SINGLE-TRIAL TREATMENT OF ANXIETY AS A FUNCTION OF THE INTERACTION BETWEEN RELAXATION PROCEDURES AND PERSONAL RESPONSE MODES

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SINGLE-TRIAL TREATMENT OF ANXIETY AS A FUNCTION OF THE INTERACTION BETWEEN RELAXATION PROCEDURES AND PERSONAL RESPONSE MODES

BY

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A thesis submitted to the School of Graduate Studies
in partial fulfilment of the requirements for the degree of
Master of Science

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April 1986

St. John's Newfoundland

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ISBN 0-315-31000-6

Abstract

This study examines the importance of matching individual response modes and treatment modes in relieving anxiety. Fifty-five university students high on trait anxiety were categorized as expressing anxiety primarily through somatic symptoms, cognitive concerns, or in a mixed fashion. Half the subjects in each group were given single-session training in modified progressive muscle relaxation, and the other half received single-session training in guided imagery. Pre-post session state anxiety and pulse-rate measures were taken for all subjects. Other post-session measures included subjects' ratings of their level of absorption during the session and their perceived expectations of treatment effectiveness. The results did not indicate a significant difference between matched and unmatched groups, although all groups became significantly less anxious as a result of training. Because other studies have found matching of anxiety mode and treatment method to be important, it is conjectured that the absence of a matching effect in this study was the result of employing only a single session, or of the characteristics of the subject sample, or possibly of overlapping effects between relaxation methods. Further research directions to clarify these issues were discussed.

Acknowledgements

I wish to express my sincere appreciation to several people who made possible the completion of this thesis. I am indebted to my supervisor, Dr. Charles Preston, for his untiring direction, encouragement and enthusiasm. His invaluable guidance will always be remembered and appreciated. To my committee members, Dr. David Hart and Dr. Michael Stones, I am grateful for their suggestions and their unqualified willingness to answer my numerous questions. For statistical help, thanks are extended to Dr. Jack Strawbridge, Dr. Graham Skanes, Dr. Chu-In Lee, and Mrs. Cathy Lee, and for their time and answers, thank you to Dr. Albert Kozma and Dr. Michael Sherrick. I am further grateful to the Dean of Graduate Studies for financial support throughout the program. I also wish to acknowledge Dr. Paul Lehrer and Dr. Gary Schwartz for permission to use their questionnaires. Special recognition and thanks go to my brother Steve and his family, for graphic work and continued support and assistance throughout the project. And finally, to many fellow Psychology students, for guidance and patience with my innumerable technical questions - your tremendous help did not go unnoticed.

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Anxiety is an important and central concept in clinical psychology. The interactional approach allows due weight to be given to the complexities of the interaction among treatment variables and individual differences in the expression and experience of anxiety. More precisely, the interactional approach provides a research strategy for evaluating the importance of matching personal anxiety response modes with appropriate anxiety treatment.

In this thesis, the interactional approach is applied to anxiety treatment by assessing the effectiveness of two relaxation methods, progressive muscle relaxation and guided imagery, in the reduction of the somatic and cognitive components of anxiety. It is predicted that greater therapeutic benefit will result when a subject's anxiety response mode is matched to a relaxation method which focuses on that same mode. This prediction emerges from a consideration of both the theoretical and the research literature. The theoretical literature will be summarized first in order to derive a conceptual framework that deals adequately with the interactional approach and the concepts of anxiety and relaxation. Following the development of the conceptual framework, relevant research literature will be examined in regard to individual response patterns in anxiety expression, the process of relaxation, and relaxation procedures that have been applied to the treatment of anxiety.

Conceptual Background

Interactional approach. In recent years, it has become apparent that attempts to attribute the variance in human behavior to personality variables

without regard for situational variables, or to situational variables without regard for personality variables reflect an inadequate theoretical base for either research or clinical application. This does not imply that persons or situations are unimportant sources of behavioral variance; however, in many clinical and theoretical cases, it has been found that the proportion of variance attributable to the interaction between these variables outweighs the proportion attributable to either variable alone. Bowers (1973) argues "that both the trait and the situational positions are inaccurate and misleading and that a position stressing the interaction of the person and the situation is both conceptually satisfying and empirically warranted" (p. 125).

An interactionist or biocognitive view denies the priority of either traits or situations in the determination of behavior; instead, it fully recognizes that any main effects which do emerge will depend primarily upon the particular sample of settings and individuals. In other words, interactionism argues that "situations are as much a function of the person as the person's behavior is a function of the situation" (Bowers, 1973, p. 152).

As Endler (1975) observes, the concept of interaction is not new. The seventeenth century physicist Robert Hooke proposed Hooke's Law which states that "within the elastic limit, strain is proportional to stress. For fluids and gases, elasticity has a different meaning" (Bridgwater and Kurtz, 1963, p. 637). Stated differently, the elasticity of a substance is an interaction between the nature of the material and the degree of situational stress. By extension, Hooke's Law may be applied to the concept of anxiety in that anxiety reactions are an interactive function of personality traits (the nature of the material) on the one hand, and of

situational stress on the other (Endler and Shedletsky, 1973; Spielberger, 1972; Hodges, 1968).

Endler (1975) summarizes some of the data based on the variance partitioning methodology that deal with the situation versus person controversy. Endler and Hunt (1969) for example, have presented self-report anxiety data based on their S-R Inventories of Anxiousness (Endler et al., 1962; Endler and Hunt, 1969) for 22 samples of males and 21 samples of female subjects. They found that on the average, individual differences accounted for 4.44 percent of the variance for males and 4.56 percent of the variance for females, while situational variance accounted for 3.95 percent of the variance for males and 7.78 percent of the variance for females. However, each of the two-way interactions (Persons by Situations, Persons by Modes of Response, and Situations by Modes of Response) accounted for about 10 percent of the variance.

Furthermore, Bowers (1973) presents a summary of 11 studies including data based on self-report measures of anxiousness and hostility, self-ratings of feelings of trust, affiliation, affect, etc., and actual or observed behavior related to honesty, smoking, talking, etc. He found that the person by situation interaction accounted for more variance than either the person or the situation in 14 out of 18 possible comparisons. Specifically, Bowers (1973) found that for these studies, the average variance due to persons was 12.71 percent, that due to situations was 10.17 percent, and the variance due to person by situation interaction was 20.77 percent. As all of these studies indicate, interactions accounted for a greater portion of the variance than either person or situation variables alone. It should be noted however, that more recently, researchers have applied several

methodological innovations to the study of personality (see, for example, a review by Rorer and Widiger, 1983).

Nevertheless, Mischel (1973) suggests that it is insufficient to acknowledge the existence of interactions. One should also be able to predict the nature of the interaction in order for the science of personality to advance. Endler (1975) describes such a predictive model, a person-situation interactional model for anxiety, in which anxiety as a personality trait is viewed as having three factors: interpersonal anxiety, physical danger anxiety, and ambiguous anxiety. The multidimensional nature of this measure enables one to examine the interaction between the trait aspects of anxiety and situational stress in producing actual states of anxiety. However, Endler points out that in order for this person by situation interaction to be effective in inducing state anxiety, it is necessary for the trait measure to be congruent to the threatening situation. For example, it can be predicted that the trait of interpersonal anxiety will interact with an interpersonal threat situation to elicit an actual state of anxiety although it will not interact with a physical threat situation.

In summary, Endler (1975) explains that views regarding traits as the prime determinants of behavior have led to much misguided research, while an approach which focuses exclusively on situational factors can also be misleading. He further remarks that due to the complexity of human behavior, psychologists must be willing to tolerate ambiguity and complex approaches rather than turning to simple solutions in terms of either traits or situations. A specific consideration of interactions would improve personality description "by emphasizing what kinds of responses individuals make with what intensity in various kinds of situations"

(Endler and Hunt, 1966, p. 336).

The concept of anxiety. Major interest in the present research lies in the interaction between individual anxiety response modes (personality variables) and alternative treatment procedures (situational variables). Anxiety is a widespread phenomenon which has received considerable attention in both the research and clinical literature. Anxiety has been shown to have major effects on such diverse processes as perceptual abilities, performance proficiency, learning, memory, cognition, and sexual responsivity. Nietzel and Bernstein (1981) note that every major theory of personality and psychopathology has emphasized anxiety as a necessary explanatory concept.

Anxiety, however, is a highly complex hypothetical construct. Psychologists have studied state and trait anxiety, conditioned or reactive anxiety, and cognitive, behavioral, or physiological anxiety response components. Furthermore, anxiety clearly involves both personality and situational variables as previously noted in Endler's (1975) summary of self-report anxiety data. Moreover, a wide variety of assessment devices has been employed to measure anxiety, such as psychophysiological measures, behavioral measures, and self-report measures (Nietzel and Bernstein, 1981). And finally, several types of treatments, both psychological and pharmacological, are available to deal with anxiety. Since Lang's (1968) Three-Systems Model of anxiety provides some of the rationale for the present study, it will be described briefly.

Lang's Three-Systems Model of anxiety. According to Lang (1968), while the experience of fear invites us to perceive it as a unitary feeling and thus a

correlated set of similarly determined responses, the measurement of fear behavior leads to an opposite result. That is, anxiety is not a unitary system. Rather, it is composed of three somewhat independent dimensions (cognitive/subjective, physiological, and behavioral). Thus, different measures produce different estimates of fear intensity and furthermore, different variables appear to control different aspects of the fear response. He notes, for example, that large individual differences are frequently observed in subjects' response to desensitization. Some show gains in overt behavior, and others may report less fear or appear more relaxed, without any change in approach behavior.

In summary, Lang (1968) observes that most therapies are generally aimed at a broad construct called fear or anxiety. However, one must approach treatment with a different strategy given that the responses used to assess the anxiety construct show very little unity. This ultimately suggests, therefore, that therapy should be a multidimensional process in which specific techniques are critically and systematically selected and appropriately applied to the different behavioral systems we are attempting to change - whether verbal, overt motor, somatic, affective, or cognitive.

Hence, in the clinic, the global anxiety complex must be analyzed in terms of its components. For example, a client's presenting complaints may involve clearly defined symptoms in one or more of the three anxiety response channels (cognitive, behavioral, and physiological). Such a desynchrony of anxiety channels would therefore require both multi-method assessment and multi-component treatments that give due weight both to the individual's characteristics and environmental variables present in the situation at hand.

Anxiety and relaxation. In recent years, the high prevalence of anxiety has encouraged psychologists among others to devise a variety of procedures for anxiety management. As summarized by Cormier and Cormier (1979), relaxation training is one of the more promising techniques for treating anxiety, and other clinical problems. Originally introduced by Jacobson (1929) as a procedure called "progressive relaxation," muscle relaxation was later described by Wolpe (1958) as an anxiety-inhibiting procedure within his systematic desensitization strategy. Others, such as Bernstein and Borkovec (1973) and Goldfried and Davison (1976) have also written extensively on relaxation training. Cormier and Cormier (1979) cite several studies in which relaxation training has been employed for clients with insomnia, high blood pressure, epileptic seizures, asthma, tension headaches, painful labour, and of course, as an anxiety-reduction procedure.

Other authors have discussed autogenic training. In addition, more recent approaches using clients' imaginal capacities have coincided with the current development of various cognitive-behavioral therapies (see later).

Summary. In view of the complexities of the interactional approach, the anxiety syndrome, and anxiety management procedures, it is obviously important, both clinically and theoretically, to identify the variables in each of these areas relevant to predicting the outcome of therapy. A greater understanding of the relationship between client characteristics and therapeutic variables should increase the efficacy of the behavior change process and more people might therefore remain in therapy and show stronger therapeutic gains (Norton,

Dinardo, and Barlow, 1983). By analogy with pharmacological prescription, not every drug compound is equally effective with every patient; relevant indication must be carefully considered.

Research Background

In psychology also, concern with tailoring treatments to the unique characteristics of individuals is not new. Almost two decades ago, Paul (1969) posed the important question... "What treatment, by whom, is more effective for this individual with that specific problem, under which set of circumstances, and how does it come about?" (p. 44). Behavioral research on clinical phobias has generally lumped together patients with the same diagnosis and randomly assigned them to treatments to address theoretical or procedural questions. As Borkovec (1976) stated, this research "almost completely ignored the role of individual differences in anxiety-response components, despite Paul's (1969) warning that the question of technique effectiveness cannot be divorced from the subject characteristic considerations" (p. 274). Furthermore, according to Mathews et al. (1981), "It would clearly be of some practical and theoretical value to predict who would benefit most from a particular method... Unfortunately, to date, few useful predictors have been found" (p. 142-143).

Since Paul's (1969) question, researchers have attempted to determine which client characteristics could act as useful predictors of therapy outcome. For example, in an experiment to illustrate the importance of observing interactions between introversion/extroversion and hypnotizability, Preston (1982) found that

extroverts were more hypnotizable in a group situation, while the opposite was true for introverts. This suggests that the clinician must be responsive to the cues provided by the client and then appropriately tailor various aspects of the treatment; in this case, the environmental contingencies.

In the area of phobias and anxiety, several studies have attempted to isolate and match client characteristics to specific treatment procedures. Lang's (1968) Three-Systems Model of anxiety, for example, has provided researchers with one useful form of individual distinction. Researchers, such as Rachman (1976) have also argued that there are distinct patterns of experiencing anxiety and that these might be differentially responsive to different types of treatment procedures. Norton et al. (1983) review some of the anxiety research which has considered the matching of specific patterns of anxiety to treatment (Borkovec, 1973; Shipley, Butt, Horwitz, and Farby, 1978; Ost, Jerremalm, and Johansson, 1981; Ost, Johansson, and Jerremalm, 1982; Shahar and Merbaum, 1981; Norton and Johnson, 1983).

Individual response patterns in anxiety research. Borkovec (1973) was interested in the interaction between external cues (suggestion of improvement) and internal responses. He characterized snake phobics into four groups (strong versus weak pulse rate reactivity and strong versus weak perceived reactivity) based on their heart rate response when exposed to a snake, and on their responses to the Mandler, Mandler, and Uviller (1958) autonomic perception questionnaire. Following initial assessment, the groups received information and instructions for interacting with snakes prior to being retested on their ability to

approach the snake. As predicted, repeated testing and intervening instructions of improvement had a greater effect on fearful subjects displaying weak internal responses than on fearful subjects displaying strong internal responses. It was suggested that subjects who were highly reactive, physiological responders did not improve as much as low physiological responders to a cognitive type of treatment procedure. Furthermore, it was noted that it may be worthwhile to view the four subject groups as special analogues to different clinical groups, and to draw implications for differential treatment.

In the study by Shipley et al. (1978), a group of patients was exposed to a videotape of a stressful medical procedure of endoscopy prior to receiving upper-gastrointestinal endoscopy. The researchers were interested in the interaction between subject characteristics (repressors versus sensitizers) and number of exposures to the tape (0, 1, or 3). Subjects were divided into groups using the Modified Repression-Sensitization Scale developed by Epstein and Fenz (1967). Repressors are characterized as avoiding anxiety information while sensitizers generally seek information to reduce anxiety. Regarding the interaction between subject characteristics and preparation message, of those subjects who did not view the videotape, those with a sensitizer cognitive coping style had greater increases in heart rate during the actual endoscopy than those with repressor coping style. Sensitizers who were exposed to one viewing, however, had smaller heart rate increases and were evaluated as less anxious than repressors having one viewing. No difference existed between repressors and sensitizers who viewed the videotape three times. This was explained in light of the hypothesis that repressors maintain low arousal in the face of threat by avoiding information

seeking and thoughts. Thus one exposure to the tape weakened their repressing defences and left them in an aroused state similar to unprepared sensitizers. These results suggest that repressors and sensitizers might benefit from different preparation strategies.

Norton et al. (1983) caution, however, that the latter two studies provide only tentative support for the use of pretreatment measures of components of anxiety for predicting therapy outcome. In these cases, only one dimension of anxiety was measured and only one type of treatment was used. Recent studies have provided more direct evidence.

Ost and colleagues (1981, 1982) conducted two rather similar studies which demonstrated the effectiveness of matching treatments to the response patterns of phobic patients. In the first study (Ost et al. 1981), psychiatric outpatients with social phobia were assessed using a videotaped social interaction test. On the basis of their reaction to the tape situation, patients were divided into behavioral or physiological reactors. Half the subjects in each group were randomly assigned to either social skills training (a behaviorally-focused method) or applied relaxation (a physiologically-focused method). The hypothesis was supported by the data to a large extent; that is, irrespective of response pattern, the group treated with a method that matched its response pattern achieved better results than the group treated with the inappropriate method. Among behavioral reactors, social skills training was significantly better than applied relaxation in six of the ten measures, and for the physiological reactors, applied relaxation was significantly better than social skills training on three of the measures.

In their subsequent study, Ost et al. (1982) assessed claustrophobic

outpatients in a small test chamber and divided them into groups of behavioral and physiological reactors. Within each group, patients were assigned to one of exposure (a behaviorally-focused method), applied relaxation (a physiologically-focused method), or a waiting-list control. Although the two active treatments both yielded a larger reduction in phobic behavior than the waiting-list control; nevertheless, irrespective of response pattern, the groups receiving treatment methods matched to their response pattern (e.g. physiological reactors to applied relaxation) achieved better results than the unmatched groups. All clients that received the appropriate treatment were considered clinically improved, compared to 50 percent of the clients receiving the unmatched treatment. The researchers summarized these results by concluding that it does seem important carefully to consider individual differences in response patterns when planning treatment at least for claustrophobic patients.

Shahar and Merbaum (1981) pursued Borkovec's (1973) suggestion that physiological reactivity and autonomic perception are separate dimensions which in combination might predict an effective response to different anxiety reduction procedures. Subjects with interpersonal anxiety were characterized as strong reactors and strong perceivers (SS) or weak reactors and strong perceivers (WS). Physiological reactivity was assessed by the difference in a 15-second pulse rate measure before and after hearing a tape-recorded description of a stressful situation. Autonomic perception was determined by a modified version of the Mandler, Mandler, and Uviller (1958) autonomic perception questionnaire. Subjects were randomly assigned to either Systematic Rational Restructuring (a primarily cognitive method), Self-Control Desensitization (a primarily

physiological method), or a waiting-list control. The hypothesis was partially supported on some measures. SS subjects achieved better therapeutic gains with desensitization, while WS subjects improved more with rational restructuring.

As Norton et al. (1983) point out, this suggests that a person's response to treatment may be related not only to the person's absolute level of responding in each of the three dimensions, but also to the person's awareness of that dimension. As they suggest, people's self-evaluation of their experience of fear predicts their responses to various anxiety-reducing procedures. Furthermore, since all people who experience fear will not benefit from the same treatment program, an important consideration for designing treatment programs is an assessment of the individual's pretreatment pattern of cognitive, physiological, and behavioral measures in relation to fear stimuli.

In addition, an important consideration for treatment is an analysis of the components within the treatment procedures. One widely used treatment for anxiety is relaxation. Despite the frequently observed findings indicating that differential effects are elicited by different forms of relaxation (Paul, 1969), investigators have generally treated relaxation methods as if they were equally effective with all clients. Furthermore, investigators have generally accepted the phenomenon of relaxation without examining its component processes. The following sections will further address the subject of relaxation.

The process of relaxation. In their review of the psychobiology of relaxation and related states, Davidson and Schwartz (1976) propose the existence of several elements in the relaxation process: cognitive, somatic, and attentional (active

versus passive). The present study addresses in particular the distinction between cognitive and somatic components of the anxiety experience and of relaxation procedures. Upon examining the role of cognitive and somatic components in relaxation, Davidson and Schwartz (1976) note that some of the most provocative research on relaxation has emerged from the systematic desensitization literature. In its original conception (Wolpe, 1958), systematic desensitization employed progressive relaxation (Jacobson, 1938) as a response antagonistic to internally-generated anxiety-provoking stimuli. The main process involved in this technique, reciprocal inhibition (Wolpe, 1958) involved superimposing relaxation on the anxiety reaction. Given Jacobson's (1938) conclusion that the generation of thoughts and feelings is impossible when the body parts involved are relaxed, one might question if it is possible to be somatically relaxed and cognitively anxious simultaneously. Davison (1966) cites numerous studies (e.g. Solomon and Turner, 1962; Smith et al., 1947) from which the following inescapable conclusion is drawn: A state of complete muscular relaxation (defined as the absence of activity at the most peripheral level) is not incompatible with cognitive anxiety. As one client expressed it, "My body is all relaxed, but my mind is in a knot".

In 1968, Rachman offered a theoretical conception of relaxation by differentiating muscular relaxation from "mental" relaxation. He further explained that "what has been described in a number of experimental and clinical reports as 'relaxation' may be simply a feeling of calmness - and have very little to do with the actual state of tension in the musculature" (p. 160).

Davidson and Schwartz (1976) conclude that there exists a distinction between muscular and "mental" relaxation. Although one may not necessarily

depend upon the other, the experience of relaxation will likely be more profound when both are present.

Given that evidence exists suggesting the presence of mode-specific manifestations of anxiety in different individuals or in the same individuals at different times (e.g. Corah, 1964; Eysenck, 1961), Davidson and Schwartz (1976) propose that relaxation procedures differ in their effect, depending upon the mode in which anxiety is experienced. The two following sections outline their description of several relaxation procedures, and examine the relevant research on different relaxation techniques.

Relaxation procedures. 1. Progressive Relaxation (Jacobson, 1938) involves primarily the somatic system, incorporates active and passive elements, and is probably the most extensively employed relaxation technique today. The effectiveness of even brief training has been well established. This method of relaxation involves the systematic focus of attention on the various gross muscle groups of the body. The individual is first instructed to actively tense each muscle group for a few seconds and then to release his muscles and relax. The emphasis on progressive relaxation is on the self-generation of somatic behavior and the self-regulation of attention to somatic events. Tensing each major muscle increases the saliency of somatic cues, enabling subjects to passively attend to specific body parts while facilitating complete somatic relaxation.

2. Hypnotic Suggestion is a widely used relaxation technique (e.g. Barber and Hahn, 1963; Paul, 1969). This procedure involves the self-generation of cognitive behavior, with passive attention to somatic processes present at the

time. Several authors (e.g. Shor, 1959, 1962; Orne, 1959) have suggested that hypnotic suggestion usually involves an alteration of cognitive orientation, which primarily affects a shift in attention from the external environment to internally generated cognitive activity. The active generation of imagery with occasional attention to somatic processes seems to be an important component in the execution of a hypnotic suggestion.

3. Autogenic Training was developed in the early 1900's by J.H. Schultz, a Berlin neuropsychiatrist. After sufficient practice; this technique involves passive somatic and cognitive attention. Sitting in an armchair in a quiet room with eyes closed, the individual is instructed to "passively concentrate" on the repetition of verbal formulae (e.g. "my right arm is warm"). Following warmth training of all the limbs, concentration focuses on cardiac activity using the formula, "Heartbeat calm and regular." Then the respiratory mechanism is introduced with "It breathes me", followed by a warmth suggestion in the abdominal region ("My solar plexus is warm"). Finally, the formula, "My forehead is cool" is introduced.

4. Zen Meditation originated in China hundreds of years ago. One form of Zen Meditation is the most basic breathing technique. A product of this form of meditation is increased feelings of relaxation and calmness (Maupin, 1969). Zen Meditation has been classified as involving passive somatic attentional self-regulation.

5. Transcendental Meditation (TM) is a simple cognitive technique entailing the silent repetition of a mantra - a Sanskrit word or sound - to create a "concentrated attitude." TM involves the self-generation of a cognition (a mantra) which eventually gives way to passive attention to the mantra "repeating

itself. TM has been described as initially requiring both active and passive cognitive components. Individuals practicing TM typically report increased feelings of relaxation and greater emotional stability (Wallace, 1970).

6. Yoga encompasses many diverse forms. One version, Hatha Yoga, incorporates two procedures : (a) bodily postures, or asanas, and (b) breath control, or pranayama. Both components of Hatha Yoga involve active self-generation of somatic behavior. Practicing this technique has been known to increase relaxation and foster positive mental health.

Davidson and Schwartz (1976) note the extreme variability that exists in methodology and procedure, making meaningful comparisons between relaxation studies very difficult. It becomes necessary, therefore, to examine some recent studies designed to compare different relaxation techniques.

Studies comparing relaxation procedures. Various studies have compared progressive muscle relaxation to other relaxation methods (e.g. Paul, 1969; Borgeat, 1983; Woolfolk, Lehrer, McCann, and Rooney, 1982; Lehrer, Woolfolk, Rooney, McCann, and Carrington, 1983; Heide and Borkovec, 1983). For example, in his comparison of the effects of different relaxation techniques, Paul (1969) found that in general, both progressive relaxation training and hypnotic suggestion produced significantly greater effects than a self-relaxation control procedure. However, progressive relaxation training produced significantly greater reductions than hypnotic suggestion in systems not under direct voluntary control (i.e. heart rate, tonic muscle tension).

Borgeat (1983) compared progressive muscle relaxation to subliminal

relaxation, a technique using the relaxing effect of music mixed with subliminal relaxation suggestions. The researcher found no significant difference between the physiological effects of the two techniques. However, progressive relaxation was more effective in reducing the EMG levels of the more anxious subjects (as measured on the IPAT Anxiety Scale, Catell and Sheir, 1957). Results were interpreted in light of Benson's (1975) hypothesis that a general and natural "relaxation response" exists which can be facilitated by a diversity of techniques.

Although both of these studies found progressive relaxation to be more effective on certain physiological measures, neither one assessed the subjects' mode of responding to anxiety prior to random treatment assignment. Thus, it is possible that different results might have been found if subjects had been matched to treatment type. It is interesting that in his discussion, Paul (1969) describes progressive relaxation as being more effective than hypnotic suggestion in producing desired physiological changes. Hence, it might be that subjects strong in cognitive responding may primarily produce cognitive changes from a "cognitive" method. Testing this assumption would necessitate assessment of mode of responding to anxiety and subsequent matching to a treatment procedure which focuses on that same mode.

In Heide and Borkovec's (1983) study, subjects experiencing general tension were given one session of training in each of two relaxation methods - progressive relaxation and mantra meditation. Pre-post treatment rating scales and physiological measures generally displayed reductions due to treatment, with a significantly greater decrease in anxiety/physiological activity in the progressive relaxation condition. Results also suggested a higher incidence of relaxation-

induced anxiety with meditation than with progressive relaxation. The researchers explained this finding by the assumption that focused cognitive attention is more anxiety provoking and/or less facilitative of relaxation than focused somatic attention.

Progressive relaxation and mantra meditation were also compared in the Lehrer et al. (1983) study. Anxious subjects were randomly assigned to one of these procedures or a control group. Results showed that both techniques appeared to ameliorate a broad array of symptoms. However, progressive relaxation generally produced a more powerful therapeutic effect than meditation. Furthermore, limited support was provided for Davidson and Schwartz's (1976) hypothesis regarding the specificity of effects of relaxation compared to meditation. However, the only measure to provide this support was forearm EMG levels, which were lower for progressive relaxation than for meditation, and lower for meditation than for the control group. Paper and pencil measures revealed no differences in cognitive versus somatic symptoms between progressive relaxation and meditation. They concluded that despite the relative similarity of subjects' responses to the two relaxation procedures, it is possible that certain problems may warrant one technique over the other, and for various disorders, combinations of techniques may produce more powerful therapeutic effects than either method alone.

Despite the findings in both of the latter studies that progressive relaxation was more effective than meditation, several concerns come to mind. First, it is possible that different findings might have emerged if the subjects were matched to treatments based on their individual mode of responding to anxiety. Although

Lehrer et al. (1983) employed dependent measures which tapped cognitive and somatic levels of arousal, these anxiety components were not included as criteria for treatment assignment.

To further elaborate this point, it is noteworthy that in a study by Woolfolk et al. (1982), both progressive relaxation and meditation were found to be effective in ameliorating stress with both treatment groups manifesting significant improvement on a number of dependent measures. Moreover, on a daily questionnaire to measure cognitive and somatic arousal, the meditation group more frequently reported lowered levels of cognitive arousal and the progressive relaxation group more frequently reported lowered somatic arousal, although these differences failed to reach statistical significance. Perhaps a more distinctive pattern of effects might have therefore emerged between both techniques if subjects had been assigned to treatments based on their primary mode of responding to anxiety.

Another point of concern is the conclusion drawn by Heide and Borkovec (1983) that "focused cognitive attention is more anxiety provoking and/or less facilitative of relaxation than focused somatic attention" (p. 181). This conclusion is open to question because no attempt was made to isolate subjects' mode of responding (cognitive versus somatic) prior to treatment assignment. To illustrate this point, when Norton, Rhodes, and Hauch (in press) considered the characteristics of subjects experiencing relaxation and relaxation-induced anxiety, relaxation-induced anxiety was found to occur only when a mismatch occurred between a persons's typical expression of anxiety (i.e. cognitive or somatic) and the type of relaxation procedure (i.e. mantra meditation versus progressive

relaxation).

It thus appears that when researchers specifically consider individual anxiety characteristics in studying subjects' responses to relaxation, more striking differences are found. The following three studies investigated this idea.

Schwartz, Davidson and Goleman (1978) noted that unfortunately, most anxiety questionnaires provide a single, global score reflecting an unknown mixture of different forms of anxiety. Also, they pointed out that data are currently available that indicate that different relaxation procedures elicit distinct patterns of autonomic activity (e.g. Paul, 1969). Hence, Schwartz et al. conducted their study with two goals in mind: (a) to develop an anxiety symptom checklist with separate cognitive and somatic scales, and (b) to assess the efficacy of a somatic procedure and a cognitive procedure in the differential reduction of the cognitive and somatic components of anxiety.

Individuals who were practicing either meditation or physical exercise for at least one month were the subjects of this study. To assess the first goal of the study, all participants completed a cognitive-somatic trait anxiety inventory in the context of a larger battery of tests. This Cognitive-Somatic Anxiety Questionnaire (CSAQ) was constructed by selecting items from well-known questionnaires that were independently agreed upon to reflect cognitive or somatic anxiety. On a 5-point scale, subjects were asked to "rate the degree to which you generally or typically experience this symptom when you are feeling anxious". Separate correlations between the cognitive and somatic scales of the CSAQ and the Trait form of the Spielberger State-Trait Anxiety Inventory were both highly significant ($r = 0.67$ and 0.40, respectively for both, $p < .001$). For the entire

sample, the cognitive and somatic scales of the CSAQ were modestly correlated and their shared variance was sufficiently low to allow for patterning of results as a function of different training techniques ($r = 0.42$). However, further data regarding reliability and internal consistency of the CSAQ were not reported in this study.

Regarding the second goal of the study, results indicated that meditators reported less cognitive and more somatic anxiety than exercisers, and conversely, that exercisers reported less somatic and more cognitive anxiety than meditators. Moreover, the two groups did not differ on overall anxiety but rather on the specific patterning of anxiety subsystems. This is consistent with the hypothesis that the practice of meditation versus exercise may be associated with the differential patterning of cognitive and somatic symptoms of anxiety. The authors note that these findings, along with other findings in the literature, question the notion of a generalized relaxation response as a complete description of the nature of relaxation. They suggest that different techniques employed to elicit relaxation may be associated with specific consequences, which in turn may be a function of the underlying systems directly affected by the procedure in question.

Consequently, Schwartz et al. (1978) proposed that relaxation consists of:

> **a generalized reduction in multiple physiological systems (termed the relaxation response by Benson) and a more specific pattern of changes superimposed upon the general reduction, which is elicited by the particular technique employed. The present line of reasoning highlights the importance of considering these components in any complete account of anxiety and its reduction. (p. 327)**

Lehrer, Schoicket, Carrington, and Woolfolk (1980) tested an hypothesis

that training in meditation has relatively greater effects on indices of cognitive anxiety, while training in progressive relaxation has greater effects on measures of somatic arousal. Thirty-six volunteer subjects were assigned to either progressive relaxation, clinically standardized meditation, or a waiting list control. Following four weekly sessions of group training (for the treatment groups only), all subjects were tested in a mildly stressful laboratory session. Findings indicated that the meditation group exhibited fewer symptoms of cognitive anxiety than the other two groups, and the progressive relaxation group reported more sensations of muscular relaxation than the other groups. These results are consistent with those of Schwartz et al. (1978) and with the Davidson and Schwartz (1976) hypothesis that meditation differentially effects cognitive symptoms of anxiety while progressive relaxation differentially effects somatic symptoms.

Finally, Norton and Johnson (1983) studied the effectiveness of two different relaxation procedures in treating snake anxious people who expressed anxiety in primarily a cognitive or primarily a somatic manner (as evaluated using the CSAQ, Schwartz, Davidson, and Goleman, 1978). Half the subjects in the cognitive anxiety group and half the subjects in the somatic anxiety group were randomly assigned to either Agni Yoga (hypothesized as being more effective for reducing cognitive anxiety) or progressive relaxation (hypothesized as being more effective for reducing somatic anxiety), resulting in four groups. Following training sessions of equal length, measures were taken to evaluate anxiety to a snake. These measures included approach distance, subjective fear, pulse rate, and a snake fear scale.

The results partially supported Davidson and Schwartz's (1976) hypothesis

that cognitive and somatically anxious subjects would benefit more from different relaxation procedures. It was clearly demonstrated that progressive relaxation was more effective for reducing somatic anxiety than cognitive anxiety. However, the effects of Agni Yoga on cognitive anxiety were less clear. Nevertheless, the researchers interpreted these findings as providing evidence that synchronous changes in behavioral, physiological and subjective dimensions of anxiety might be more likely to occur when the anxiety treatment procedure is matched to the type of anxiety the person is experiencing. Ultimately, this suggests that to tailor a treatment to an individual's type of anxiety may improve general treatment outcome while producing more synchronous changes in the three anxiety dimensions. The present study specifically addresses this problem.

Approach and hypothesis. The research review provides support for the interactional view that a consideration of both the person and the situation is important in understanding and treating anxiety. The present study was designed to further address the hypothesis that people who experience cognitive anxiety may benefit more from a "cognitive" relaxation procedure, whereas those who experience somatic anxiety may benefit more from a procedure which focuses on somatic anxiety. In other words, a person's subjective evaluation of cognitive and somatic anxiety will be effective for predicting changes produced by different (i.e. cognitive or somatic) relaxation procedures. Norton and Johnson (1983) provide the best prototype design for the present research. There are five ways, however, in which the present study differs from the studies reported in the literature, and more particularly from the Norton and Johnson (1983) study.

1. In order to adequately study the effects of mode-specific relaxation methods in anxiety treatment, it is necessary to obtain a subject sample which manifests a sufficiently high level of anxiety. Many of the studies previously cited have employed a clinically anxious (e.g. phobic) group. However, problems may arise when using a clinical group, such as the difficulty in obtaining the appropriate number and type of subjects. Also, among a clinically anxious population, anxiety is often confounded with other psychological concerns, and it would thus become difficult to distinguish the variance attributable to anxiety from the variance attributable to confounding variables. Fortunately, the college student population provides a large sample of readily available anxious, but otherwise normal individuals.

The use of a college student sample will allow for comparisons between the results of the present study and the Norton and Johnson (1983) study. It will also facilitate better experimental control, given that the lab situation will be consistent across subjects. For example, in the lab setting, the effectiveness of treatment is not confounded with such things as length of practice, extraneous distractions, etc. Finally, since anyone can potentially benefit from relaxation training, teaching relaxation skills to a college sample is no less valuable than teaching these same skills to a "clinical" population.

2. Norton and Johnson (1983) divided their subjects into two groups, those with a cognitive mode and those with a somatic mode of expressing anxiety. Given, however, the fact that many anxious people express their anxiety in both a cognitive and a somatic fashion, it will be interesting to observe whether either technique proves to be more effective when applied to a group with mixed

manifestations of anxiety. The addition of a third group may also indicate whether the two groups with distinctive modes of anxiety, cognitive and somatic, are somehow different from a "mixed" group in their response to relaxation training.

3. In the Norton and Johnson (1983) study, subjects were exposed to a series of four relaxation sessions. In the present study, the effects of single-session relaxation training will be examined . This will have the advantage of controlling for subjects' motivation to practice between sessions. For ethical reasons, however, it will be emphasised to participants that they are not expected to master the procedure in a single, introductory session.

Previous research does suggest, nevertheless, that a single session can be effective. For example, Paul (1969) found that following a single training session, both progressive relaxation and hypnotic suggestion produced reductions in subjectively reported levels of tension and distress. Moreover, progressive relaxation produced significantly greater decreases in experimental subjects than in controls in heart rate, muscle tension, and respiratory rate. Paul (1969) concluded that it is clear that hypnotic suggestion and progressive muscle relaxation can produce decreased physiological arousal and subjective distress within one to two sessions.

Other studies have also demonstrated significant changes following one relaxation session on such physiological measures as heart rate, respiratory rate, skin conductance, systolic blood pressure, and EMG, as well as reductions in pre-post treatment anxiety rating scales (Schandler and Grings, 1976; Heide and Borkovec, 1983; Norton, Rhodes, and Hauch, in press).

Finally, Borgeat (1983) notes that:

> In clinical situations, most patients come to relaxation for the relief of an anxiety-related problem: they expect quick improvement and their motivation depends on their initial experience. Thus, the popular perception of a technique, its short-term subjective effects, its pleasant and attractive characteristics and its simplicity constitute important factors likely to affect patients' expectancies and to influence their motivation to continue with the technique. (p.181)

Perhaps it will be useful, therefore, to determine whether one relaxation session is adequate to assess the compatibility of a technique to the client as well as his motivation to apply that technique further.

4. In their discussion, Norton and Johnson (1983) suggested that Agni Yoga is possibly not so effective for reducing cognitive anxiety as progressive relaxation is for reducing somatic anxiety. They note that perhaps another relaxation procedure with more cognitive content would have produced greater relaxation for the cognitively anxious subjects. Guided imagery is a relaxation technique which has been used with some success, and it may possibly have a richer cognitive component than Agni Yoga.

Although some studies used mantra meditation as the cognitive procedure with which to compare progressive relaxation, many of these studies failed to find cognitive and somatic differences between progressive relaxation and meditation (Woolfolk, Carr-Kaffashan, McNulty, and Lehrer, 1976; Zuroff and Schwarz, 1978; Lehrer et al., 1983; Woolfolk et al., 1982). Moreover, some of them have failed to demonstrate any superiority of meditation training over control conditions (e.g. Goldman, Domitor, and Murray, 1979; Holmes, 1984; Smith, 1975; Klindon, 1983). Hence, it will be interesting to see if more distinctive

differences result between progressive relaxation and the more highly cognitive procedure of guided imagery.

The rationale for the use of guided imagery in treating anxiety is suggested by Kroger and Fezler's (1976) statement that any pleasant scene that can be constructed in the mind's eye will produce relaxation. They further explain that one produces relaxation by imagining oneself in a relaxing situation. The more vivid the image, the deeper the relaxation, and the sooner the counterconditioning can be accomplished. It is possible to construct a powerful image if one concentrates and uses several sensory modalities. A common scene employing all five senses is picturing oneself walking along a deserted beach, "feeling" the warmth of the sand on one's feet and the beat of the sun on one's face, "smelling" and "tasting" the salty air, "hearing" the breeze rustle through the trees, "seeing" the blue of the sky and water, and the whiteness of the sand. It is important to focus on recalling these primary sensations. With practice, the relaxing scene can be turned on and off at will.

Evidence exists which illustrates the therapeutic benefit derived from imagery (e.g. Lazarus and Abramovitz, 1962; Horan, 1973, 1976; Schandler and Dana, 1983). Lazarus and Abramovitz (1962) employed the technique of "emotive imagery" with several phobic children. In this procedure, certain emotion-arousing situations are presented to the child's imagination, and the emotions induced are assumed to have autonomic effects which are incompatible with anxiety. The researchers found that the majority of these children recovered in a mean of only 3.3 sessions, as demonstrated by their comfort in the presence of the phobic stimuli and the reduction of phobic-related symptoms.

Schandler and Dana (1983) compared a self-rest control procedure to frontalis muscle feedback relaxation and a guided imagery protocol designed for general tension reduction and control. The imagery narrative consisted of phrases designed to elicit images associated with relaxation, such as: "Picture yourself at a warm, quiet seashore." These images were further paired with tension-related images.

Results indicated that the imagery procedure was associated with moderate reductions in physiological tension and significant reductions in state anxiety and three tension-related personality dimensions. On the other hand, the biofeedback group showed the largest reductions in physiological tension, with only small changes in state anxiety and personality dimensions. Little change was produced by the self-rest control procedure. The researchers concluded that these results support the use of cognitively mediated protocols in the treatment of specific or general anxiety behaviors.

In a single-session approach, it is likely that subjects will achieve more pronounced benefits from the cognitively richer procedure of guided imagery than from mantra meditation. In looking at studies which examined the effectiveness of mantra meditation, benefits were more apparent in people practicing the technique over a long period (e.g., Smith, 1975; Schwartz et al., 1978). It is possible that this may also be the case with yoga. Moreover, guided imagery is a procedure easily administered by most therapists without the intensive prior training that yoga and certain other methods might entail; and therefore, more suited to use in a single-session treatment.

5. Norton and Johnson (1983) note that, with the exception of the Snake

Attitude Questionnaire (SNAQ), pretreatment measures were not taken for the dependent variables, and some pretreatment differences might have affected the level of treatment outcome measures. Therefore, in this study, pulse rate and anxiety level will be measured prior to the relaxation session and also, along with other measures, post-session.

The present study, therefore, has been designed in order to examine the hypothesis that individuals who manifest their anxiety in a particular mode will benefit more from a treatment directed to that mode. This means that individuals who are evaluated as experiencing cognitive anxiety will benefit more from a "cognitive" relaxation procedure such as guided imagery. Individuals who are evaluated as experiencing somatic anxiety will benefit more from a "somatic" relaxation procedure such as progressive muscle relaxation. As a corollary, individuals who do not manifest their anxiety in a specific mode would be expected to benefit equally from treatment directed to either mode.

Incidental to the main hypothesis are several issues which will be addressed in the present research. First among these is the frequent finding, on the one hand, that one relaxation technique is better than another, and on the other hand, that no difference exists between subjects' response to different types of relaxation as indicated on various physiological or subjective anxiety measures (e.g., Heide and Borkovec, 1983; Borgeat, 1983; Lehrer et al., 1983). As was noted on several occasions, these studies failed to consider individual differences in subjects' mode of manifesting anxiety prior to treatment assignment. With the addition of a "mixed" anxiety group, the present study will assess and match subjects' anxiety mode to treatment in an attempt to determine if differential treatment effects will

result when anxiety response modes are considered, and whether the mixed group will derive greater benefit from one relaxation technique over the other.

Secondly, the present study addresses the point raised by Norton and Johnson (1983) that Agni Yoga may not be as effective in reducing cognitive anxiety as progressive relaxation is for reducing somatic anxiety. Results will indicate if guided imagery proves to be an effective alternate cognitive procedure.

Thirdly, the present study seeks to determine whether one session is adequate to determine the optimal mode of relaxation treatment based on individual mode of responding to anxiety. This has clinical utility given Borgeat's (1983) point that patients' motivation depends on their initial experience. It would be useful, therefore, to assign patients to treatment on the basis of a personality assessment. Such matching of person and treatment should enhance the client's initial experience, and so improve both treatment effectiveness and motivation to continue therapy.

Method

Subjects

Forty-two females and thirteen males were selected from a group of 418 Introductory Psychology students at Memorial University of Newfoundland on the basis of their responses to the Trait form (X-2) of the State-Trait Anxiety Inventory (STAI: Spielberger, Gorsuch and Lushene, 1970) and the Cognitive-Somatic Anxiety Questionnaire (CSAQ: Schwartz, Davidson and Goleman, 1978). At the time of screening, all students were advised that the researcher would be phoning several of them in the near future for one additional hour of participation, at a rate of $3.50/hour. They were requested to include their name, phone number and free time slots in the slot schedule provided.

In order to meet the researcher's criterion for "anxious" on the STAI (X-2), only scores that were at or above the 80th percentile on the norms for college students (Spielberger et al., 1970) were considered, yielding 189 potential subjects. CSAQ scores for these 189 subjects were then calculated. Subjects were excluded unless CSAQ scores were at least 18 (i.e., at or above the means reported by Norton and Johnson, 1983) on either the somatic or the cognitive component. If these criteria were met, students' scores on cognitive anxiety items were divided by their scores on somatic anxiety items to determine a cognitive/somatic anxiety ratio for each student. Based on CSAQ ratios, subjects were divided into three experimental groups. Group #1, Somatic Anxiety Group (SA) consisted of the 15 students with the highest somatic/cognitive ratios (cutoff scores ranging from

0.53-0.88; X ratio, C/S=0.75). Group #2, Mixed Anxiety Group (MA) consisted of the 20 students with cognitive/somatic ratios approaching unity (cutoff scores ranging from 0.94-1.06; X ratio, C/S=1.01). Group #3, Cognitive Anxiety Group (CA) consisted of the 20 students with the highest cognitive/somatic ratios (cutoff scores ranging from 1.35-2.00; X ratio, C/S=1.55).

Subjects in each group were then randomly assigned to either of the Guided Imagery (GI) or Progressive Relaxation (PR) conditions, a procedure which resulted in six groups: (a) Somatic Anxiety/Progressive Relaxation (SA/PR), (b) Somatic Anxiety/Guided Imagery (SA/GI), (c) Mixed Anxiety/Progressive Relaxation (MA/PR), (d) Mixed Anxiety/Guided Imagery (MA/GI), (e) Cognitive Anxiety/Progressive Relaxation (CA/PR), and (f) Cognitive Anxiety/Guided Imagery (CA/GI). Table 1 shows the number of subjects in each group, as well as their mean scores on the STAI (X-2) and CSAQ.

Questionnaires and Apparatus

1. State-Trait Anxiety Inventory (Spielberger, Gorsuch and Lushene, 1970; see Appendices A and B). Test-retest reliability for STAI (Trait form) ranges from 0.73 to 0.86. Reliability for the STAI (State form) ranges from 0.16 to 0.54. Furthermore, both forms of the STAI have a high degree of internal consistency, with reliability coefficients ranging from 0.83-0.92 for A-State and from 0.86-0.92 for A-Trait (Spielberger et al., 1970).

2. Cognitive-Somatic Anxiety Questionnaire (Schwartz, Davidson and Goleman, 1978; see Appendix C). The cognitive and somatic scales of the CSAQ

Table 1. Mean scores on the STAI (Trait) and the CSAQ for all groups

Group	n	CSAQ	STAI (Trait)
SA/PR	7	0.78	89.7
SA/GI	8	0.72	88.8
MA/PR	10	1.00	89.3
MA/GI	10	1.01	88.8
CA/PR	10	1.61	90.7
CA/GI	10	1.49	92.0

are modestly correlated (r=0.42) but their shared variance is sufficiently low.

3. Probe questionnaires designed by the researcher to determine subjects' level of absorption in the relaxation session. Different forms exist for each relaxation method (See Appendices D and E).

4. Post-Relaxation Session Questionnaire; in effect, the Post-Therapy Session Questionnaire (Lehrer et al., 1983) used to evaluate subjects' treatment expectations (See Appendix F).

5. Pulse Minder, American Biofeedback Corp., Model No. 7710; Pulsemeter, San-Ei Instruments Co., Ltd., Model No. PM-101A

Procedure

In each experimental condition, groups containing two to four subjects of varying response modes received one relaxation session, approximately 35 minutes in length. Upon arrival at the session, it was explained that anxiety is not uncommon among university students, particularly those beginning their first year. Participants were told that in the session they would learn a brief, simple method for relaxing but that they could not expect to really master it in one, introductory session. Furthermore, they were advised that such a technique is useful whenever tension or anxiety is experienced (e.g. exam week) and that it has been successfully employed by numerous people to bring about relaxation.

Prior to the relaxation session, subjects' pulse rate was measured using small, hand-held pulse-rate monitors (one Model No. PM-101A, three Model No. 7710). The researcher fit the apparatus onto each subject's finger and instructed him to sit quietly for two minutes before recording any measures. Then, she took

three independent readings, alternating among subjects from one reading to the next. These three readings were later averaged to give one pulse rate measure per subject. Subjects were then informed that a second reading would be taken immediately following the relaxation session. In addition to the initial pulse rate measure, levels of pre-treatment state anxiety were determined using the STAI (State form X-1). Initial pulse rate and State anxiety levels were analyzed to ensure that groups were matched on these measures (see Results).

Following these pre-treatment measures, subjects in the PR condition were given training in a modified form of progressive relaxation (Cormier and Cormier, 1979, adapted from Bernstein and Borkovec, 1973). Following a brief rationale and instructions, including a variation of Barber's (1965) Task Motivational Instructions, subjects were told to tense sequentially each of 16 muscle groups, attend to the feelings of tension, relax the muscles, and notice the difference in feelings produced by tension and relaxation. This sequence was repeated twice for each muscle group, and direct reference to focus on imagery was excluded from the procedure (see Appendix G).

After receiving a rationale and instructions, including a variation of Barber's Task Motivational Instructions, subjects in the GI condition were guided through a standard beach imagery scene (Kroger and Fezler, 1976) which focuses on tactile feelings of warmth and cold, visual colors, the basic taste and smell of salt, and rhythmic sound. Direct reference to attend to breathing was excluded from the procedure (see Appendix H).

Immediately following the relaxation session, four measures were taken for all subjects:

1. Pulse rate was measured in the same manner as before treatment.
2. A brief questionnaire of probes was distributed to determine subjects' degree of absorption in the session.
3. State anxiety was assessed using Form X-1 of the STAI.
4. Subjects' expectations of treatment effectiveness were evaluated using the Post-Relaxation Session Questionnaire.

Finally, subjects were thanked and paid for their time. The entire session averaged 50 minutes in length and all sessions were conducted over a two week period.

Results

Subject Selection

Statistical analysis of trait anxiety and CSAQ measures indicated that the criteria established were successful in providing matched groups of subjects prior to treatment. With regard to trait anxiety, a 3x2 (anxiety-type x relaxation method) analysis of variance (ANOVA) was performed on the data from the pre-treatment State-Trait Anxiety Inventory (STAI, Form X-2). There were no significant main effects or interactions, indicating that subjects in each of the six groups were initially equivalent on their trait anxiety scores (see Table I-1).

Although groups were selected on the basis of cognitive/somatic ratios on the Cognitive-Somatic Anxiety Questionnaire (CSAQ), it is prudent to check statistically whether the groups actually differed significantly in anxiety response mode. For this purpose, paired comparisons using the Scheffe test were performed to evaluate varying preferences for cognitive or somatic anxiety items in the three groups (See Tables J-1 and J-2). On the basis of these comparisons, it can be concluded that the somatic and the cognitive groups differed significantly. Although significance was not demonstrated with all mixed anxiety group comparisons, the mixed group was not the main focus of the study. Table 2 shows that the cognitive anxiety scores were higher for the two cognitive anxiety groups than for the somatic anxiety groups, and somatic anxiety scores were higher for the somatic anxiety groups than for the cognitive anxiety groups. Furthermore, cognitive and somatic anxiety scores were approximately equal for

Table 7. Mean scores on the Cognitive-Somatic Anxiety Questionnaire

Group	Cognitive Score	Somatic Score
SA/PR	16.29	21.00
SA/GI	14.88	20.63
MA/PR	21.20	21.20
MA/GI	22.10	21.80
CA/PR	25.10	15.60
CA/GI	23.40	15.70
$\overline{X}$	20.49	19.32

the mixed anxiety groups.

Pre-treatment Assessment

To ensure that subjects in each of the six groups were initially equivalent on their state anxiety scores, a 3x2 ANOVA was performed on the pre-treatment STAI (X-1) scores. The finding of no significant main effects or interactions indicates that the groups were initially matched on state anxiety scores (see Table I-2).

Finally, a 3x2 ANOVA was performed on pre-treatment pulse rate measures to assess whether each of the six groups was initially equivalent on this measure. There were no significant main effects or interactions (see Table I-3). It is legitimate to conclude, therefore, that the groups were initially matched on pulse rate.

Treatment Assessment

STAI (X-1). The effects of Progressive Relaxation and Guided Imagery training were analyzed using a 3x2x2 (anxiety-type x relaxation method x time of measurement) repeated measures ANOVA for the differences in state anxiety pre to post treatment. There were no significant interactions nor were there main effects for anxiety response mode or relaxation training method (see Table I-4). However, there was a large and significant within subjects main effect, $F(1,49)=124.98$, $p < .01$, indicating that all groups decreased considerably in

state anxiety following relaxation training (see Figures 1, 2 and 3).

Pulse rate. In order to determine whether different changes in pulse rate occurred between matched and unmatched groups following treatment, a 3x2x2 repeated measures ANOVA was performed on pre and post pulse rate measures. There were no significant interactions nor were there main effects for anxiety response mode or relaxation training method (see Table I-5). However, there was a large and significant within subjects main effect, $F(1,49)=40.56$, $p < .01$, indicating that all groups decreased in pulse rate following relaxation training (see Figures 4, 5 and 6).

Probe questionnaires. Question #1 was analyzed along with the Post-Relaxation Session Questionnaire and will be discussed below. The remaining Probe questions were different for the two relaxation methods, and therefore could not be subjected to an analysis across treatments. Regarding the remaining Probe questions, subjects' self-ratings of involvement in the relaxation training session indicate that all groups reported being absorbed in the session. For example, when asked whether they had trouble holding the image in their mind, on the average, the GI group reported little trouble ($\overline{X}=3.67$, see Table 3). Similarly, when asked if they had trouble focusing on relaxation with any muscle groups, the PR group reported that this was rarely a problem ($\overline{X}=3.00$, see Table 3). Subjects' involvement in the training sessions is supported by the statistical findings that everyone improved, regardless of relaxation method employed.

Post-Relaxation Session Questionnaire. A multivariate analysis of variance and covariance (MANOVA) performed on Probe Question #1 and all the questions regarding perceived benefit of treatment indicated no significant

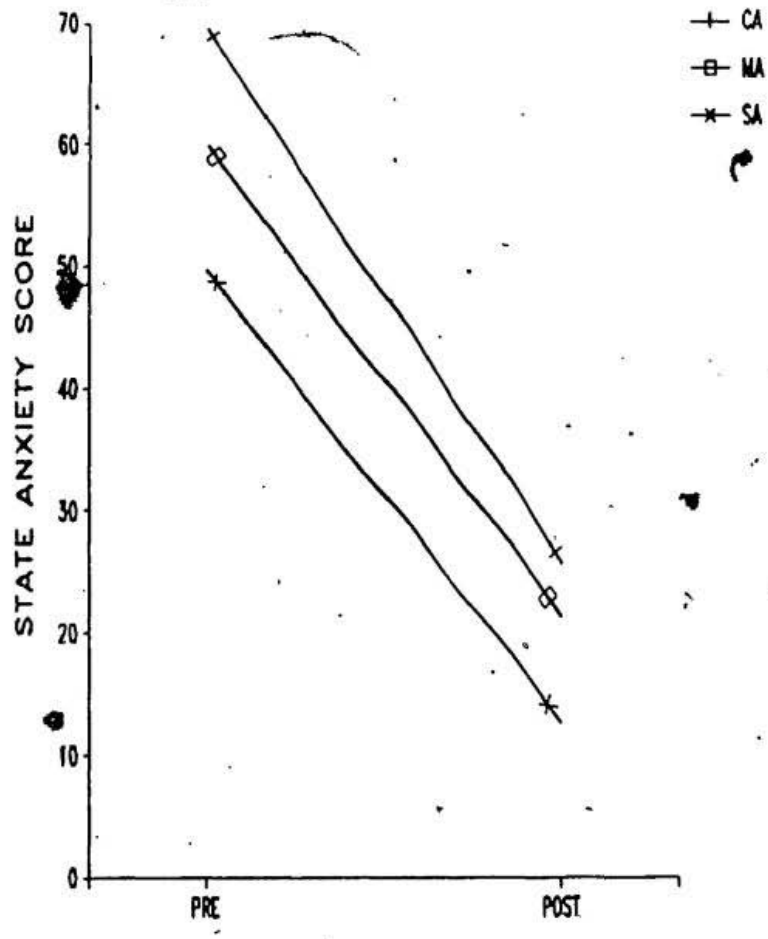


Figure 1. Pre-post training session state-anxiety means for the three anxiety groups.

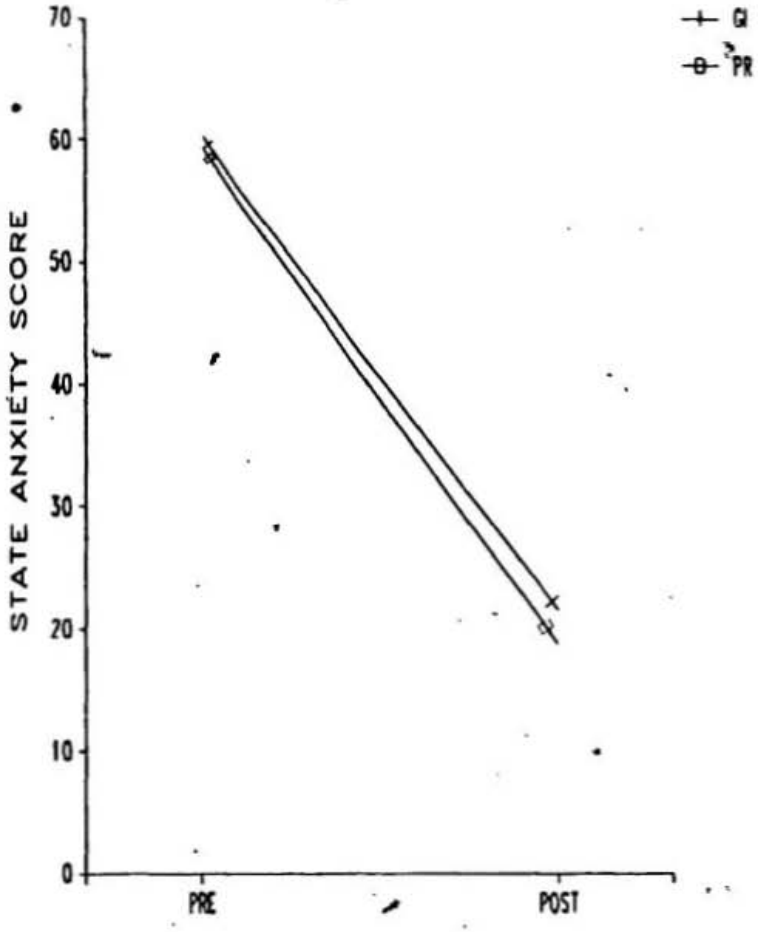
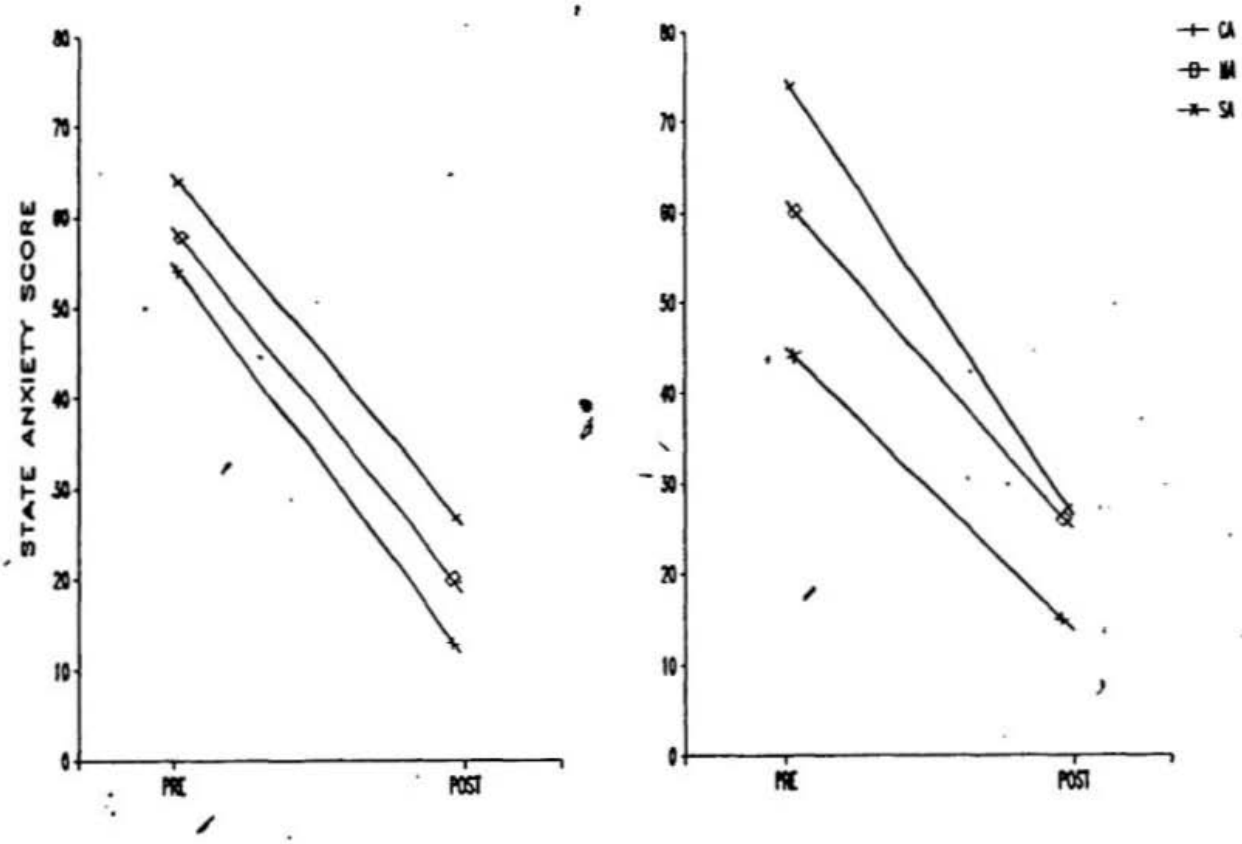


Figure 2. Pre-post training session state-anxiety means for the two relaxation methods.



Progressive Relaxation Guided Imagery

Figure 3. Pre-post training session state-anxiety means for anxiety groups within each relaxation method.

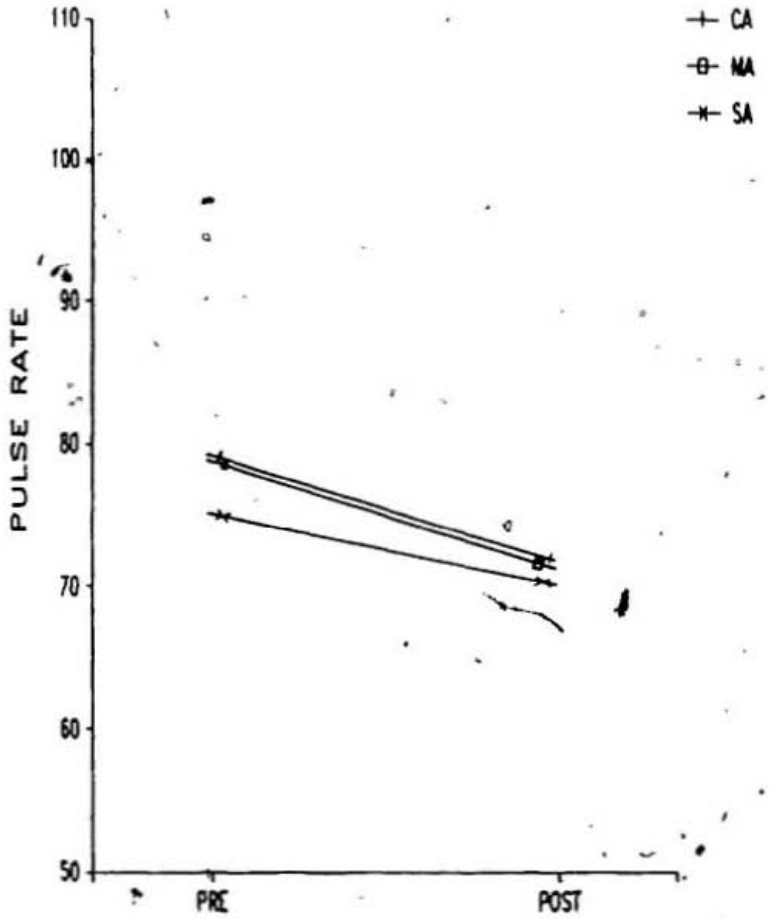


Figure 4. Pre-post training session pulse-rate means for the three anxiety groups.

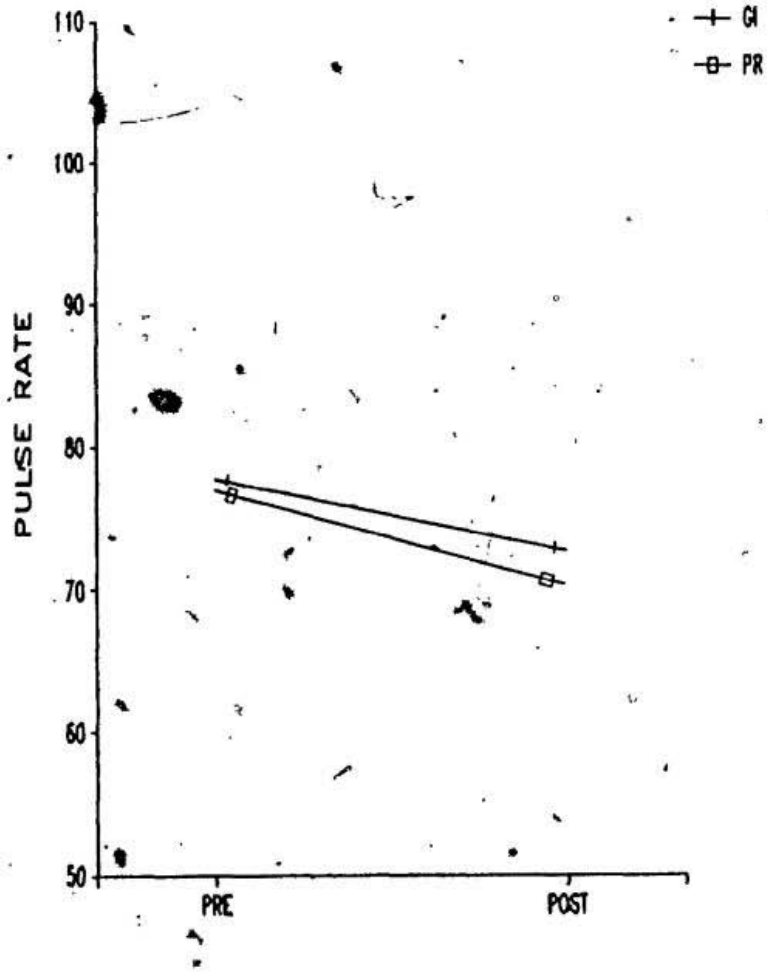


Figure 5. Pre-post training session pulse-rate means for the two relaxation methods.

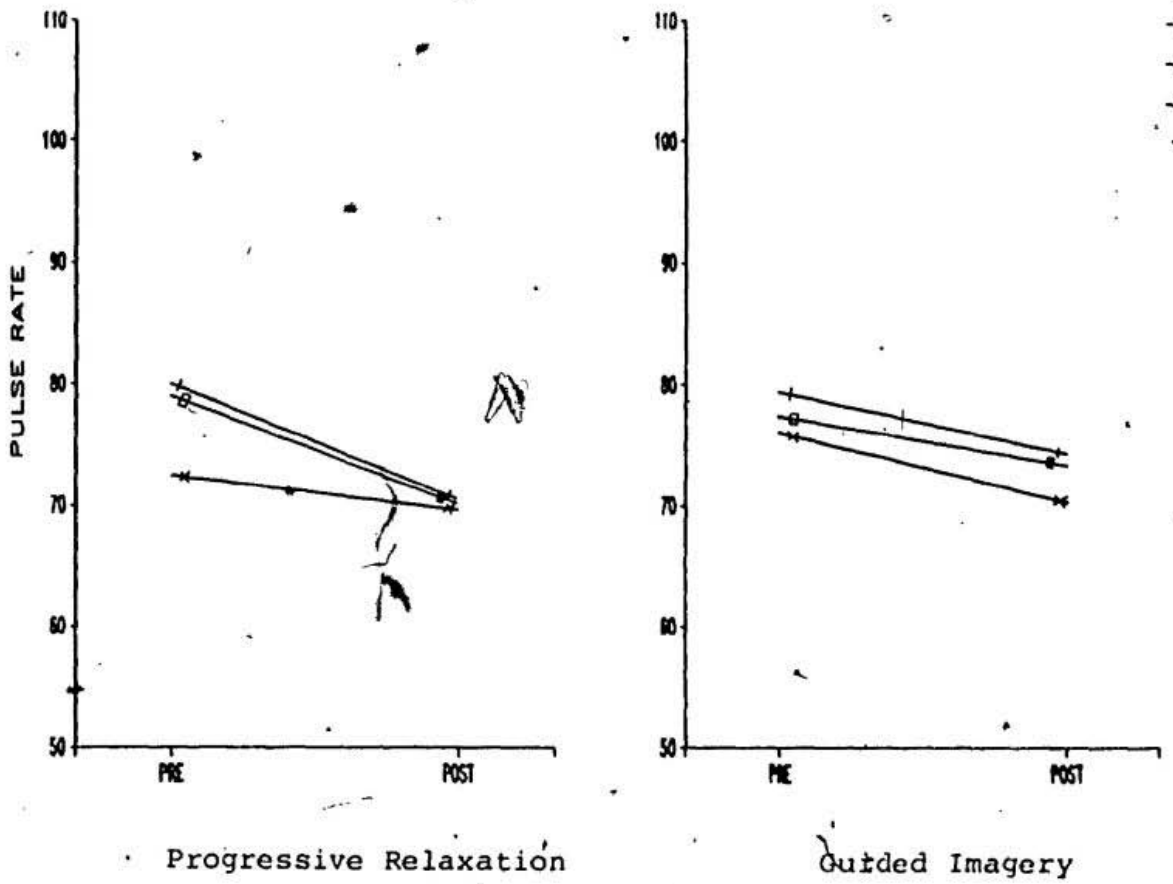


Figure 6. Pre-post training session pulse-rate means for anxiety groups within each relaxation method.

Table 3. Mean responses to probe questions for subjects in each condition

Question #	GI	PR
1[a]	2.75	2.26
2	3.35	3.08
3	3.58	3.00
4	3.67	3.09
5	3.63	1.96
6[b]	5.00	

[a]This question was also subjected to a MANOVA.

[b]This question was relevant to the GI group only.

difference between groups on their responses to these items. Table 4 shows that, regardless of treatment assignment, all groups generally rated themselves as relaxed during the session and relaxed post-session. Furthermore, all groups consistently indicated on the bipolar rating scales that during the relaxation session, they were comfortable, interested, drowsy, positive, absorbed in the experience, and peaceful. Moreover, they felt that their feelings of anxiety and tension would improve as a result of practicing the method they were taught, that the method is a very effective means of relaxing, and that they would recommend the method to friends or relatives suffering from anxiety.

Table 4. Mean ratings for probe question #1 and Post-Relaxation Session Questionnaire items (1-12)

Item	Desired Response[a]	SA/PR	SA/GI	MA/PR	MA/GI	CA/PR	CA/GI
#1	Low	2.0	2.8	2.0	2.8	2.7	2.7
1	Low	2.6	2.8	2.4	2.4	3.8	2.6
2	Low	3.9	4.3	4.7	4.7	5.0	5.2
3	Low	1.9	1.8	2.0	1.9	2.2	2.0
4	Low	2.3	2.3	1.5	2.4	2.8	1.9
5	High	7.4	7.4	8.3	8.2	8.2	7.9
6	High	7.7	7.1	6.3	7.6	6.2	7.7
7	High	7.9	7.3	7.9	7.4	7.7	7.9
8	Low	2.6	3.4	2.2	2.2	2.7	3.6
9	Low	2.0	1.9	2.0	2.0	2.8	2.7
10	High	6.6	6.1	6.5	6.0	6.6	5.5
11	High	7.7	7.8	7.2	7.0	7.6	7.1
12	High	8.1	8.6	7.7	7.7	7.9	8.1

[a] These items were counterbalanced so that high ratings would indicate benefit on some items and low ratings would indicate benefit on other items.

Discussion

A decrease in anxiety was found in all groups regardless of the relaxation method used or anxiety type. Self-ratings of treatment effectiveness and absorption in the relaxation session were consistent with this anxiety decrease. No non-treatment control group was included because this was not germane to testing the major interactional hypothesis.

The results of the present study do not provide support for the interactional hypothesis: that individuals who are evaluated as experiencing cognitive anxiety will benefit more from a cognitive relaxation procedure, whereas individuals who are evaluated as experiencing somatic anxiety will benefit more from a somatic relaxation procedure. In fact none of the measures used provided support for the interactional hypothesis. These included state anxiety (STAI, X-1), pulse rate, level of absorption in the session (probe questionnaires), and subjective evaluation of treatment effectiveness (Post-Relaxation Session Questionnaire). Based on the present study, therefore, it would not seem necessary to match a specific therapeutic method with a specific anxiety type, at least for single-session relaxation training.

In not supporting the major interactional hypothesis, these results are inconsistent with most of the prior research on the interaction between personality variables (anxiety mode) and situational variables (relaxation method). There are several possible explanations for these discrepant findings.

1. Number of sessions. Perhaps the most obvious and significant reason for the lack of interaction between anxiety type and relaxation method is the use of a

single training session. Both treatments produced considerable reductions in anxiety scores and both were perceived as effective by the participants, although this study was not designed to test the general effectiveness of the relaxation methods employed (no non-treatment control group was included). On the basis of the literature, it seems reasonable to suppose that subjects would continue to show improvement in subsequent sessions, and that the interaction between treatment and anxiety type could become apparent at a later point. Hence, it might be the case that the anxiety level of matched groups would decrease further than unmatched groups before asymptote is reached.

2. Subject sample. For the purpose of the present study, Introductory Psychology students were recruited. It is probable that very few of these students had ever engaged in relaxation training of the sort we employed, and it is likely that all were somewhat curious and interested in doing well. Hence, their overall general interest and possible demand characteristics may have further contributed to the lack of difference among groups.

Perhaps if we were to employ a severely anxious patient population, it would be more imperative that they receive the proper, congruent treatment before benefits become apparent. For example, Ost and colleagues (1981, 1982) demonstrated clinical improvement when matching treatments to the response patterns of phobic patients. It is likely more difficult to reduce the anxiety level of highly anxious (e.g. phobic) individuals. Thus, every enhancement of treatment would help, such as assigning specific personality types to treatment types. Although our college group was less anxious than a patient population, nevertheless, they all aquired short-term benefit from the novel training session.

they experienced. Whether or not they received the "right" treatment for their introductory session, therefore, mattered less than for a difficult treatment population such as used in the Ost et al. studies.

Furthermore, Lehrer (1978) notes that physiological effects of brief relaxation instructions can best be measured in an anxious population, and brief progressive relaxation does not appear to reveal measurable physiological effects among subjects who are not exceptionally anxious. Moreover, physiological effects of progressive relaxation are revealed more clearly when subjects are tested under stressful conditions than under relaxing conditions (Lehrer, 1978). Therefore, if treatment effects are more noticeable in a more anxious group than in the college students used in this study, it is reasonable to expect that specific effects due to matching might also be more apparent in such a group.

3. No difference between methods. If we refer to Figures 2 and 5 on pages 43 and 46, it is clear that both relaxation methods produced approximately equal levels of improvement across all subjects. Perhaps, therefore, the relaxation methods were not as distinct as was initially intended. This has been the case in some studies. Woolfolk et al. (1982), for example, looked at the effects of meditation and progressive relaxation as treatments for symptoms of stress. When the two treatments were compared, both were found to be equally effective in ameliorating stress symptoms. The researchers suggested a picture of progressive relaxation and meditation as having overlapping effects, and they explained that this finding provides little guidance to clinicians when attempting to determine the most effective treatment for somatic complaints such as those associated with stressful living. They concluded that either technique is likely to

produce general improvement in anxiety, hostility, depression, and somatic discomfort associated with stress. It might similarly be the case that progressive relaxation and guided imagery have overlapping effects and that both are likely to produce general improvement with either anxiety type, particularly in a brief, novel session with only moderately anxious subjects.

4. No difference between groups. During subject selection, it was difficult to obtain predominantly somatic types, while there was no difficulty in aquiring predominantly cognitive types. It was necessary, therefore, to accept a somewhat less stringent criterion for "somatically" anxious subjects. Although statistically different, it is likely that the "somatic" group was not substantially distinguishable from the "mixed" and "cognitive" groups. Perhaps the range of variability among cognitive and somatic types is lower in a university population than in a clinical population. It may be that university students are a more intellectual, cognitively-oriented group; if so, they would express anxiety in this form as well, and this would tend to limit the range of somatic expression. However, one might expect greater somatic expression among a clinically anxious group.

It is also noteworthy that the cognitive and somatic scales of the CSAQ are reported as having a correlation of $r=.42$. Traditionally, such a value has been viewed as somewhat modest. However, recent statistical developments reported in the literature (Ozer, 1985) have demonstrated that in cases of this kind, where the correlation is between two aspects of a common factor, the shared variance is best estimated by the correlation coefficient rather than its square. If Ozer (1985) is correct, then the shared variance between the cognitive and somatic scales of the

CSAQ is not 16 percent but rather 42 percent. It is possible that this scale fails to clearly differentiate cognitive and somatic responders. Also, due to the recency of its development, the CSAQ lacks adequate reliability data. Such poor reliability may further contribute to the lack of any difference among the groups matched and unmatched to treatment.

The present study also addressed three issues incidental to the main hypothesis. First, a "mixed" group of responders was added to the present study to determine whether either technique would be more effective when applied to such a group of responders, and also whether the two extreme groups of responders are somehow different from a mixed group. However, as the results illustrate, there were no anxiety-group or relaxation-method main effects, indicating that the mixed anxiety group's response to relaxation did not differ from that of either the cognitive or somatic group.

In clinical work, it is useful to know the relative merits of a single or multi-session treatment paradigm. Although several researchers have demonstrated the necessity of matching specific treatments to specific individuals, these have all used multi-session treatment paradigms. From the present study, it would seem that it is not critical that matching occur as early as the first session. It appears that anxious people may benefit from any treatment initially, and that it is only when treatment progresses that the benefit of matching might become apparent. It may be that if a treatment is congruent to a person, benefit will continue as treatment continues, while an incongruent treatment would fail to show incremental improvement with continued treatment.

Borgeat (1983) suggests that the short-term effects of treatment, its

simplicity, etc., will likely affect patients' expectations and influence their motivation to continue treatment. As the results of the present study indicate, all groups demonstrated subjective and physiological benefit, and this benefit paralleled their positive evaluation of treatment benefit and treatment expectancies. Thus, it appears that short-term effects of treatment influence subsequent treatment evaluation, but the degree to which these benefits affect future motivation to continue treatment would have to be tested in subsequent sessions.

Finally, Norton and Johnson (1983) found that the effects of Agni Yoga on cognitive anxiety were less defined than the effects of progressive relaxation on somatic anxiety. Therefore, on their suggestion, it was decided to test an alternate cognitive technique, guided imagery, in order to determine whether this method would provide a more effective cognitive treatment. While Norton and Johnson (1983) found that Agni Yoga was less effective than progressive relaxation in reducing the anxiety levels of either anxiety type, results of the present study showed that both progressive relaxation and guided imagery were effective in reducing anxiety, although no interactions occurred. Several possible explanations for this finding have been suggested. First, the student sample was not extremely anxious, and perhaps, not clearly different in their expression of anxiety. Next, the two relaxation methods may have overlapping effects. Finally, specific effects may begin to appear in the first session but do not reach significant levels until subsequent sessions.

As a result of this previous research, a number of interesting issues have arisen which require further investigation: (a) It is conceivable that if this study

were replicated over four to five training sessions, differences among groups would emerge. (b) Employing a clinically anxious (e.g. phobic) group as opposed to a university population may better differentiate between groups matched and unmatched to treatment. (c) Testing anxiety level in a stressful as opposed to a relaxing situation may produce more distinct effects, thus enhancing any interactions which may occur. (d) Obtaining a subject sample which is more distinctly "somatic" would likely broaden the differences among the three groups, making interactions more apparent.

In essence, application of the interactional approach to anxiety treatment is convincing and important. As much of the research suggests, the optimal method of treatment often involves an assessment of individual personality characteristics as they relate to the clinical problem, and the subsequent introduction of an appropriate treatment paradigm to suit those characteristics. However, areas also exist where it is valuable to look beyond interactions. In order to evaluate the efficacy of a newly developed treatment program, for example, one often compares it to a non-treatment control. In this case, the researcher is probabably less interested in interactions and more interested in the relative effectiveness of this treatment over no treatment. Other circumstances occur in which certain problems may warrant one technique over another, and for various disorders, a combination of methods may constitute the optimal mode of treatment (Lehrer et al., 1983). Finally, perhaps it is sometimes the case that a general and natural "relaxation response" exists which can be facilitated by a diversity of techniques (Benson, 1975). As earlier suggested, most individuals may find initial relief from anxiety, regardless of therapeutic method employed.

References

Barber, T. X. (1965). Measuring "hypnotic-like" suggestibility with and without "hypnotic induction"; Psychometric properties, norms, and variables influencing response to the Barber Suggestibility Scale (BSS). *Psychological Reports*, **16**: 809-844.

Benson, H. (1975). *The relaxation response*, New York: William Morrow and Company Inc.

Borgeat, F. (1983). Psychophysiological effects of two different relaxation procedures: Progressive relaxation and subliminal relaxation. *The Psychiatric Journal of the University of Ottawa*, **8**: 181-185.

Borkovec, T. D. (1973). The effects of instructional suggestion and physiological cues on analogue fear. *Behavior Therapy*, **4**: 185-192.

Borkovec, T. D. (1976). Physiological and cognitive processes in the the regulation of anxiety. In G.E. Schwartz & D. Shapiro (Eds.), *Consciousness and self-regulation: Advances in research*. New York: Plenum Press.

Bowers, K. S. (1973). Situationism in psychology: An analysis and a critique. *Psychological Review*, **80**: 307-336.

Bridgewater, W. & Kurtz, S. (1963). *Columbia Encyclopedia (3rd Edition)*. New York: Columbia University Press.

Cormier, W. H., & Cormier, L. S. (1979). *Interviewing strategies for helpers: A guide to assessment, treatment, and evaluation*. California: Brooks/Cole Publishing Company.

Davidson, R. J., & Schwartz, G. E. (1976). The psychobiology of relaxation and related states. In D. I. Mostofsky (Ed.), *Behavioral control and modification of physiological activity*. Englewood Cliffs: Prentice-Hall.

Davison, G. C. (1966). Anxiety under total curarization: Implications for the role of muscular relaxation in the desensitization of neurotic fears. *Journal of Nervous and Mental Disease*, **143**: 443-448.

Endler, N. S. (1975). The case for person-situation interactions. *Canadian Psychological Review*, **16**: 12-21.

Endler, N. S. & Hunt, J. McV. (1966). Sources of behavioral variance as measured by the S-R Inventory of Anxiousness. *Psychological Bulletin*, **65**: 336-346.

Endler, N. S. and Shedletsky, R. (1973). Trait versus state anxiety, authoritarianism and ego threat versus physical threat. *Canadian Journal of Behavioural Science*, **5**: 347-361.

Goldman, B. L., Domitor, P. J., & Murray, E. J. (1979). Effects of Zen Meditation on anxiety reduction and perceptual functioning. *Journal of Consulting and Clinical Psychology*, **47**: 551-556.

Heide, F. J., & Borkovec, T. D. (1983). Relaxation-induced anxiety: Paradoxical anxiety enhancement due to relaxation training. *Journal of Consulting and Clinical Psychology*, **51**: 171-182.

Hodges, W. F. (1968). Effects of ego threat and threat of pain on state anxiety. *Journal of Personality and Social Psychology*, **8**: 364-372.

Holmes, D. S. (1984). Meditation and somatic reduction: A review of the experimental evidence. *American Psychologist*, **39**: 1-10.

Horan, J. J. (1973). "In vivo" emotive imagery: A technique for reducing childbirth anxiety and discomfort. *Psychological Reports*, **32**: 1328 (Abstract).

Klindon, D. J. (1983). Comparison of use of meditation and rest in treatments of test anxiety. *Psychological Reports*, **53**: 931-938.

Kroger, W. S., & Fezler, W. D. (1976). *Hypnosis and behavior modification: Imagery conditioning*. Philadelphia: J.B. Lippincott Company.

Lang, P. (1968). Fear reduction and fear behavior: Problems in treating a construct. In J. M. Shlien (Ed.), *Research in psychotherapy (Vol. 3)*. Washington, D.C.: American Psychological Association Inc.

Lazarus, A. A., & Abramovitz, A. (1962). The use of "emotive imagery" in the treatment of children's phobias. *Journal of Mental Science*, **108**: 191-195.

Lehrer, P. M. (1978). Psychophysiological effects of progressive relaxation in anxiety neurotic patients and of progressive relaxation and alpha feedback in nonpatients. *Journal of Consulting and Clinical Psychology*, **46**: 389-404.

Lehrer, P. M., Schoicket, S., Carrington, P., & Woolfolk, R. L. (1980). Psychophysiological and cognitive responses to stressful stimuli in subjects

practicing progressive relaxation and clinically standardized meditation. *Behavior Research and Therapy*, **18**: 293-303.

Lehrer, P. M., Woolfolk, R. L., Rooney, A. J., McCann, B., & Carrington, P. (1983). Progressive relaxation and meditation: A study of psychophysiological and therapeutic differences between two techniques. *Behavior Research and Therapy*, **21**: 651-662.

Mathews, A. M., Gelder, M. G., & Johnson, D. W. (1981). *Agoraphobia: Nature and treatment*. New York: Guilford Press.

Mischel, W. (1973). Towards a cognitive social learning reconceptualization of personality. *Psychological Review*, *80*: 252-283.

Neitzel, M. T. & Bernstein, D. A. (1981). Assessment of anxiety and fear. In M. Hersen & A. Bellack (Eds.), *Behavioral assessment*. New York: Pergamon Press Inc.

Norton, G. R., Dinardo, P. A., & Barlow, D. H. (1983). Predicting phobics responses to therapy: A consideration of subjective, physiological, and behavioral measures. *Canadian Psychology*, **24**: 50-58.

Norton, G. R., & Johnson, W. E. (1983). A comparison of two relaxation procedures for reducing cognitive and somatic anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*, **14**: 209-214.

Norton, G. R., Rhodes, L., & Hauch, J. (in press). Characteristics of subjects experiencing relaxation and relaxation-induced anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*.

Ost, L. G., Jerremalm, A., & Johansson, J. (1981). Individual response patterns and the effects of different behavioral methods in the treatment of social phobia. *Behavior Research and Therapy*, **19**: 1-16.

Ost, L. G., Johansson, J., & Jerremalm, A. (1982). Individual response patterns and the effects of different behavioral methods in the treatment of claustrophobia. *Behavior Research and Therapy*, **20**: 445-460.

Ozer, D. J. (1985). Correlation and the coefficient of determination. *Psychological Bulletin*, **97**: 307-315.

Paul, G. L. (1969). Behavior modification research: Design and tactics. In C. M. Franks (Ed.), *Behavior therapy: Appraisal and status*. New York: McGraw-Hill.

Paul, G. L. (1969). Physiological effects of relaxation training and hypnotic suggestion. *Journal of Abnormal Psychology*, **74**: 425-437.

Preston, C. F. (1982). An interactional analysis of hypnotic reactivity. *The International Journal of Clinical and Experimental Hypnosis*, **30**: 224 (Abstract).

Rachman, S. (1968). The role of muscular relaxation in desensitization therapy. *Behavior Research and Therapy*, **6**: 159-166.

Rachman, S. (1976). The passing of the two-stage theory of fear and avoidance: Fresh possibilities. *Behavior Research and Therapy*, **14**: 125-131.

Rorer, L. G. & Widiger, T. A. (1983). Personality structure and assessment. *Annual Review of Psychology*, **34**: 431-463.

Schandler, S. L., & Dana, E. R. (1983). Cognitive imagery and physiological feedback relaxation protocols applied to clinically tense young adults: A comparison of state, trait, and physiological effects. *Journal of Clinical Psychology*, **39**: 672-681.

Schandler, S. L. & Grings, W. W. (1976). An examination of methods for producing relaxation during short-term laboratory sessions. *Behavior Research and Therapy*, **14**: 419-426.

Schwartz, G. E., Davidson, R. J. & Goleman, D. J. (1978). Patterning of cognitive and somatic processes in the self-regulation of anxiety: Effects of meditation versus exercise. *Psychosomatic Medicine*, **40**: 321-328.

Shahar, A. & Merbaum, M. (1981). The interaction between subject characteristics and self-control procedures in the treatment of interpersonal anxiety. *Cognitive Therapy and Research*, **5**: 221-224.

Shipley, R. H., Butt, J. H., Horwitz, B., & Farby, J. E. (1978). Preparation for a stressful medical procedure: Effect of amount of stimulus preexposure and coping style. *Journal of Consulting and Clinical Psychology*, **46**: 499-507.

Smith, J. C. (1975). Meditation as psychotherapy: A review of the literature. *Psychological Bulletin*, **82**: 558-564.

Spielberger, C. D. (1972). Anxiety as an emotional state. In C. D. Spielberger (Ed.) *Anxiety: Current trends in theory and research*. Volume I., New York: Academic Press.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the*

State-Trait Anxiety Inventory. Palo Alto, CA.: Consulting Psychologists Press, Inc.

Woolfolk, R. L., Carr-Kaffashan, L., McNulty, T. F., & Lehrer, P. M. (1976). Meditation training as a treatment for insomnia. *Behavior Therapy*, **7**: 359-365.

Woolfolk, R. L., Lehrer, P. M., McCann, B. S., & Rooney, A. J. (1982). Effects of progressive relaxation and meditation on cognitive and somatic manifestations of daily stress. *Behavior Research and Therapy*, **20**: 461-467.

Zuroff, D. C. & Schwarz, J. C. (1978). Effects of transcendental meditation and muscle relaxation on trait anxiety, maladjustment, locus of control, and drug use. *Journal of Consulting and Clinical Psychology*, **46**: 264-271.

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SELF-EVALUATION QUESTIONNAIRE

ATAI FORM X-1

Developed by C.D. Spielberger
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SELF-EVALUATION QUESTIONNAIRE

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

STAI FORM X-1

NAME _____ DATE _____

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

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④

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SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

NAME _____ DATE _____

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

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	①	②	③	④
22. I tire quickly	①	②	③	④
23. I feel like crying	①	②	③	④
24. I wish I could be as happy as others seem to be	①	②	③	④
25. I am losing out on things because I can't make up my mind soon enough	①	②	③	④
26. I feel rested	①	②	③	④
27. I am "calm, cool, and collected"	①	②	③	④
28. I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
29. I worry too much over something that really doesn't matter	①	②	③	④
30. I am happy	①	②	③	④
31. I am inclined to take things hard	①	②	③	④
32. I lack self-confidence	①	②	③	④
33. I feel secure	①	②	③	④
34. I try to avoid facing a crisis or difficulty	①	②	③	④
35. I feel blue	①	②	③	④
36. I am content	①	②	③	④
37. Some unimportant thought runs through my mind and bothers me	①	②	③	④
38. I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
39. I am a steady person	①	②	③	④
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	①	②	③	④

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Appendix C

CSAQ

NAME: _____ DATE: _____

Rate the degree to which you generally or typically experience this symptom when you are feeling anxious. Circle the appropriate number.

	NOT AT ALL				VERY MUCH SO
1. I nervously pace.	1	2	3	4	5
2. My heart beats faster.	1	2	3	4	5
3. I can't keep anxiety provoking pictures out of my mind.	1	2	3	4	5
4. I find it difficult to concentrate because of uncontrollable thoughts.	1	2	3	4	5
5. I feel jittery in my body.	1	2	3	4	5
6. I become immobilized.	1	2	3	4	5
7. I feel like I am losing out on things because I can't make up my mind soon enough.	1	2	3	4	5
8. I imagine terrifying scenes.	1	2	3	4	5
9. I can't keep anxiety provoking thoughts out of my mind.	1	2	3	4	5
10. Some unimportant thought runs through my mind and bothers me.	1	2	3	4	5
11. I perspire.	1	2	3	4	5
12. I worry too much over something that doesn't really matter.	1	2	3	4	5

	NOT AT ALL				VERY MUCH SO
13. I feel tense in my stomach.	1	2	3	4	5
14. I get diarrhea.	1	2	3	4	5

Appendix D

Probe Questions for Progressive Relaxation

1. On this scale where 1 is complete relaxation and 9 is extreme tension, where would you rate yourself now?

1	2	3	4	5	6	7	8	9
completely relaxed								extremely tense

2. Think back to what we did. Did you have trouble focusing on the tension with any of the muscles?

1	2	3	4	5	6	7	8	9
not at all				sometimes				a lot

3. Think back to what we did. Did you have trouble focusing on the relaxation with any of the muscles?

1	2	3	4	5	6	7	8	9
not at all				sometimes				a lot

4. Think back to what we did. Did you have problems with any muscle groups?

1	2	3	4	5	6	7	8	9
no problems				problems with some muscle groups				problems with several muscle groups

5. Did your feelings of relaxation get better as you progressed through the different muscle groups?

1	2	3	4	5	6	7	8	9
got more relaxed				stayed the same				got less relaxed.

Appendix E

Probe Questions for Guided Imagery

1. On this scale where 1 is complete relaxation and 9 is extreme tension, where would you rate yourself now?

1	2	3	4	5	6	7	8	9
completely relaxed								extremely tense

2. Rate how vivid was the scene you just imagined.

1	2	3	4	5	6	7	8	9
very vivid								not very vivid

3. Did you become so involved in the scene that you felt as if you were there rather than here?

1	2	3	4	5	6	7	8	9
high involvement				medium involvement				low involvement

4. Did you have trouble holding the image in your mind?

1	2	3	4	5	6	7	8	9
no trouble				some trouble				a lot of trouble

5. Did you experience any distracting thoughts or images (i.e. did your mind wander?)

1	2	3	4	5	6	7	8	9
very little				some				a lot

6. Circle each of the following items you experienced while imagining the scene:

a. colors d. smells g. tastes

b. sounds e. warmth h. other _____

c. sights f. cold

POST-RELAXATION SESSION QUESTIONNAIRE

Name _____ Date _____

1. Looking back over the relaxation session which you have just completed, about how anxious or relaxed would you say you were on the average? Circle the appropriate number.

1	2	3	4	5	6	7	8	9
As relaxed as I can ever remember being			Neither anxious nor relaxed				As anxious as I can ever remember being	

2. At your most anxious moment during the relaxation session, how anxious were you? Circle the appropriate number.

1	2	3	4	5	6	7	8	9
As relaxed as I can ever remember being			Neither anxious nor relaxed				As anxious as I can ever remember being	

3. At your most relaxed moment during the relaxation session, how relaxed were you? Circle the appropriate number.

1	2	3	4	5	6	7	8	9
As relaxed as I can ever remember being			Neither anxious nor relaxed				As anxious as I can ever remember being	

Rate your feelings during the relaxation practice session by placing an "x" in the appropriate space on the scale.

4. Comfortable ____:____:____:____:____:____:____:____:____ Uncomfortable

5. Bored ____:____:____:____:____:____:____:____:____ Interested

6. Full of Energy ____:____:____:____:____:____:____:____:____ Drowsy

7. Negative ____:____:____:____:____:____:____:____:____ Positive

8. Absorbed in the Experience ____:____:____:____:____:____:____:____:____ Not Absorbed in the Experience

9. Peaceful ____:____:____:____:____:____:____:____:____ Upset

Circle the number which most accurately reflects how you feel about your paritci-pation in this study of relaxation techniques..

10. How much do you expect your feelings of anxiety and tension to improve as a result of practicing the method of relaxing you have learned?

NOT AT ALL 1 2 3 4 5 6 7 8 9 TO A VERY GREAT DEGREE

11. How effective do you think the method of relaxing is?

NOT AT ALL EFFECTIVE 1 2 3 4 5 6 7 8 9 VERY GREATLY EFFECTIVE

12. Would you recommend this kind of relaxation to a friend or relative suffering from tension or anxiety?

NOT AT ALL 1 2 3 4 5 6 7 8 9 VERY DEFINITELY

Script For Progressive Muscle Relaxation Session

Anxiety is fairly common among university students, especially those in their first year - facing new surroundings, a heavier workload than highschool, etc. The session you are going to learn is a brief, simple method for relaxing. The name of this relaxation technique is progressive muscle relaxation. Muscle relaxation has been used very effectively to benefit people who have a variety of concerns like insomnia, high blood pressure, anxiety or stress, or for people who are bothered by everyday tension. Muscle relaxation will be helpful in decreasing your tension by helping you control and get rid of tension that interferes with your daily activities. It can be used whenever you feel tension (e.g. exam week).

Before we begin, I'd like you all to sit quietly for a couple minutes while I read your pulse rate. I'll take three readings to insure accuracy. Then, I'd like you to complete a brief questionnaire. Following the relaxation session, I'll be taking your pulse rate again and you will have a few more questionnaires to complete. (Upon completion of this portion of the session, subjects returned to their reclining chairs and the lights were softened).

Now, what we will do is tense up and relax various muscle groups. Although we all need a certain amount of tension in our bodies in order to stand, sit, walk, etc. sometimes we have too much tension. By tensing and relaxing, you will become aware of the contrast between feelings of tension and relaxation. One training session is not intended for you to master this relaxation technique. It is a skill which sometimes requires a lot of practice to learn well. The success you

have with progressive relaxation, however, will depend to a large extent on the amount of effort you put into the following suggestions I will give you. Most people find they can achieve high levels of relaxation when they use this technique.

During the session, if you wish to shift in your chair to get more comfortable, feel free to do so. Also, you may wish to remove glasses or a tight watch, etc. (At this point, students were asked to recline their chairs).

Just before we start, I'd like to show you some of the exercises we will use in muscle relaxation. For example, I make a fist to create tension in my right hand and forearm, and then, I relax it. I point my toes to the ceiling to tense my calves and feet , and then, I relax. (These and one or two of the more ambiguous exercises were briefly demonstrated to the participants).

Now, get as comfortable as you can, close your eyes, and listen to what I'm going to tell you. I'm going to make you aware of certain sensations in your body and then show you how you can reduce these sensations to increase feelings of relaxation. First, take a deep breath, hold it, and exhale. (This instruction was repeated twice more).

Let's begin with your right arm, your right hand in particular. Clench your right fist. Clench it tightly and maintain the tension in the hand and in the forearm. Notice those sensations of tension (pause). And now let go. Just relax the right hand and let it rest on the arm of the chair (pause). And note the difference between the tension and the relaxation (10-second pause; repeat).

Now we'll do the same with your left hand. Clench your left fist. Notice the tension (5-second pause) and now relax. Enjoy the difference between the tension

and the relaxation (10-second pause; repeat).

Now bend both hands back at the wrists so that you tense the muscles in the back of the hand and in the forearm. Point your fingers toward the ceiling. Maintain the tension, and now relax (pause). Notice the difference between the tension and relaxation (10-second pause; repeat).

Now, clench both your hands into fists and bring them toward your shoulders. As you do this, tighten your bicep muscles, the ones in the upper part of your arm. Feel the tension in these muscles (pause). Now relax. Let your arms drop down again to your sides. See the difference between the tension and the relaxation (10-second pause; repeat).

Now, we'll move to the shoulder area. Shrug your shoulders. Bring them up to your ears. Feel and hold the tension in your shoulders. Now, let both shoulders relax. Note the contrast between the tension and the relaxation that's now in your shoulders (10-second pause; repeat).

Now we'll work on relaxing the various muscles of the face. First, wrinkle up your forehead and brow by raising your eyebrows. Feel the tension (pause). Now relax. Smooth out the forehead. Let it loosen up (10-second pause; repeat).

Now close your eyes tightly. Feel the tension all around your eyes (5-second pause). Now, relax those muscles, noting the difference between the tension and the relaxation (10-second pause; repeat).

Now, press your tongue to the roof of your mouth. Study the tension in the jaws (5-second pause). Relax your jaws now. Notice the difference between tension and relaxation in your jaw area (10-second pause; repeat).

Now, press your lips together tightly. As you do this, notice the tension all

around the mouth (pause). Now relax those muscles around the mouth. Just enjoy the relaxation in your mouth area and your entire face (pause; repeat).

Now, we'll move to the neck muscles. Press your head back against your chair. Feel the tension in the back of your neck and in your lower back. Hold the tension. Now let your head rest comfortably. Notice the difference. Keep on relaxing (pause; repeat).

Now, see if you can bury your chin into your chest. Note the tension in your neck. Now relax and let go (10-second pause; repeat).

Now, direct your attention to your upper back area. Arch your back like you're sticking out your chest and stomach. Feel the tension in your back. Notice that tension (pause). Now relax and notice the difference between the tension and relaxation (repeat).

Now take a deep breath, filling your lungs. Note the tension all through your chest and into your stomach area. Hold that tension (pause). Now relax and let go. Let your breath out naturally. Enjoy the pleasant sensations (10-second pause; repeat).

Now, focus on the stomach. Tighten the muscles by making your stomach like a knot. Now relax. Loosen these muscles and notice how good it feels (10-second pause; repeat).

Now, we'll move to the legs. Stretch both legs and feel the tension in the thighs (5-second pause). Now relax. Study the difference between the tension in the thighs and the relaxation you feel now (10-second pause; repeat).

Now, notice your lower legs and feet. Tighten both calf muscles by pointing your toes toward your head. Pretend a string is pulling your toes up. Feel the

pulling and the tension and hold it (pause). Now, let your legs relax deeply. Enjoy the difference between the tension and the relaxation. (10-second pause; repeat).

(N.B. Throughout the session, periodic reminders were given to breathe evenly and naturally, and to continue to relax all muscle groups that were previously dealt with).

Now, I'm going to go over briefly the different muscle groups that we've covered. As I name each group, try to notice whether there is any tension left in those muscles. If there is any, try to focus on those muscles and tell them to relax. Try to drain any extra tension out of your body. Relax the muscles in your feet, ankles, and calves (pause). Let go of your knee and thigh muscles (pause). Loosen your hips (pause). Loosen the muscles of your lower body (pause). Relax all the muscles of your stomach, waist, and lower back (pause). Drain any tension from your upper back, chest, and shoulders (pause). Relax your upper arms, forearms, and hands (pause). Let go of the muscles in your throat and neck (pause). Relax your face (pause). Let all the muscles of your body become loose. Drain all the tension from your body and continue to breathe evenly and relax.

I am going to count backwards from five to one. At the count of one, relax with your eyes closed while I put the pulsemeter on your finger and take three readings. I'll let you know when that is finished.

Script For Guided Imagery Session

Anxiety is fairly common among university students, especially those in their first year, facing new surroundings, a heavy workload, etc. The session you are going to learn is a brief, simple method for relaxing. The name of this relaxation technique is Guided Imagery. Guided Imagery has been used very effectively to benefit people with a wide variety of concerns like anxiety, stress, everyday tension, and even the pain of childbirth. Guided Imagery will be helpful in decreasing your tension by helping you to imagine yourself in a relaxing situation. It can be used whenever you feel tension (e.g. exam week).

Before we begin, I'd like you all to sit quietly for a couple minutes while I read your pulse rate. I'll take three readings to insure accuracy. Then, I'd like you to complete a brief questionnaire. Following the relaxation session, I'll be taking your pulse rate again and you will have a few more questionnaires to complete. (Upon completion of this portion of the session, subjects returned to their reclining chairs and the lights were softened).

Now, what I will do is I will ask you to imagine certain pleasant scenes in your mind. Any pleasant scene that can be constructed in the mind's eye will produce relaxation. One training session is not intended for you to master this relaxation technique. It is a skill which sometimes requires a lot of practice to learn well.

The success you have in Guided Imagery will depend on a large extent on your willingness to try to imagine and visualize the things I will ask you to

imagine. Most people find they can imagine quite well when they try. Using all your senses, try to experience, as vividly as possible, what I will describe to you.

If you wish to shift in your chair during the session, feel free to do so, so you can get more comfortable. Also, you may wish to remove your glasses or a tight watch, etc. (At this point, students were asked to recline their chairs).

Now, get as comfortable as you can, close your eyes and listen to what I'm going to tell you. Try to empty your mind of all images and thoughts and just relax. If distracting thoughts and images occur in your mind, try not to dwell on them. Don't try to solve problems or think things over. Just let any distracting thoughts pass through your mind and drift out. To help you rid your mind of distracting thoughts, count slowly in your head to three. (This instruction was repeated twice more).

Now... You are walking along the beach; it is mid-July. It is very, very warm. It is five o'clock in the afternoon. The sun has not yet begun to set but it is getting low on the horizon. The sun is a golden, blazing yellow, the sky a brilliant blue, the sand a dazzling, glistening white in the sunlight. Feel the cold, wet, firm, hard-packed sand beneath your feet. Dig your toes into it and feel its coolness on your feet; it is very soothing (pause).

Taste and smell the salt in the air. There is a residue of salt deposited on your lips from the ocean spray. You can taste it if you lick your lips (pause). Hear the beating of the waves, the rhythmic lapping to and fro, back and forth of the water against the shore. Notice the relaxing rhythm of the waves as they gently surround and refresh your feet. Hear the far-off cry of a distant gull as you continue to walk (pause).

Suddenly, you come to a sand dune, a mound of pure, white sand. Covering the mound are bright yellow buttercups, deep pink moss roses. The sweet aroma of these flowers is heavy in the air. Breathe the aroma (pause). Brightly colored butterflies are darting back and forth among the flowers.

You sit down on the crest of the sand dune and open your can of coke. As you take a mouthful, you feel the bubbles against your nose and throat. Taste it - it is very cool and refreshing as you sit on the sand dune, soaking up the afternoon sun (pause).

You lie down on the sand now, listening to the lapping of the waves, the cry of the gulls, and enjoying the smell of the flowers around you. You look up at a wisp of a cloud in the blue sky. The sun is still hot on your face as you drift, you float, you doze (long pause).

When you finally sit up, you look out to sea. The sea is like a mirror of silver reflecting the sun's rays, a mass of pure white light, and you are gazing intently into this light. As you continue to stare into the sun's reflection off the water, you begin to see flecks of violet, darting spots of purple intermingled with the silver. Everywhere there is silver and violet. There is a violet line along the horizon...a violet halo around the flowers. The horizon looks endless - you wonder what lies beyond that far expanse of blue sky meeting blue sea (pause). As you continue to stare into the horizon, the two blues seem to merge into one and it goes on forever (pause).

Now, the sun is beginning to set. With each movement, with each motion of the sun into the sea, you become deeper and deeper relaxed. The sky is turning crimson - scarlet - pink - amber - gold and orange as the sun sets... you are

engulfed in a deep purple twilight, a velvety blue haze... you look up into the night sky. It is a brilliant starry night. Each star sends out a bright glow in the otherwise black sky. You gaze into the heavens which seem to have no end. You continue to gaze into the stars (long pause).

Now you focus on the Big Dipper - each of its stars sending out a powerful glow in the night. As you continue to stare into the stars, you are aware of the beating of the waves, the smell and taste of the salt, the sea, the sky... and you feel yourself carried upward and outward into space, one with the universe...

I am now going to count backwards from five to one. At the count of one, continue to relax with your eyes closed while I put the pulsemeter on your finger and take three readings. I'll let you know when that is finished.

Appendix I

Table I-1. ANOVA summary of mean trait anxiety for the three anxiety groups prior to relaxation training

Source of Variation	SS	df	MS	F
A (Anxiety type)	58.75	2,49	29.37	0.77
M (Relaxation method)	0.40E-01	1,49	0.40E-01	0.11E-02
AxM	12.85	2,49	6.43	0.17
P (Subjects)	1870.73	49	38.18	

*p<.05

**p<.01

Table I-2. ANOVA summary of mean state anxiety for the three anxiety groups prior to relaxation training

Source of Variation	SS	df	MS	F
A (Anxiety type)	3488.69	2,49	1744.35	2.24
M (Relaxation method)	13.96	1,49	13.96	0.18E-01
AxM	961.03	2,49	480.52	0.62
P (Subjects)	38190.4	49	779.40	

*p<.05

**p<.01

Table I-3. ANOVA summary of mean pulse rate for the three anxiety groups prior to relaxation training

Source of Variation	SS	df	MS	F
A (Anxiety type)	179.15	2,49	89.57	0.48
M (Relaxation method)	6.05	1,49	6.05	0.33E-01
AxM	98.27	2,49	49.13	0.26
P (Subjects)	9124.40	49	186.21	

*p<.05

**p<.01

Table I-4. ANOVA summary of mean state anxiety for the three anxiety groups before and after relaxation

Source of Variation	SS	df	MS	F
Between Subjects				
A (Anxiety type)	5052.36	2,49	2526.18	2.38
M (Relaxation method)	104.31	1,49	104.31	0.98E-01
AxM	457.65	2,49	228.83	0.22
P (Subjects)	52022.6	49	1061.69	
Within Subjects				
S (Pre vs Post)	42638.0	1,49	42638.0	124.98**
AxS	190.49	2,49	95.25	0.28
MxS	24.29	1,49	24.29	0.71E-01
AxMxS	613.31	2,49	306.65	0.90
SxP	16716.8	49	341.16	

*p<.05

**p<.01

Table I-5. ANOVA summary of mean pulse rate for the three anxiety groups before and after relaxation

Source of Variation	SS	df	MS	F
Between Subjects				
A (Anxiety type)	197.44	2,49	98.72	0.38
M (Relaxation method)	57.60	1,49	57.60	0.22
AxM	19.25	2,49	9.63	0.37E-01
P (Subjects)	12701.1	49	258.21	
Within Subjects				
H (Pre vs Post)	951.49	1,49	951.49	40.56**
AxH	27.85	2,49	13.93	0.59
MxH	16.89	1,49	16.89	0.72
AxMxH	96.67	2,49	48.34	2.06
HxP	1149.55	49	23.46	

*$p < .05$

**$p < .01$

Appendix J

Table J-1. Paired comparisons of mean group responses to the cognitive anxiety items on the CSAQ

Group Mean Comparison	Computed F	Scheffé Criterion F(.05)	Scheffé Criterion F(.01)
SA with MA	21.54**	6.38	10.16
MA with CA	4.60	6.38	10.16
SA with CA	19.89**	6.38	10.16

*p<.05

**p<.01

Table J-2. Paired comparisons of mean group responses to the somatic items on the CSAQ

Group Mean Comparison	Computed F	Scheffé Criterion F(.05)	Scheffé Criterion F(.01)
SA with MA	0.37	6.38	10.16
MA with CA	30.83**	6.38	10.16
SA with CA	20.55**	6.38	10.16

*p<.05

**p<.01