is the business world being affected by science and technology? (it is being continuously altered) _____

   b. How will tools of today compare to those of the future? (they will appear quite crude) _____

   c. How has the use of shorthand been affected? (it is used less frequently) _____

   d. What advantage do microfilmed records have over traditional filing systems? (they are less cumbersome than files) _____

   e. What continued effect will machines have on the world of work? (they will increase the accuracy, volume, and speed of work) _____

   Total _____

Form C-10

a. What instrument will revolutionize commerce, business, and education in the future? (the computer) _____

b. Describe one way, mentioned in this paragraph, in which the video-phone will benefit the family. (shopping) _____

c. How will computers improve library facilities? (contents of entire libraries will be stored in world library centers which will be available to everyone) _____

d. Why is it conceivable that the future international language may be English? (approximately 1/5 of the world's population already speak or comprehend English) _____

e. What additional benefit may result from a universal language when it is finally adopted? (it should provide one basis on which world peace can be realized) _____

Total _____

TOTAL _____

POSTTREATMENT DATA FORM

Name _____

Date _____

Pretest _____ Posttest _____

1. Answer from serial 7's. _____

2. Form D-9

   a. What profession had the children previously thought of entering? (medicine) _____

   b. What were Bob and his science teacher discussing? (the differences between human beings and animals) _____

   c. What did Bob learn about symbols? (virtually all knowledge is transmitted through symbolic expression) _____

   d. What effect may disturbed emotions have upon the mind's ability to use symbols? (an adverse effect) _____

   e. Name one specialized field mentioned in the paragraph that uses symbols. (mathematics, music, art) _____

   Total _____

Form D-10

a. In what college course will Bob and Jane study in detail about the workings of the human mind? (psychology) _____

b. What factor affects the happiness and equilibrium of every individual and all those in contact with him? (emotional adjustment) _____

c. According to modern psychology, what scientific principle explains all relationships among people-- good or bad? (cause and effect) _____

d. Name another area of study besides psychology in which specialists are studying problems of human relations. (anthropology, sociology, statistics) _____

e. What can we do as individuals to help in the solution of these problems? (we can try conscientiously to understand our own behavior) _____

Total _____

TOTAL _____

RELAXATION TRAINING RESEARCH PROGRAM

Pre-Training Survey

NAME _____

1. What prompted you to sign up for the program?

_____

_____

_____

_____

_____

2. Have you ever participated in a relaxation training program before?

   a. Yes No

   b. If yes, please describe. _____

_____

_____

_____

_____

_____

3. Do you plan to use any other relaxation strategy (e.g., meditation, etc.) besides this program during the next five weeks?

   a. Yes No

   b. If yes, please explain. _____

   _____

   _____

   _____

   _____

   _____

4. With what specific concerns (if any) do you expect this relaxation program to be helpful? _____

   _____

   _____

   _____

   _____

5. Please rate your general overall anxiety level <u>right now</u>.

   Not anxious at all Very anxious

   0 1 2 3 4

6. Please rate what you expect your general overall anxiety level to be <u>after completing the program</u>.

   Not anxious at all Very anxious

   0 1 2 3 4

7. How well are you able to relax at will, now?

Not at all				Very well
0	1	2	3	4

8. How well do you expect to be able to relax after completing this relaxation program?

Not at all				Very well
0	1	2	3	4

9. How beneficial do you expect this relaxation program to be in helping you reduce your anxiety?

Not beneficial at all				Very beneficial
0	1	2	3	4

10. Do you expect to encounter any particularly stressful situations in the next five weeks?

    a. Yes No

    b. If yes, please explain. _____

    _____

    _____

    _____

    _____

    _____

11. Are you presently taking any prescribed medications?

    a. Yes No

    b. If yes, what? _____

    _____

CIRCLE THE APPROPRIATE NUMBERS IN ITEMS 12 - 16.

12. How many cigarettes per day do you smoke?

    0. none

    1. less than 6

    2. between 7 and 19

    3. 20 (1 pack) or more

13. How much coffee or tea do you drink each day?

    0. none

    1. 3 cups or less

    2. 4 to 7 cups

    3. 8 or more cups

14. How often do you drink alcoholic beverages?

    0. never

    1. less than once per month

    2. once or twice per week

    3. weekends only

    4. daily or four or more days per week

15. When you do drink, how much do you usually drink?

    0. none

    1. 1 or 2 drinks per occasion

    2. 3 to 4 drinks per occasion

    3. 5 or more drinks

16. What type of alcoholic beverage do you usually drink?

(Circle all appropriate answers.)

1. Beer
2. Wine
3. Liquor

APPENDIX B

POST FIVE WEEK SURVEY FOR SELF-INSTRUCTION PARTICIPANTS

RELAXATION TRAINING RESEARCH PROGRAM

Post Five Week Survey

Name _____

A. Please read through the following checklist of relaxation training activities and check off the activities you completed.

RELAXATION TRAINING CHECKLIST

PRETRAINING — Completed ( )

Day 1 - Read Introduction and Section 1 entitled "What is Relaxation" p. 1-12. _____

Day 2 - Read Section II entitled "Developing Skill at Relaxing" p. 14-22. _____

BEGIN RELAXATION TRAINING

Week 1
- Practice "Progressive Relaxation" _____
- Record data on "Relaxation Monitoring Sheet" _____

Week 2
- Move to "Autosuggestive Relaxation" _____
- Record data on "Relaxation Monitoring Sheet" _____

Week 3
- Continue with "Autosuggestive Relaxation" _____
- Record data on "Relaxation Monitoring Sheet" _____

Week 4
- Begin to fade out use of relaxation tape _____
- Record data on "Relaxation Monitoring Sheet" _____

Week 5
- Practice relaxation without tape - Record data _____
- Begin to strengthen relaxation CUE _____

OR

- Begin differential relaxation training _____

OR

- Read section entitled "Using Relaxation" and _____
- Decide which use of relaxation is most appropriate for your situation and implement that use _____

B. On the chart below please check ( ) the days:

1. you went through a relaxation exercise (R) e.g.

MON
R
D

2. you collected data (D) on pulse rate, respiration rate and finger temperature, e.g.

MON
R
D

Begin on the day on which you first practiced Progressive Relaxation

	MON	TUE	WED	THUR	FRI	SAT	SUN
WEEK 1	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 2	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 3	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 4	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 5	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 6	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 7	R	R	R	R	R	R	R
	D	D	D	D	D	D	D

C. 1. In your opinion, how closely did you follow the relaxation training program?

Not at all Very closely

0 1 2 3 4

2. In the first three weeks of the training program, how did you practice home relaxation: a) by listening to the prepared tape or b) did you practice by means of mental recall or c) did you prepare your own relaxation tape?

a) listened to supplied tape

b) used mental recall

c) prepared and listened to my own tape

3. Did you practice with any of the alternate sequences presented at the back of the manual (i.e. Autogenic Relaxation or Guided Imagery)?

a) Yes No

b) If yes, which one(s)? _____

_____

c) Comments? _____

_____

4. Did you use or begin any other relaxation strategy (e.g. meditation, regular exercise, etc.) during the five weeks of this training program?

a) Yes No

b) If yes, please explain (i.e., what stategy was used, how long you've been using it, how often, how long each time and why you used that strategy in addition to, or instead of, the ones outlined in the manual?)

_____

_____

_____

D. 1. With what specific concerns (if any) did this relaxation program help you with?

_____

_____

_____

_____

2. Please rate your general overall anxiety level after completing the program.

Not anxious at all — Very anxious

0 1 2 3 4

3. How well are you able to "relax at will" after completing the program?

Not at all — Very well

0 1 2 3 4

4. How beneficial was this relaxation program in helping you to reduce your anxiety?

Not beneficial at all — Very beneficial

0 1 2 3 4

5. Do you consider the benefit you gained from participating in this relaxation training program to be due to: (please circle the appropriate number along the continuum)

Your efforts — About half and half — The explicitness of the training procedures

0 1 2 3 4

E. 1. Did you encounter any particularly stressful situations during the training program?

a) Yes No

b) If yes, please explain _____

_____

_____

_____

c) Did you try to use your relaxation response in that situation?

Yes No

d) How well did it work?

Not at all Very well

0 1 2 3 4

F. 1. Please indicate the extent to which you feel the manual alone (i.e. without the weekly telephone call) could be used as a completely self-contained program.

Inadequate Very Adequate

0 1 2 3 4

2. Please indicate the extent to which you feel the professionally prepared tapes (i.e. those made available with the manual) are important to the training program (the alternative would be to have no prepared tape and have each person make his/her own tape). Prepared tapes are:

Not important at all Very important

0 1 2 3 4

3. Would you recommend this program to one of your friends?

Never Definitely

0 1 2 3 4

4. If this relaxation training program were to be presented again what suggestions for improvement would you make?

5. What were the most beneficial aspects of the relaxation program?

6. What were the factors involved in your not practicing the relaxation exercises?

7. What were the factors involved in your not gathering the pulse rate, respiration rate, finger temperature data?

G. CIRCLE THE APPROPRIATE NUMBERS IN ITEMS 1 - 5

1. How many cigarettes per day do you smoke?

   0. none

   1. less than 6

   2. between 7 and 19

   3. 20 (1 pack) or more

2. How much coffee or tea do you drink each day?

   0. none

   1. 3 cups or less

   2. 4 to 7 cups

   3. 8 or more cups

3. How often do you drink alcoholic beverages?

   0. never

   1. less than once per month

   2. once or twice per week

   3. weekends only

   4. daily or four or more days per week

4. When you do drink, how much do you usually drink?

   0. not applicable

   1. 1 to 2 drinks per occasion

   2. 3 to 4 drinks per occasion

   3. 5 or more drinks

5. What type of alcoholic beverages do you usually drink? (Circle all appropriate answers.)

   0. not applicable

   1. Beer

   2. Wine

   3. Liquor

H. PERSONAL DATA

1. Age: _____

2. Sex: Female _____ Male _____

3. Occupation: (Please circle and fill in blank if applicable)

   1. Student 2. a) S.F.U. Staff 3. Other:
   b) Position: _____ _____

4. Circle the number of years of education you have completed:

8 9 10 11 12	13 14 15 16	17 18 19 more
High School	College	Graduate

5. Circle the highest educational degree you have completed:

   a. Grade school

   b. High school

   c. Community College (Associate Diploma)

   d. College (Bachelor's degree)

   e. Master's degree

   f. Doctoral degree

APPENDIX C

POST FIVE WEEK SURVEY FOR THERAPIST-INSTRUCTED PARTICIPANTS

B. On the chart below please check ( ) the days:

1. you went through a relaxation exercise (R) e.g.

	MON
R	
D	

2. you collected data (D) on pulse rate, respiration rate and finger temperature, e.g.

	MON
R	
D	

Begin on the day on which you first practiced Progressive Relaxation

	MON	TUE	WED	THUR	FRI	SAT	SUN
WEEK 1	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 2	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 3	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 4	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 5	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 6	R	R	R	R	R	R	R
	D	D	D	D	D	D	D
WEEK 7	R	R	R	R	R	R	R
	D	D	D	D	D	D	D

C. 1. In your opinion, how closely did you follow the relaxation training program?

Not at all Very closely

0 1 2 3 4

2. In the first three weeks of the training program, how did you practice home relaxation: a) by listening to the prepared tape or b) did you practice by means of mental recall or c) did you prepare your own relaxation tape?

a) listened to supplied tape

b) used mental recall

c) prepared and listened to my own tape

3. Did you practice with any of the alternate sequences presented at the back of the manual (i.e. Autogenic Relaxation or Guided Imagery)?

a) Yes No

b) If yes, which one(s)? _____

_____

c) Comments? _____

_____

4. Did you use or begin any other relaxation strategy (e.g. meditation, regular exercise, etc.) during the five weeks of this training program?

a) Yes No

b) If yes, please explain (i.e., what stategy was used, how long you've been using it, how often, how long each time and why you used that strategy in addition to, or instead of, the ones outlined in the manual?)

_____

_____

_____

D. 1. With what specific concerns (if any) did this relaxation program help you with?

_____

_____

_____

_____

2. Please rate your general overall anxiety level after completing the program.

Not anxious at all — Very anxious

0 1 2 3 4

3. How well are you able to "relax at will" after completing the program?

Not at all — Very well

0 1 2 3 4

4. How beneficial was this relaxation program in helping you to reduce your anxiety?

Not beneficial at all — Very beneficial

0 1 2 3 4

5. Do you consider the benefit you gained from participating in this relaxation training program to be due to: (please circle the appropriate number along the continuum)

Your efforts — About half and half — The explicitness of the training procedures

0 1 2 3 4

E. 1. Did you encounter any particularly stressful situations during the training program?

a) Yes No

b) If yes, please explain _____

_____

_____

_____

c) Did you try to use your relaxation response in that situation?

Yes No

d) How well did it work?

Not at all Very well

0 1 2 3 4

F. 1. Please indicate the extent to which you feel the manual alone (i.e. without the weekly telephone call) could be used as a completely self-contained program.

Inadequate Very Adequate

0 1 2 3 4

2. Please indicate the extent to which you feel the professionally prepared tapes (i.e. those made available with the manual) are important to the training program (the alternative would be to have no prepared tape and have each person make his/her own tape). Prepared tapes are:

Not important at all Very important

0 1 2 3 4

3. Would you recommend this program to one of your friends?

Never Definitely

0 1 2 3 4

4. If this relaxation training program were to be presented again what suggestions for improvement would you make?

5. What were the most beneficial aspects of the relaxation program?

6. What were the factors involved in your not practicing the relaxation exercises?

7. What were the factors involved in your not gathering the pulse rate, respiration rate, finger temperature data?

G. CIRCLE THE APPROPRIATE NUMBERS IN ITEMS 1 - 5

1. How many cigarettes per day do you smoke?

   0. none

   1. less than 6

   2. between 7 and 19

   3. 20 (1 pack) or more

2. How much coffee or tea do you drink each day?

   0. none

   1. 3 cups or less

   2. 4 to 7 cups

   3. 8 or more cups

3. How often do you drink alcoholic beverages?

   0. never

   1. less than once per month

   2. once or twice per week

   3. weekends only

   4. daily or four or more days per week

4. When you do drink, how much do you usually drink?

   0. not applicable

   1. 1 to 2 drinks per occasion

   2. 3 to 4 drinks per occasion

   3. 5 or more drinks

5. What type of alcoholic beverages do you usually drink? (Circle all appropriate answers.)

   0. not applicable

   1. Beer

   2. Wine

   3. Liquor

H. PERSONAL DATA

1. Age: _____

2. Sex: Female _____ Male _____

3. Occupation: (Please circle and fill in blank if applicable)

   1. Student 2. a) S.F.U. Staff 3. Other: _____
   b) Position: _____

4. Circle the number of years of education you have completed:

8 9 10 11 12	13 14 15 16	17 18 19 more
High School	College	Graduate

5. Circle the highest educational degree you have completed:

   a. Grade school

   b. High school

   c. Community College (Associate Diploma)

   d. College (Bachelor's degree)

   e. Master's degree

   f. Doctoral degree

APPENDIX D

POST FIVE WEEK SURVEY FOR CONTROL PARTICIPANTS

RELAXATION TRAINING RESEARCH PROGRAM
Post Five Week Survey
Name _____

A. 1. Did you use or begin to use any other relaxation strategy (e.g. meditation, regular exercise, etc.) in the time since you last came in?

a) Yes No

b) If yes, please explain _____

_____

_____

_____

2. Please rate your general overall anxiety level right now.

Not anxious at all Very anxious

0 1 2 3 4

3. Did you encounter any particularly stressful situations during the training program?

a) Yes No

b) If yes, please explain _____

_____

_____

_____

4. Did you begin or stop taking any prescribed medication during the training program?

a) Yes No

b) If yes, what? _____

_____

_____

B. CIRCLE THE APPROPRIATE NUMBERS IN ITEMS 1 - 5

1. How many cigarettes per day do you smoke?

   0. none

   1. less than 6

   2. between 7 and 19

   3. 20 (1 pack) or more

2. How much coffee or tea do you drink each day?

   0. none

   1. 3 cups or less

   2. 4 to 7 cups

   3. 8 or more cups

3. How often do you drink alcoholic beverages?

   0. never

   1. less than once per month

   2. once or twice per week

   3. weekends only

   4. daily or four or more days per week

4. When you do drink, how much do you usually drink?

   0. not applicable

   1. 1 to 2 drinks per occasion

   2. 3 to 4 drinks per occasion

   3. 5 or more drinks

5. What type of alcoholic beverages do you usually drink? (Circle all appropriate answers.)

   0. not applicable

   1. Beer

   2. Wine

   3. Liquor

C. PERSONAL DATA

1. Age: _____

2. Sex: Female _____ Male _____

3. Occupation: (Please circle and fill in blank if applicable)

   1. Student 2. a) S.F.U. Staff 3. Other:
   b) Position: _____ _____

4. Circle the number of years of education you have completed:

8 9 10 11 12	13 14 15 16	17 18 19 more
High School	College	Graduate

5. Circle the highest educational degree you have completed:

   a. Grade school

   b. High school

   c. Community College (Associate Diploma)

   d. College (Bachelor's degree)

   e. Master's degree

   f. Doctoral degree

APPENDIX E

PROTOCOL FOR MONITORING CALLS

PROTOCOL FOR MONITORING CALLS FOR SELF-INSTRUCTED SUBJECTS

'This is _____. I'm with the Relaxation Project at S.F.U.'

First call (Day 2):

'I'm just calling to ask how things are going with the use of the manual.'

'I'm wondering if you finished reading the first 2 sections of the manual.'

If answer is yes.....

'Good, so then you're ready to move on to practicing Progressive Relaxation and begin talking data.'

If answer is no.....

'Has something come up to make you reconsider your willingness to participate in the program, or do you plan on staying with it?'

If answer is 'I want to drop out'

'It would be helpful to us if you could tell us your reasons.'

If answer is 'I want to stay with it'

'Its really important if we're to get valid data that people stick pretty closely to the program. In this case the manual really guides what you're to do.'

'You've told me you want to continue - when do you see yourself getting the reading done..'

'What I'd like to do is phone you then to see if you have any questions...'

(After making follow-up call-ask person to enter date of first practice on their data sheet and delay monitoring calls accordingly.)

Calls #2 & 3.

'I'm just calling to ask how the home practice sessions are going.'

'I'm wondering how the data gathering is going.'

If subject expresses excitement at changes - incorporate and reinforce and say something like, 'so you see how important it is to take the data so you can know how well you're doing.'

'I would like you to turn in your data sheet tomorrow at MPX 7507 and pick up another one' (from Peter -receptionist or alternate arrangement).

Call 4

Add 'You now move to fading out the use of the tape.'

Call 5

Add 'I would like to make an appointment for your post-test.'

'How about...'

Call 6

Add 'We would like you to bring you data sheet with you when you come in for your post-test tomorrow at _____.'

APPENDIX F

PARTICIPANT INFORMATION SHEET

INFORMATION SHEET

In May, June and July 1981, Dr. Bryan Hiebert in the Counselling Psychology program of the Faculty of Education, will be coordinating a research project. The purpose of the project is to test the effectiveness of various relaxation training procedures.

Those taking part in the study will learn a method for producing deep relaxation at will. Before and after the relaxation training, physiological reactions will be measured and participants will fill out two questionnaires which will measure anxiety. At the start, instruments will measure the participant's hand temperature, muscle tension, heart rate and sweat gland activity, while participants relax and while they perform some mental tasks (reading and arithmetic). Participants will then learn a method of producing deep relaxation by following a relaxation training program; the physiological measures will then be taken again in order to determine how deeply participants have learned to relax.

The whole process will involve two one and one-half hour sessions (to record the physiological measures and fill out the questionnaires), a daily twenty minute practice period for five weeks (which each participant conducts alone at their own convenience), and one contact per week (from 15 minutes to 1 hour) with a project assistant. At the end of the study, participants will have learned a procedure that will help them relax and control stress and anxiety.

The research project has been approved by the University Ethics Committee at Simon Fraser University.

Anyone who wishes more information may telephone Mr. Larry Dumka at 526-7553 or 291-4344 (messages), Jim Cardinal at 291-3389, or Dr. Bryan Hiebert at 291-3389.

APPENDIX G

CONSENT FORM

CONSENT FORM

I, _____, have read the accompanying information sheet and agree to take part in the relaxation training research project.

I understand my participation will involve taking a psycho-physiological stress profile, the State-Trait-Anxiety Inventory and the IPAT Self Analysis Form on two occasions. The data from this questionnaire and the physiological measurement sessions will be kept confidential. My responses will be coded on a computer file for the purposes of data analysis and the questionnaire responses will then be destroyed. I understand that I can obtain the results from my own questionnaires and a copy of the final results of the research project by contacting Mr. Larry Dumka or Mr. Jim Cardinal at the above address.

I understand that I am free to decide the degree to which I will follow the training procedures outlined to me.

I understand that I can withdraw from this project at any time I wish.

I understand that if I have any concerns or questions about the project I can telephone Mr. Dumka at 526-7553 or 291-4344 (messages), Jim Cardinal at 291-3395 (messages), or Dr. Bryan Hiebert at 291-3389 (office) or 291-3395 (messages).

_____ _____

Date Signature

APPENDIX H

PRETREATMENT INSTRUCTIONS FOR SELF-INSTRUCTION PARTICIPANTS

PRETREATMENT INSTRUCTIONS FOR THERAPIST-INSTRUCTED PARTICIPANTS

PRETREATMENT INSTRUCTIONS FOR CONTROL PARTICIPANTS

PRETREATMENT INSTRUCTIONS FOR SELF-INSTRUCTION PARTICIPANTS

This manual explains in a brief clear step by step fashion how to proceed through the relaxation training program.

Here is a checklist which outlines what you are to do when.

When you complete each step you can check it off. In this way you can chart your progress through the program.

For example, as you can see the first step on day 1 which is tomorrow is to read the section entitled "What is relaxation."

And when you turn to the table of contents in the manual you find ....

Back to the checklist now. You see in "Week 1" it says "Practice Progressive Relaxation" that means listening to and following the instructions.

On the Progresive Relaxation side of this cassette tape. For weeks 2, 3 and 4 the checklist instructs you to practice "Auto-suggestive Relaxation" which is on the flip side of the cassette.

Do you have access to a cassette tape recorder which you could use daily at home for the next month?

(If yes, that's fine; if no, then instruct the subject to listen to the tape once - at the SFU library - as a model - and then to practice by merely recalling the relaxation sequence to themselves).

Please disregard references in the manual to 'reading scripts' and 'making a tape'. In this program we are supplying you with this pre-recorded tape.

I am also going to ask you to take some data both before and after your practice sessions.

The reason is that most people want some objective measure of how well they're doing at relaxing.

Most people find it easy to take their own heart or pulse rate, their breathing rate and their finger temperature. How to measure these is explained in the manual beginning on page 8. (Flip to page 9 diagram re: pulse rate.)

You will need a thermometer to take your finger temperature so here's one. You can take your finger temperature as indicated in the manual or with this thermometer you can hold it lightly between your thumb and index finger like this.

Here is a data sheet on which to record your measurements for one week. I would like you to bring in your data sheet to the receptionist outside when you've completed it, that would be about next ....., and the receptionist will give you a new sheet. If you come in after hours or if the receptionist is not there, just slip the completed data sheet under the door and take a new one from the envelope tacked up beside the door.

I will call you in two or three days and then once a week thereafter to see how things are going.

Do you have any questions?

There are two benefits to you from participating in the program:

1. you learn to relax more effectively, and

2. you get to keep the materials, the manual, the tape, and the thermometer.

INSTRUCTIONS FOR 'THERAPIST-INSTRUCTED PARTICIPANTS'

You will be working with me to learn a relaxation procedure.

I'll be teaching you a procedure which has been found to be effective with most people.

The training sessions will be once per week for 5 weeks and will last 40 to 50 minutes each.

I would like to set up an appointment with you in the next few days, at a time and day you could keep regularly.

How would _____ be?

So that we will be meeting on _____ at _____ for the next 5 days/weeks.

PRETREATMENT INSTRUCTIONS FOR CONTROL PARTICIPANTS

As we have said, everybody who participates in this study will learn a relaxation procedure.

I've just finished taking an initial measure of your anxiety level and your physiological reactivity.

What I need is a stable measure of your anxiety level and physiological reactivity over a 5 week period.

What I want you to do is return in 5 weeks time and, we will repeat this procedure and then you will immediately be assigned to a treatment group.

I'd like to make an appointment for you to come in at the same time of day in 5 weeks if that's O.K. with you.

(If the person is not able to make an appointment then, ask the person when we can contact them to make an appointment.)

We'll give you a reminder call about a week ahead of time.

APPENDIX I

RELAXATION MONITORING SHEET

RELAXATION MONITORING SHEET

Week # _____ Name _____

From _____ to _____

DAY	INDICATOR	START	FINISH	DIFFERENCE
1. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
2. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
3. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
4. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
5. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
6. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____
7. _____	pulse rate (per minute)	_____	_____	_____
	breathing rate (per minute)	_____	_____	_____
	finger temperature (degrees)	_____	_____	_____
	_____	_____	_____	_____

APPENDIX J

THERAPIST-INSTRUCTED RELAXATION

THERAPIST - INSTRUCTED RELAXATION

Session I

I. Overview

- Introduce stress response
- Opposite, relaxation response
- Teach you how to measure it
- Teach you a way of producing the relaxation response

II. Stress Response

- Increased HR, RR, GSR, muscle tension
- Decreased hand temperature, stomach motility
- Shunting of blood in brain away from rational to muscle movement control centers
- Typically all happen

III. Relaxation Response

- Opposite of the stress response
- Decrease HR, RR, etc.
- How to measure: HR, RR, Temp.
- Data sheet (fill in for seven days)
- Relaxation training is a skill

Session I (continued)

IV. Relaxation Procedure

- Take data
- Progressive relaxation tape
- Take data

V. Debrief

- Descriptive praise-data
- Home practice
  - 20 mins. - 1/2 hr., once or twice/day
  - go through P.R. from memory

Session II

I. Overview

- Review
- Train

II. Review

- Relaxation response
- Collect data sheet and generally talk about how the home practice is going
- Emphasize relaxation is a skill
- Introduce notion of shorter script - more time in very relaxed state (rationale for autosuggestive relaxation)

Session II (continued)

III. Relaxation Procedure

- Take data
- Autosuggestive relaxation
- Take data

IV. Debrief

- Descriptive praise
- Introduce inoculation use of regular relaxation - lower baseline = farther from threshold
- Give data sheet to take home

Session III

I. Overview

- Review
- Introduce notion of "mini-relax"

II. Review

- Collect data sheet
- Inoculation use of relaxation

III. Today

- Explain Cue:
  - the 2, 4-count breaths can be used to "mini-relax"
- Practice it several times at the end
- Function of Cue = relaxation trigger

Session III (continued)

IV. Relaxation Procedure

- Take data
- Autosuggestive relaxation + 3 X cue at end
  - Use cue and relax again ... "that's good, just continue sitting."
  - Use cue again ... "that's good, etc."
- Take data

V. Debrief

- Descriptive praise
- Inoculation
- Practice cue at home
- Give data sheet to take home
- Next week, ready to try relaxing without the tape

Session IV

I. Overview

- Review
- Discuss how to use cue
- Practice relaxing without relaxation tape

II. Review

- Inoculation
- Cue

Session IV (Continued)

III. Today

- Introduce how to use cue in active coping - monitor - cue - relax
- Solicit - Feedback of appropriate instances for using cue
  - Examples of them noticing the effects of a lower baseline
- Practice relaxing without relaxation tape

IV. Relaxation Procedure

- Take data
- Self-relaxation - signal with fingers when done
- Take data
- Practice cue, i.e., cue down

V. Debrief

- Descriptive praise
- Practice cue at home
- Give data sheet to take home

Session V

I. Overview

- Review
- Practice relaxing without relaxation tape
- Guidelines for continued use of skill

Session V (continued)

II. Review

- Stress response
- Relaxation response
- Inoculation
- Active coping

III. Today

- Outline rational for covert modeling
- Practice relaxing without relaxation tape

IV. Relaxation Procedure

- Take data
- Self-relaxation - signal when done
- Take data
- Practice cue and relax, do this three times

V. Debrief

- Descriptive praise
- Practice at home
  - 5-6 times/week when you're just generally feeling uptight
  - 3-4 times/week to keep the skill and the cue really strong
  - use the skill in an active coping way whenever you get tense

APPENDIX K

PROGRESSIVE RELAXATION

PROGRESSIVE RELAXATION

by

Dr. Bryan Hiebert

The purpose of this tape is to teach you deep muscle relaxation. If you practice, you can learn to relax at will; to put yourself into a very pleasant and comfortable state known as deep relaxation. I'd like you to start by loosening any tight clothing and finding a comfortable position and then closing your eyes. This method works by teaching you to identify tension in various parts of your body and then to identify the opposite of that tension, which is deep relaxation.

I'd like you to clench your **right hand** into a fist ... clench your right hand into a fist and just think about the tension in your right hand..... Feel the knuckles becoming white with tension... and then let it relax. Notice the contrast between the tension and the relaxation.... Once again, clench your right hand into a fist and study the tension in your right hand.... and then let it relax. Notice the pleasant contrast between tension and relaxation.

Now clench your **left hand** into a fist and study the tension in your left hand..... Then let it relax. Notice the contrast between tension and relaxation..... Once again, clench your left hand into a fist and study the tension in your left hand..... And then let it relax -- just let it go loose and limp and relaxed.....

Now bend your **right hand at the wrist** and point your fingers up to the ceiling. Study the tension in your right wrist and forearm, and then let it relax.. and feel the contrast between tension and relaxation. Once again, bend your right hand at the wrist and point your fingers up to the ceiling... Feel the tension in your right wrist and your forearm.... and then let it relax, noting the contrast between tension and relaxation.....

Now bend your **left hand at the wrist**; point the fingers up to the ceiling..... and then let it relax.... Just go loose and limp and very relaxed.... Once again, bend your left hand at the wrist, pointing the fingers up to the ceiling, study the tension in your left wrist and forearm..... and then let it relax. ... Notice the contrast between tension and relaxation. ....

Appendix K (continued)

Now I'd like you to **flex both of your bicep muscles** by bringing your hands up to your shoulders. Bring your hands up to your shoulders, flex both of your bicep muscles .... study the tension in your biceps.... and then let them relax.... It's not necessary to tense your muscles so much that you get a cramp, only just to tense them enough so that you can feel the tension. Once again.... flex your bicep muscles.... bringing both hands up to the shoulders, and then let them relax... just go loose and limp and relaxed.....

Now **shrug your shoulders** up to your ears. Study the tension in your shoulders and the base of your beck..... and then let your shoulders relax. Notice the pleasant contrast between the tension and the relaxation..... Once again, shrug your shoulders up to your ears..... study the tension in your shoulders and the base of your neck..... and then just let them relax... Just sag down...loose and limp and very relaxed.....

Now wrinkle up your **forehead** by raising your eyebrows up to the top of your head..... Study the tension in your forehead...and then let it relax..... Once again, raising your eyebrows up to the top of your head.....study the tension in your forehead....and then let it relax..let your forehead become more and more smooth, more and more relaxed.....

Close your **eyes** very tightly... Study the tension around your eyes, the bridge of your nose... Squint your eyes tightly, study the tension, and then let them relax.....Once again, squinting your eyes very tightly...study the tension around your eyes and the bridge of your nose... and then let them relax.... Let them relax and just slightly close.....

Now make a **big smile**, as if to touch both ears. Study the tension in your cheeks and in your mouth...and then let it relax, feeling the contrast betwen tension and relaxation.... Once again, making a big smile as if to touch your ears....study the tension in your mouth and your cheeks....and then let it relax...noticing the pleasant contrast between tension and relaxation.....

Now I'd like you to press your **tongue** up against the roof of your mouth... and study the tension inside your mouth....and then let it relax..... Once again, pressing your tongue up against the roof of your mouth...study the tension inside your mouth, and then let it relax....

Appendix K (continued)

Bury your chin in your chest.... Study the tension in the front of your neck, and your chin..... and then let it relax..... Notice the contrast between the tension and the relaxation..... Once again, bury your chin in your chest... and study the tension in your chin and the front of your neck.....and then let it relax.... feeling the pleasant contrast between tension and relaxation.....

Now, I'd like you to **press your head back**, against the back of a chair or the bed, or whatever. Study the tension in the back of your neck..... and then let it relax.....Once again, pressing your head back....study the tension in the back of your neck..... then let it relax.....let those muscles go loose and limp....and relaxed.....

Feel that relaxed feeling now..... in your forehead... your forehead is becoming more and more smooth, more and more relaxed.... That relaxed feeling is spreading down through your face...as your eyes relax.....your cheeks relax..... your mouth relaxes.... your jaw and your chin relax..... that relaxation flowing down into your neck..... down into your shoulders.... down into your biceps, so relaxed..... your forearms relaxed..... that relaxed feeling spreading down through your wrists...and into your heads... and all the way down to the tips of your fingers .....very warm....and very relaxed.....

Now, take a **deep breath** and hold it..... Take a deep breath and study the tension in your chest.....and then let it relax..... Once again, taking a deep breath...and holding it.... and study the tension in your chest.....and then let it relax... let your breathing become more and more regular.....more and more relaxed..... More relaxed with every breath.....

Now tighten up your **tummy muscles....** Study the tension in your abdomen.... then let those muscles relax.....Once again, tensing the stomach muscles, study the tension in your stomach....and then let them relax... Feel the pleasant contrast between tension and relaxation.....

Now tighten up your **buttocks** muscles..... Study the tension in your buttocks and hips...and then let them relax.....Once again, tighten up your buttocks muscles....study the tensions.... and them let them relax. Let that feeling of deep relaxation..... spread down into your buttocks and hips.....

Appendix K (continued)

Now, tighten up your **thighs**..... Study the tension in your thighs .... and then let them relax.....Once again, tighten up your thighs.....Study the tension in your thighs....and then let them relax... go loose...and limp...and relaxed.....

Now point your **toes towards your face**... Study the tension in your lower legs..... then let them relax..... Once again, pointing your toes towards your face... study those tensions..... and then let them relax.....

Now point your **toes away from your face**... Study the tension in your lower legs and your ankles.....then let them relax..... Once again, pointing your toes away from your face....study the tension in your ankles and lower leg.....and let them relax..... Feel that pleasant contrast between tension and relaxation.....

Now **curl up your toes**.... curl them up inside your shoes or whatever... Study the tension in your feet and your toes.....and then let them relax..... Once again, curl up your toes and study the tension in your feet and your toes.....and then let them relax....Let that feeling of relaxation.....flow down into your feet....and down into your toes.....

You are doing a good job of relaxing. Your whole body is starting to relax and now to help you relax even further....I am going to **review the different muscle groups** that we've relaxed, and as I mention each one, they will become even more relaxed than they are now... As I mention each muscle group.....it will relax even further than it already is... Your fingers relaxed....your hands and your wrists relaxed.....your forearms relaxed.....your biceps relaxed.....and that relaxed feeling flowing up into your shoulders..... along the back of your neck over the top of your head, are the muscles in your scalp relaxing... and the relaxation spreading down to your forehead...your forehead becoming more and more smooth....and more and more relaxed..... The relaxation...spreading down through your face..as your eyes relax.... and your cheeks and your mouth relax... and relaxed feeling spreading down into your chest....your breathing becoming more and more regular ... more and more relaxed.....The relaxation spreading down through your stomach.... around the sides and into your back... up and down your spine..... all those muscles relaxing... relaxation spreading down into your hips...and buttocks .....flowing down into your thighs... your calves relaxed....and your shins and ankles relax..... Deep relaxation flowing down into your feet...all the

Appendix K (continued)

way down into the tips of your toes.....Relaxation coursing through your veins...bathing your whole body....a peaceful, tranquil feeling of relaxation.

You are doing a good job of relaxing. Even when we are as relaxed as we think we can be...there is still an extra measure of relaxation. To help your body to become even more relaxed than it is.... I'm going to ask you to imagine yourself standing beside a **long, black wall,** on which the numbers from one to ten are painted... in great big, white numbers. I'm going to ask you to imagine yourself...standing there beside the number one.... and starting to stroll along beside the wall... and as you pass by each number, your body will become more relaxed... more and more relaxed as you pass by each number... Even more relaxed than it is now.....

Okay, imagine yourself standing beside the long black wall.....and starting to stroll along beside the wall now.... You pass by the number "One" and you become more relaxed..... And you pass by "two" ....and more relaxed..... And more relaxed as you pass by "three" ..... and "four" .. and more relaxed..... "Five" and more relaxed..... And more relaxed as you pass by "six" ..... and "seven" ..... And even though you don't think it possible... as you pass by "eight"..... you become even more relaxed..... And more relaxed as you pass by "nine" ..... and "ten" ..... Deep, deeply relaxed .....

Stop imagining that now..... and imagine your **special relaxation place.** It's your own private place...where you can go to relax..... Perhaps it's a place where you went as a child.....where you felt very secure....and very warm... and relaxed....Imagine yourself in your relaxation place....while you continue to soak up those feelings of deep relaxation.....

You've been doing a good job of relaxing.....Your whole body....is warm and comfortable.....very, very relaxed.....You're feeling really good because you've relaxed so deeply.....feeling more confident ..... more certain of your ability to cope with your problems..... more confident about your ability to handle the demands that are placed upon you..... . feeling really, really good to be so relaxed.....

You can become just as relaxed as you are now whenever you want to..... Simply by taking two four-count breaths..... a four-count breath in... and a four-count breath out..... and a four-count breath

Appendix K (continued)

in....and on the last four-count breath out.....letting your jaw sag..... letting that relaxed feeling spread down through your chin..... and up through your face.....and down through your neck.... and shoulders...and arms.....chest and stomach.....down through your forearms and wrist .... and hands and fingers....letting that relaxed feeling spread down through your hips and buttocks.....and down through your legs....your thighs, and your calves...and shins.... and ankles..... and all the way down to the tips of your toes..... This is called the 10-second relaxation exercise.....You can become just as relaxed as you are now....simply by counting to four as you breath in..... and counting to four as you breath out...and on that second four-count breath out...letting your jaw sag...and letting this wonderful feeling of relaxation spread down through your jaw and chin.... and up through your face..... and down through your neck...and all the way down through your body..... I'd like you to practice that right now.... practice this 10-second exercise.... making yourself very relaxed ..... So-o-o-o- relaxed..... You can become just as relaxed as you are now.....simply by doing this 10-second exercise..... placing your whole body in this stage of deep relaxation.....

You've been doing a really good job of relaxing.... Your whole body is warm and comfortable.... and very relaxed..... And now to help your body to return to its ordinary state..... I'm going to count **backwards from five to one**.... and as I count backwards from five.... you'll feel your body starting to wake up..... When I get to one.... you'll feel wide awake... and very, very relaxed..... "five"..... "four ..... "three" ..... you're beginning to wake up..... "two" ..... eyes starting to open ... and "one".

APPENDIX L

AUTO-SUGGESTIVE RELAXATION

AUTO-SUGGESTIVE RELAXATION

by

Dr. Bryan Hiebert

This is a follow-up program to progressive relaxation for people who can identify the feeling of deep muscle relaxation. Once a person can tell when their body is deeply relaxed, they can produce that feeling more quickly in their body. This program will help you learn to achieve that deeply relaxed state more quickly.

Begin by making yourself comfortable, hands laying peacefully in your lap, your right hand on your left hand. Now **clench your right hand** into a fist and study the tension in your right hand.... Feel the knuckles turning white with tension. Feel the tension even in your wrist and forearm.... And now, let it relax.... and feel the pleasant contrast between tension and relaxation..... Place your **right hand on your left** hand and let that feeling of deep relaxation spread into your left hand... as that tingly feeling of relaxation becomes more and more apparent in your left hand..... And now... let that relaxation start to spread.... up into your **wrists**..... as your wrists become more and more relaxed..... and the relaxation starts to spread up into your **forearms**.... up to your **biceps**..... both arms... growing more and more heavy..... And now the relaxation spreading up into your **shoulders**..... as your shoulders become more relaxed..... And the relaxation now spreading up the **back of your neck**.... all of the muscles in the back of your neck relaxing..... the tension draining away..... As the relaxation spreads up the back of your neck..... and across the **top of your head**..... as all the muscles in your scalp relax..... and that peaceful feeling of relaxation.... spreading now down into your **forehead**... as your forehead becomes more smooth..... and more relaxed..... Let your **eyes** relax.... the eyelids slightly closed..... the eyeballs floating peacefully in their sockets..... as the relaxation spreads down through your face.... as your **cheeks** relax..... your **mouth** and your **lips** relax..... your **chin** and your **jaw** relax..... and that peaceful feeling of deep relaxation spreads down from your face now.... and down the **front of your neck**..... as the muscles in your neck relax more and more deeply..... and the relaxation spreading down into your **chest**..... as your breathing becomes more relaxed..... more regular..... and more relaxed. The air flowing easily in and out of your lungs..... Breathing effortlessly..... as you relax more and more deeply..... And the relaxation now spreading down to your **stomach**..... all of the muscles in your abdomen relax..... and the relaxation spreading around your **sides**..... all of the muscles up and down your spine relaxing..... your whole body relaxing more

Appendix L (continued)

and more deeply..... with every breath..... the air flowing in and out..... more and more **peacefully**..... more and more relaxed.....with every breath..... And that feeling of deep relaxation..... now flowing down into your **hips** and **buttocks**..... and down into your legs..... as your **thighs** relax..... your **calves** and your **shins** relax..... your legs becoming more heavy with relaxation..... As that peaceful feeling spreads down into your **ankles**..... and into your feet..... spreading along the soles of your **feet**..... curling up over the tips of your toes..... your whole body now..... so very relaxed.....

Even when you are as relaxed as you are now.... there is still an extra measure of relaxation that you can achieve.... and to help you become even more relaxed.... I'm going to ask you to imagine yourself standing beside the long, black wall, on which the numbers from one to ten are painted... in large, white numerals. And I'm going to ask you to imagine yourself strolling along beside that wall..... and as you pass by each number..... you become more and more relaxed..... even more relaxed than you are now. Imagine yourself now, standing alongside the long, black wall.... and starting to stroll..... and as you pass by the number "one"..... and as you become more relaxed..... and more relaxed as you pass by "two"..... and "three" and more relaxed ..... and more relaxed as you pass by "four"..... and "five"..... "six" and more relaxed..... and more relaxed as you pass by "seven"..... and even though you didn't think it possible.... as you pass "eight" you become even more relaxed..... and more relaxed as you pass "nine"..... and "ten"..... so very relaxed, indeed..... peace and tranquility coursing through your veins..... your whole body... bathed in deep relaxation.....

Stop imagining the long, black wall now..... and imagine your relaxation place..... your special relaxation place..... that place where you go to relax..... Perhaps it was a spot where you visited as a child..... where the whole world seemed peaceful and secure..... and so very... relaxed..... Imagine yourself in your special relaxation place..... while you continue to soak up the wonderful feelings of deep relaxation..... more and more peaceful..... more and more relaxed with every breath.....

Your doing a good job of relaxing..... your whole body feels peaceful and calm..... You can become just as relaxed as you are now..... simply by doing the short 10-second relaxation exercise..... The four-count breath in and the four-count breath out..... A

Appendix L (continued)

second four-count breath in and on the second four-count breath out..... letting your jaw sag..... letting this deep feeling of relaxation spread down from your jaw to your chin..... up through your face..... across the top of your head..... down through your neck..... and into your shoulders..... down your arms to the tips of your fingers..... down through your body and into your legs..... and down through your legs..... to the tips of your toes..... Anytime you want to relax..... you can become just as relaxed as you are now..... simply by doing this short... 10-second relaxation exercise..... the four-count breath in..... the four-count breath out. A second four-count breath in and on the second four-count breath out..... letting your jaw sag..... letting this feeling of relaxation spread down through your jaw to your chin.... up through your face..... over the top of your head..... and down through your body..... to the tips of your toes..... Practice that now..... your relaxation cue.....
.....

You've been doing a really good job of relaxing.... Your whole body is warm and comfortable.... and very relaxed..... And now to help your body to return to its ordinary state..... I'm going to **count backwards from five**.... and as I count backwards from five.... you'll feel your body starting to wake up..... When I get to one.... you'll feel wide awake... and very, very relaxed..... "five".... "four".... "three".... you're beginning to wake up..... eyes starting to open... and "one".

APPENDIX M

SUMMARIES OF ANALYSIS OF VARIANCE

STAI-S, STAI-T, IPAT

Summary of Analysis of Variance STAI-S

Source	SS	df	MS	F	p
Total	9284.55	97			
Between Subjects	6468.36	48			
Group	482.42	2	241.21	1.85	.17
Subjects Within	5985.94	46	130.13		
Within Subjects	2816.19	49			
Time	627.22	1	627.22	13.50	.001
Group x Time	51.59	2	25.80	<1.00	.58
Subjects Within	2137.38	46	46.47		

Summary of Analysis of Variance STAI-T

Source	SS	df	MS	F	p
Total	10643.18	93			
Between Subjects	7121.14	46			
Group (A)	133.01	2	66.51	<1.00	.66
Subjects Within	6988.13	44	158.82		
Within Subjects	3522.04	47			
Time (B)	167.38	1	167.38		.14
Group x Time (AB)	31.53	2	15.76	<1.00	.81
Subjects Within	3323.13	44	75.53		

Summary of Analysis of Variance IPAT

Source	SS	df	MS	F	p
Total	13934.00	97			
Between Subjects	11134.89	48			
Group (A)	403.33	2	201.66	<1.00	.43
Subjects Within	10731.56	46	233.30		
Within Subjects	2799.11	49			
Time (B)	766.17	1	766.17	17.69	.001
Group x Time (AB)	41.00	2	20.50	<1.00	.63
Subjects Within	1991.94	46	43.30		

APPENDIX N

SUMMARIES OF ANALYSES OF VARIANCE

EMG, HR, PST

Summary of Analysis of Variance EMG

Source	SS	df	MS	F	p
Total	332.99	311			
Between Subjects	122.35	38			
Group (A)	9.98	2	4.99	1.60	.22
Subjects Within	112.37	36	3.12		
Within Subjects	210.64	273			
Time (B)	0.06	1	0.06	<1.00	.76
Group x Time (AB)	0.13	2	0.06	<1.00	.90
Subjects Within	21.52	36	0.60		
Condition (C)	52.94	3	17.65	23.23	.001
Group x Condition	3.92	6	0.65	<1.00	.53
Subjects Within	82.03	108	0.76		
Time x Condition	2.69	3	0.90	2.30	.08
Group x Time x Condition	5.16	6	0.86	2.20	.05
Subjects Within	42.19	108	0.39		

Summary of Analysis of Variance HR

Source	SS	df	MS	F	p
Total	49061.73	335			
Between Subjects	24303.23	41			
Group (A)	238.23	2	119.12	<1.00	.83
Subjects Within	24065.00	39	617.05		
Within Subjects	24758.50	294			
Time (B)	200.93	1	200.93	1.09	.30
Group x Time (AB)	339.12	2	169.56	<1.00	.41
Subjects Within	7178.00	39	184.05		
Condition (C)	2311.95	3	770.65	12.15	.001
Group x Condition	259.43	6	43.24	<1.00	.67
Subjects Within	7424.00	117	63.45		
Time x Condition	199.23	3	66.41	1.20	.31
Group x Time x Condition	351.84	6	58.64	1.06	.39
Subjects Within	6494.00	117	55.501		

Summary of Analysis of Variance PST

Source	SS	df	MS	F	p
Total	4360.44	383			
Between Subjects	1876.00	47			
Group (A)	66.94	2	33.47	<1.00	.44
Subjects Within	1809.06	45	40.20		
Within Subjects	2484.44	336			
Time (B)	53.24	1	53.24	4.76	.03
Group x Time (AB)	108.71	2	54.36	4.86	.01
Subjects Within	503.38	45	11.19		
Condition (C)	90.18	3	30.06	5.36	.002
Group x Condition	28.14	6	4.69	<1.00	.54
Subjects Within	757.25	135	5.61		
Time x Condition	56.96	3	18.99	3.01	.03
Group x Time x Condition	35.89	6	5.98	<1.00	.46
Subjects Within	850.69	135	6.30		

APPENDIX O

SUMMARIES OF ANALYSES OF VARIANCE

PARTICIPANT-MONITORED PHYSIOLOGICAL DATA HR, PST, RR

Summary of Analysis of Variance

Self-Monitored Heart Rate

Source	SS	df	MS	F	p
Total	28133.74	299			
Between Subjects	23129.68	29			
Group (A)	480.68	1	480.68	<1.00	.45
Subjects Within	22649.00	28	808.89		
Within Subjects	5004.06	270			
Pre/Post Relaxation (B)	2308.53	1	2308.53	146.24	.001
Group x Pre/Post	37.75	1	37.75	2.39	.13
Subjects Within	442.00	28	15.79		
Time (C)	51.57	4	12.89	<1.00	.52
Group x Time	122.47	4	30.62	1.94	.11
Subjects Within	1767.00	112	15.78		
Pre/Post x Time	9.21	4	2.30	<1.00	.42
Group x Pre/Post x Time	5.53	4	1.38	<1.00	.67
Subjects Within	260.00	112	2.32		

Summary of Analysis of Variance

Self-Monitored Peripheral Skin Temperature

Source	SS	df	MS	F	p
Total	5304.31	299			
Between Subjects	3182.63	29			
Group (A)	876.63	1	876.63	10.64	.003
Subjects Within	2306.00	28	82.36		
Within Subjects	2121/68	270			
Pre/Post Relaxation (B)	352.76	1	351.76	38.32	.001
Group x Pre/Post	11.05	1	11.05	1.20	.28
Subjects Within	257.00	28	9.18		
Time (C)	92.08	4	23.02	2.25	.07
Group x Time	7.37	4	1.84	<1.08	.95
Subjects Within	1144.00	112	10.21		
Pre/Post x Time	8.29	4	2.07	<1.07	.43
Group x Pre/Post x Time	10.13	4	2.53	1.18	.32
Subjects Within	240.00	112	2.14		

Summary of Analysis of Variance

Self-Monitored Rate of Respiration

Source	SS	df	MS	F	p
Total	4802.35	299			
Between Subjects	3687.18	29			
Group (A)	263.59	1	263.59	2.16	.15
Subjects Within	3423.59	28	122.27		
Within Subjects	1115.17	270			
Pre/Post Relaxation (B)	552.39	1	552.39	82.87	.001
Group x Pre/Post	23.86	1	23.86	3.58	.07
Subjects Within	186.65	28	6.67		
Time (C)	62.46	4	15.62	8.05	.001
Group x Time	8.84	4	2.21	1.14	.34
Subjects Within	217.27	112	1.94		
Pre/Post x Time	3.33	4	0.83	1.61	.18
Group x Pre/Post x Time	2.36	4	0.59	1.14	.34
Subjects Within	58.01	112	0.52		

APPENDIX P

PRETRAINING AND POSTTRAINING

RESPONSE FREQUENCIES SURVEY ITEMS

Pretraining Response Frequencies

Survey	Items	Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
2.	Previous Relaxation Training	yes	2	5	2	18.4
		no	12	12	16	81.6
3.	Planning to use other relaxation strategy	yes	5	4	5	28.6
		no	9	13	13	71.4
5.	Self-rated anxiety level now					
	not anxious	0	1	1	1	6.1
		1	5	2	3	20.4
		2	3	7	8	36.7
		3	4	6	5	30.6
	very anxious	4	1	1	1	6.1
	Mean		1.9	2.2	2.1	
6.	Self-rated anxiety level expected after training					
	not anxious	0	6	4	7	34.7
		1	6	12	8	53.1
		2	1	1	3	10.2
		3				
	very anxious	4	1	0	0	2.0
	Mean		0.9	0.8	0.8	
7.	Self-rated ability to relax at will					
	not at all	0	1	0	5	12.2
		1	6	8	7	43.0
		2	5	5	6	33.0
		3	2	2	0	8.2
	very well	4	0	2	0	4.0
	Mean		1.6	1.9	1.1	

Pretraining Response Frequencies (Continued)

Survey Items		Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
8.	Self-rated ability to relax expected following training					
	not at all	0	0	1	2	6.1
		1	0	1	1	4.1
		2	0	1	2	6.1
		3	5	10	8	47.0
	very well	4	9	4	5	37.0
	Mean		3.6	2.9	2.7	
9.	Rating of how beneficial program is expected to be in reducing your anxiety					
	not beneficial	0	0	1	1	4.1
		1	0	1	0	2.0
		2	1	1	3	10.2
		3	5	7	7	39.0
	very beneficial	4	8	7	7	45.0
	Mean		3.5	3.1	3.1	
10.	Expect to encounter stressors in the next five weeks					
		yes	10	11	13	69.4
		no	4	6	5	31.0
11.	Presently taking prescribed drugs					
		yes	3	7	3	27.0
		no	11	10	15	74.0
12.	Number of cigarettes per day					
	none	0	14	15	16	92.0
	less than 6	1	0	0	1	2.0
	between 7 and 9	2	0	1	1	4.1
	20 or more	3	0	1	0	2.0

Pretraining Response Frequencies (Continued)

Survey	Items	Category		Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
13.	Amount of coffee or tea per day	none	0	4	5	1	20.4
		3 cups or less	1	8	6	8	45.0
		4 to 7 cups	2	2	5	8	31.0
		8 cups or more	3	0	1	1	4.1
14.	Frequency of drinking alcoholic beverages						
		never	0	4	3	1	16.3
		less than once per week	1	4	2	5	22.4
		once or twice per week	2	3	6	6	30.6
		weekends only	3	1	3	5	18.4
		daily or four or more days per week	4	2	3	1	12.2
15.	Number of drinks per occasion	none	0	3	4	1	16.3
		1 or 2 drinks	1	9	8	12	59.2
		3 or 4 drinks	2	2	4	5	22.4
		5 or more drinds	3	0	1	0	2.0
16.	Type of alcoholic beverage	beer	1	5	10	7	45.0
		wine	2	11	10	14	71.4
		liquor	3	4	8	8	41.0

Posttraining Response Frequencies

Survey	Items		Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
C.1.	Self-rating of adherance to program activities	not at all	1	0	0	N/A	
			2	1	0		3.2
			3	2	2		13.0
			4	8	11		61.3
		very closely	5	3	4		23.0
		Mean		3.9	4.1		
C.2.	Method of practicing home relaxation						
		used supplied tape	1	12	N/A	N/A	86.0
		used mental recall	2	3			21.4
C.3.a.	Practiced relaxation using alternate proceedures in manual		yes	2	N/A	N/A	14.3
			no	12			86.0
C.3.b.	Alternate proceedures used						
		autogenic relaxation	1	1	N/A	N/A	7.1
		guided imagery	2	1			7.1
C.4.a.	Used other relaxation strategy		yes	5	5	4	29.0
			no	8	12	14	69.4
			no reply	1			2.0
D.2.	Self rated anxiety level now	not anxious	0	2	0	2	8.2
			1	8	8	10	53.1
			2	3	6	4	27.0
			3	1	3	1	10.2
		very anxious	4	0	0	1	2.0
		Mean		1.2	1.7	1.4	

Posttraining Response Frequencies (Continued)

Survey Items		Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
D.3.	Self-rated ability to relax at will after training					
	not at all	0	0	0	N/A	
		1	0	1		3.2
		2	7	1		32.3
		3	5	11		52.0
	very well	4	2	2		13.0
	Mean		3.0	3.0		
D.4.	Rating of how beneficial program was in reducing your anxiety					
	not beneficial	0	0	0	N/A	
		1	2	1		10.0
		2	7	2		29.0
		3	1	9		32.3
	very beneficial	4	4	5		29.0
	Mean		2.5	3.1		
D.5.	Benefits Gained from participating in relaxation training due to:					
	your efforts	0	0	0	N/A	
		1	1	0		3.2
	about half and half	2	7	10		55.0
		3	4	6		32.3
	explicitness of training proceedures	4	2	1		10.0
E.1.a.	Encountered stressors during training	yes	8	13	8	59.2
		no	6	4	10	41.0
E.1.c	Used relaxation to deal with stressors	yes	8	14	N/A	71.0
		no	6	3		29.0

Posttraining Response Frequencies (Continued)

Survey Items		Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
E.1.d.	Effectiveness of relaxation in dealing with stressors					
	not at all	0	0	0	N/A	
		1	1	0		3.2
		2	4	5		29.0
		3	1	5		19.4
	very effective	4	2	4		19.4
	no reply		6	3		29.0
	Mean		2.5	2.9		
F.1.	Rating of the adequacy of the manual alone as a self contained program					
	inadequate	0	0	N/A	N/A	
		1	3			21.4
		2	1			7.1
		3	6			43.0
	very adequate	4	4			29.0
	Mean		2.8			
F.2.	Rating of the importance of the tapes to the training program					
	not at all	0	0	N/A	N/A	
		1	1			7.1
		2	1			7.1
		3	2			14.3
	very important	4	10			71.4
	Mean		3.5			

Posttraining Response Frequencies (Continued)

Survey Items		Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
F.3.	Recommend the training program to a friend					
	never	0	0	0	N/A	
		1	0	0		
		2	1			3.2
		3	2	7		29.0
	definitely	4	11	10		68.0
	Mean		3.7	3.6		
G.1.	Number of cigarettes per day					
	none	0	14	16	17	96.0
	less than 6	1	0	0	0	
	between 7 and 19	2	0	0	1	2.0
	20 or more	3	0	1	0	2.0
G.2.	Amount of coffee or tea per day					
	none	0	5	5	2	25.0
	3 cups or less	1	8	5	11	49.0
	4 to 7 cups	2	1	7	4	25.0
	8 or more cups	3	0	0	1	2.0
G.3.	Frequency of drinking alcoholic beverages					
	never	0	3	4	11	16.3
	less than once per month	1	5	2	4	22.4
	once or twice per week	2	5	9	6	41.0
	weekends only	3	1	1	5	14.3
	daily or four or more days per week	4	0	1	2	6.1

Posttraining Response Frequencies (Continued)

Survey Items	Category	Self-Instruction (N=14)	Therapist-Instruction (N=17)	Control (N=18)	Summary %
G.5. Type of alcoholic beverage					
not applicable	0	2	3	1	12.2
beer	1	6	10	9	51.0
wine	2	6	9	10	51.0
liquor	3	4	8	7	39.0
no reply		1	0	0	2.0
Mean Expectancy Scores		2.50	3.47	2.72	

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