The Interaction of Locus of Control and the Structure of Relaxation Training

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THE INTERACTION OF LOCUS OF CONTROL AND THE 
STRUCTURE OF RELAXATION TRAINING 

by 
Bevan Todd Graybill 

A dissertation submitted in partial fulfillment 
of the requirements for the degree 
of 
DOCTOR OF PHILOSOPHY 
in 
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Approved: 

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Logan, Utah 

1980
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Bevan Todd Graybill
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ABSTRACT

The Interaction of Locus of Control and the Structure of Relaxation Training

by

Bevan Todd Graybill, Doctor of Philosophy
Utah State University, 1980

Major Professors: Dr. Michael Bertoch and Dr. Keith Checketts
Department: Psychology

The purpose of this study was to evaluate the thesis that matching locus of control with therapeutic treatment enhances behavior change. This idea was tested by comparing the effectiveness of a structured and an unstructured home practice of relaxation for internal and external locus of control subjects. It was expected that internal locus of control subjects would respond better to the unstructured training method and external locus of control subjects would respond better to the structured technique.

The subjects were 80 undergraduate college students. Forty internal locus of control students and 40 external locus of control students, with the highest degree of anxiety as measured by the State Trait Anxiety Inventory A-trait scale, were selected as subjects and randomly assigned to either a structured or an unstructured relaxation training. The relaxation training consisted of five weekly laboratory relaxation
training sessions and daily home practice. The home practice involved either a structured procedure in which subjects were instructed to listen to a prerecorded relaxation tape or an unstructured procedure in which subjects were encouraged to develop their own strategies for relaxation. The effectiveness of the relaxation training was measured by five dependent variables: EMG, skin temperature, State Trait Anxiety Inventory (A-state and A-trait scales), and number of reported home practice sessions. The data was analyzed by using analyses of variance with repeated measures.

The expected interaction between locus of control and the structure of treatment was not found in this study. Although the relaxation training was effective in reducing physiological and subjective anxiety, the matching of locus of control with a structured or an unstructured home practice of relaxation did not significantly improve the acquisition of the relaxation training. The idea that relaxation training is too readily an acquired response to use in comparing differential effectiveness is discussed. It is recommended that future research examine the interaction between locus of control and the structure of relaxation training with a clinical population. It is also recommended that future research verify with a clinical population the finding in this study that there is no practical difference between taped and individualized home practice of relaxation training.

(133 pages)
One of the most widely used personality variables in contemporary psychological research is Rotter's construct of internal versus external control of reinforcement or locus of control (Blass, 1977). By 1975, there were over 1200 published and unpublished research references involving locus of control (Thornhill, Thornhill, and Youngman, 1975).

The framework from which locus of control developed is Rotter's social learning theory (Rotter, 1954 and Rotter, 1975). The general formula for behavior in this theory involves two parts. The potential for a behavior to occur in any specific psychological situation is a function of (1) the expectancy that the behavior will lead to a particular reinforcement in that situation and (2) the value of that reinforcement. Expectancies in each situation are determined not only by specific experiences in that situation, but also by experiences in other situations which the individual perceives as similar. If a situation is novel or ambiguous, then an individual will depend upon generalized expectancies that have served one in the past.

The internal versus external control of reinforcement (I-E) construct is a generalized expectancy within this social learning theory which occurs when individuals have learned that events are contingent or non-contingent upon one's behavior. The I-E variable refers to the degree to which an individual
perceives that the events that happen to one are dependent upon one's own behavior (internal) or are the result of fate, luck, chance, or powers beyond one's personal control and understanding (external).

Strickland (1978) recently completed a review of the literature of internal-external control expectancies and health related behaviors. In this article, she examined psychological treatment and concluded that individuals in treatment become more internal as treatment progresses. However, she noted that a more complicated interaction may better explain the situation. Specifically, Strickland theorized that congruence of expectancies and situations enhances behavior change. She summarized that "external individuals evidently respond more easily to conditions in which structure is imposed from outside. Internals prefer situations in which they can assume responsibility and work independently." The practical implications of Strickland's theory are that helping professionals will be most effective when they tailor their techniques to the individual's own locus of control.

The purpose of this study was to examine the thesis that behavior change is enhanced by matching locus of control with therapeutic treatment. This theory was tested by comparing the effectiveness of a structured relaxation training method and an unstructured relaxation training method for internal and external
locus of control subjects. To this date, there has not been a study which has used both subjective and physiological measures to examine the interaction of locus of control and the structure of relaxation training.

Objectives

The objective of this study was to determine if there was an interaction between locus of control and the structure of home practice in the acquisition of relaxation training. The expected interaction was that internals would most effectively learn relaxation with unstructured, individualized home practice and that externals would gain maximum benefits from a structured or audiotaped home practice. The dependent variables were several measures of the effectiveness of the relaxation training.

Two physiological measures were used: EMG and skin temperature. These parameters were measured before and after each of the five training sessions. It was expected that as all subjects completed each relaxation training session their EMG level would decrease and their skin temperature would increase. As relaxation training ideally generalized over time, it was expected that the baseline level of EMG would decrease and the baseline skin temperature would increase across the five training sessions.

Two other dependent measures were state and trait anxiety (Spielberger, 1966). These were measured before and after the
entire treatment procedure. State anxiety refers to a transitory emotional condition; trait anxiety is conceptualized as a relatively stable personality variable of anxiety proneness. Relaxation training typically reduces state anxiety but has no effect on trait anxiety (Stoudenmire, 1975).

The frequency of reported home practice of relaxation was also measured. More frequent home practice was expected to reflect more effective relaxation training.

Hypotheses

1. There is no difference in EMG among the five training sessions and across the five training sessions between (1) internal and external locus of control subjects; (2) subjects who received a structured and those who received an unstructured home practice of relaxation; and (3) before and after each training session. It was also hypothesized that there are no interaction effects.

2. There is no difference in skin temperature among the five training sessions and across the five training sessions between (1) internal and external locus of control subjects; (2) subjects who received a structured and those who received an unstructured home practice of relaxation; and (3) before and after each training session. It was also hypothesized that there are no interaction effects.
3. There is no difference in state anxiety between (1) pre and post treatment; (2) internal and external locus of control subjects; and (3) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there are no interaction effects.

4. There is no difference in trait anxiety between (1) pre and post treatment; (2) internal and external locus of control subjects; and (3) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there are no interaction effects.

5. There is no difference in frequency of reported home practice between (1) internal and external locus of control subjects and (2) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there is no interaction effect.

Limitations

The sample in this study was composed of normal, volunteer college students. Generalization to non-volunteer and non-college populations must be done with caution.

Also, the sample in this study was not clinically motivated. The subjects did not request treatment in relaxation training.
and were not extremely high in physiological or subjective anxiety. The sample was different from the average client for whom relaxation training is an appropriate treatment. This difference must be kept in mind when generalizing from this study.

**Definition of Terms**

**ANSIE.** The Adult Nowicki-Strickland Internal-External Control Scale.

**Congruence theory.** Strickland's (1978) idea that matching of locus of control and therapeutic treatment enhances behavior change.

**EMG.** Electromyography, which is the electrical activity in the frontalis muscle and directly reflects muscle tension.

**External locus of control.** An individual who believes that the events which happen to him are typically the result of fate, luck, chance, or powers beyond his control and understanding.

**Internal locus of control.** An individual who believes that the events which happen to him are dependent upon his own behavior.

**Locus of control (I-E).** A personality variable which denotes if a person perceives that events are contingent (internal) or non-contingent (external) upon his behavior.
Relaxation training. A procedure of systematically relaxing different muscle groups of the body which results in lowered physiological arousal and subjective feelings of peace.

Skin temperature. The temperature in degrees Fahrenheit of the surface of the hand.

State anxiety. A transitory emotional condition characterized by feelings of tension and apprehension and by activation of the autonomic nervous system.

Structured home practice. Daily practice of relaxation by listening to a prerecorded tape of the relaxation exercises and completing a multiple choice diary of the practice.

Subject. An extreme internal or external locus of control student of average or moderate trait anxiety who completed five relaxation training sessions and daily home practice of relaxation.

Trait anxiety. A relatively stable, enduring personality variable of anxiety proneness.

Unstructured home practice. Daily practice of relaxation with an individualized procedure (no tape) which encouraged development of individual strategies for relaxation and which included completion of an essay-type diary of the practice.
Several areas of research related to the present study have been reviewed and will be presented in this chapter. The literature has been carefully delimited to provide information sufficient for understanding the purpose, rationale, and scope of the present study.

The review begins with the concept of locus of control and the theoretical foundation from which it originated - social learning theory. Strickland's congruence theory, which the present study examined, is then reviewed along with related research. Next, psychological differentiation, a concept similar to locus of control, is examined. Finally, relaxation training theory is reviewed. Included here is the literature related to taped versus live relaxation training and the physiological and subjective effects of relaxation training.

**Locus of control**

Social learning theory (Potter, 1954) provides the theoretical background for the concept of internal versus external control of reinforcement or locus of control. Potter was greatly influenced by two theorists, Hull and Tolman, and his social learning theory is an attempt to integrate these two trends in American psychology (reinforcement theory and cognitive learning theory).
The primary assumption in Rotter's theory of personality is that behavior is learned and is therefore modifiable and changes with experience. This theory is a social learning theory because it assumes that most behavior is learned through experiences with other people. Rotter believes that personality has unity or that a person's experiences or interactions influence each other. Past experiences influence current experiences, and current experiences change what one has learned in the past. The final assumption of social learning theory is that behavior has a directional aspect or is goal-directed. The directional aspect is inferred from the effect of reinforcing conditions.

In social learning theory, the general formula for behavior is that "the potential for a behavior to occur in any specific psychological situation is a function of the expectancy that the behavior will lead to a particular reinforcement in that situation and the value of that reinforcement" (Rotter, 1975, p. 57). Therefore, the prediction of behavior involves three variables: expectancy, reinforcement, and psychological situation. The equal emphasis upon reinforcement value, expectancy, and situational specificity makes Rotter's theory unique among learning theories which typically accentuate only the value or motive end of predictive formulas.

There are then four main concepts in social learning theory: behavior potential, expectancy, reinforcement value, and psychological situation. Behavior potential refers to the
potentiality of any behavior occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcements (Rotter, 1954). This refers to the probability of an individual responding when certain environmental and cognitive conditions are present.

Rotter defines expectancy as the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations. Expectancy is independent of the value or importance of the reinforcement. Each behavior that has been associated with reinforcement produces an expectancy; thus, each expectancy is based upon past experience. Expectancies vary in terms of their generality. One acquires generalized expectancies or expectancies specific to a given situation. Generalized expectancies operate across a variety of situations. Internal versus external control of reinforcement is a generalized expectancy and will be explored later in this chapter.

According to Rotter, reinforcement is something that changes behavior in some observable way by either increasing or decreasing the potentiality of its occurrence. Reinforcement value is the degree of preference for any one of a group of reinforcements to occur, if the probabilities of all occurring were equal. In other words, the value of a reinforcement is its importance based on past experiences.
The fourth major concept in the prediction of behavior is the psychological situation. This refers to the situation as it is defined from the perspective of the person. The potential for a behavior is different in different situations.

Locus of control or internal versus external control of reinforcement is a generalized expectancy variable within social learning theory. Locus of control has lately been a popular subject for psychological research, and the misconception has developed that locus of control is the central concept in social learning theory. It is not. As explained previously, it is only one of three variables involved in predicting behavior. Originally, Rotter observed that changes in expectancy following reinforcement varied systematically as a characteristic of the person who was reinforced. Rotter then searched for a variable that would help him refine his prediction of how reinforcements change expectancies. The key variable was the belief that reinforcement was contingent or non-contingent upon one's behavior. The concept of internal versus external control of reinforcement is defined as follows:

When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as a result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control (Rotter, 1966, p. 1).
So the theory states that the effect of a reinforcement depends upon whether a person perceives a causal relationship between his own behavior and the reward.

Rotter's theory views this individual difference as extremely significant in understanding human behavior and the learning process. Since it is a generalized expectancy, it would affect a variety of behaviors across a broad range of situations.

According to social learning theory, expectancies in each situation are determined by two factors: (1) specific experiences in that situation and (2) experiences in other situations which the individual perceives as similar. A generalized expectancy is one which is applied to situations which are perceived as similar or related. Generalized expectancies are most predictive in novel or ambiguous situations and relatively less important when an individual finds himself in a situation similar to experiences he has had in the past (Strickland, 1977). Therefore, the locus of control variable is most important and predictive in novel or ambiguous situations and less vital in routine or straightforward situations.

Locus of control is a continuum, and people can be ordered along that continuum (Phares, 1978). People differ in the degree to which they attribute events to their own actions, depending on the individual's own history of reinforcement.
Three early investigations sought to establish the importance of locus of control in understanding behavior. They were studies of the differential role of skill and chance factors in affecting expectancies for task success. Phares (1957) asked subjects to perform two perceptual judgment tasks. Some subjects were told that the task was so difficult that success was largely a matter of chance. Others were instructed that success was entirely a matter of personal ability. Over a series of trials, subjects were asked to state an expectancy or confidence level prior to each trial. The results demonstrated that changes in expectancy following success or failure were greater under skill conditions than under chance conditions. When subjects believed their performance to affect results, they made appropriate and realistic judgments which followed their past performance. In chance or luck conditions, subjects made judgments unrelated to and independent of their performance.

This study was followed by one by James and Rotter (1958). This study found that varying instructions as to whether a task was skill or chance based also influenced extinction and acquisition. Subjects under chance instructions showed the usual greater resistance to extinction under partial (50%) reinforcement condition. Apparently, when told that performance depended on chance, subjects continued trying during extinction hoping their luck would turn. Under 100% reinforcement conditions, subjects in the chance condition extinguished more
quickly as if their luck had changed. When subjects were given skill instructions, a reversal of the time honored reinforcement/extinction results occurred in that subjects in the partial reinforcement condition extinguished more quickly and in the 100% reinforcement condition more slowly. These results suggest that individuals who are operating as if they are skilled in a certain task and who have been led to believe that they have successfully mastered the task may find it difficult to accept the fact that their performance is no longer proficient.

In another study, James (1957) reported differences between skill and chance groups in acquisition of expectancies. He found significantly greater generalization of expectancies from one task to another under skill rather than chance instructions.

The conclusion of these studies was that when subjects perceive that success in a task is controlled by chance rather than by their own behavior, any reinforcement given for their responses is less effective than it would be if they believed that their success was internally controlled. These studies are important in that they suggest that human learning and behavior are not only a function of reinforcement but also dependent upon the individual's perception of locus of control of reinforcement.
Congruence Theory

The theory that behavior change is enhanced by matching locus of control with therapeutic treatment was formulated in the most recent review of locus of control (Strickland, 1978). Strickland reviewed internal-external expectancies and health related behaviors, and she found that individuals in therapy or self-improvement groups seem to become more internal as treatment progresses. However, she explained that a more complicated interaction seemed to occur when subjects were differentiated according to I-E expectancies and placed in varied treatments. Strickland found that the most pervasive behavior changes appeared when there was congruence between locus of control expectancies and the structure of the therapy. Specifically, internals wanted more control of the therapies, and externals preferred more structured approaches. Strickland also found a similar interaction in regard to physiological responding. Internals seemed to be generally superior to externals in responding to biofeedback paradigms. However, the literature suggested that internals and externals may be using different strategies in biofeedback paradigms and that effective responding might be increased if individuals are in conditions that are congruent with their expectancies for control.

Strickland concluded her article with the statement that congruence of expectancies and situations appears to increase
behavior change. She stated that "external individuals evidently respond more easily to conditions in which structure is imposed from the outside. Internals prefer situations in which they can assume responsibility and work independently." The research literature which is related to this interaction of locus of control and structure of the treatment situation will now be examined.

A number of studies, in which subjects have been differentiated according to I-E expectancy and placed in psychotherapeutic treatments of varying amounts of structure, have supported Strickland's congruence theory. Nowicki, Bonner, and Feather (1972) investigated the effects of locus of control and differential interview procedures on subjects' perception of the therapeutic relationship. Thirty-two male college students were assigned to either a relaxation technique or an interview situation for one session. They found that internals and externals perceived the same therapist differently depending on which technique was used; internals preferred the therapist in the interview situation, and externals preferred the therapist who conducted a relaxation technique.

Such a client preference was also indicated in a study by Friedman and Dies (1974). They matched extremely internal and external college students and divided them into one of three comparable, five-week therapy groups: counseling,
systematic desensitization, and automated desensitization. At the end of treatment, subjects were asked about their degree of satisfaction with the treatment. Externals provided with counseling and systematic desensitization reported they felt they retained too much control of the therapy while internals indicated an optimal amount of control in counseling. In all the therapy conditions, internals reported that if given a choice, they would have chosen "more client control" significantly more often that externals. Internals were also more likely to attempt to individualize therapy and appeared more resistant to the control implied in the two behavior therapies.

In a study of therapeutic outcome, Abramowitz, Abramowitz, Roback, and Jackson (1974) examined the differential effectiveness of directive and nondirective group therapies as a function of client I-E control. They assigned 26 college students to directive and nondirective groups. Ten subjective outcome measures of psycho-social adjustment were used. They found that overall outcome was most favorable when externals were matched with a directive group and internals with a nondirective group.

Kilmann and his associates have also evaluated the interaction of locus of control and the structure of group therapy. In their first study (Kilmann and Howell, 1974) of a 23 hour marathon group situation for hospitalized female narcotic addicts, they found that internals were better therapeutic
risks than externals. Internals made greater efforts to be successful and involved in the therapy, to understand themselves, and to become more reflective and serious. They found no interaction in therapy outcome between locus of control and the structure of therapy. However, in two further studies with college students, significant interactions were found. In Kilmann, Albert, and Sotile (1975), externals achieved the most significant therapeutic benefits in a structured format, and internals achieved maximal gain with minimal control and structure. Likewise, Kilmann and Sotile (1976) found a significant interaction between locus of control and the structure of the group leader's role. Subjects rated the leader and the group more positively and improved in anxiety and depression when externals were in groups with a structured leader and internals were in groups with an unstructured leader.

In one study of individual psychotherapy, Morley and Watkins (1974) compared two methods of rational-emotive therapy with 30 internal and external locus of control subjects with public speaking anxiety. One method was conventional RET with direct disputing of irrational beliefs. The second method was a modified form of RET, and it was less directive. The modified therapy helped the subject discriminate and then choose between rational or irrational beliefs. Internals and externals were randomly assigned to one of the two treatment methods. The results showed a significant interaction: externals showed
the greatest reduction in overt anxious behaviors with conventional RET, and internals showed the greatest therapeutic gains in the modified RET condition.

These findings in psychotherapeutic situations paralleled behavior modification results that have occurred when individuals were differentiated as to I-E expectancy and exposed to different procedures. For example, Best and Steffy (1975) involved 42 internal and external smokers in one of two smoking modification procedures. Congruence of locus of control expectancies and experimental conditions produced the most profound changes. Internals responded best in a self-planned satiation program where the individual planned the rate of cigarette reduction. Externals smoked less in a condition where the experimenter controlled the rate of reduction. Two other studies of behavioral techniques have shown similar findings. Therapeutic gains were maximized in a weight reduction program (Wallston, Wallston, Kaplan and Maides, 1976) and a covert sensitization treatment of heroin abusers (Snowden, 1978) when I-E expectancies were consistent with the treatment programs.

Several researchers have investigated the relationship between locus of control and relaxation training, which is the treatment in this study. Three studies have shown that relaxation training leads to increased internality (Cox, Freundlich, and Meyer, 1975; Ryan, 1976; Babcock, 1977). The interaction between the type of relaxation and locus of control
has also been studied. Ollendick and Murphy (1977) found some
evidence of the differential effectiveness of muscular and
cognitive relaxation as a function of locus of control. Thirty-
six women, half internals and half externals, were assigned
to one of three groups: muscle relaxation, cognitive relaxation,
and a control group. The muscle relaxation produced significantly
greater reduction in heart rate and state anxiety over the
control group in externals. The cognitive relaxation group
tended to produce better results over the control group for
internals. Although this study did support the matching of
client-treatment variables, it was not strong or clear-cut
in its conclusions, and it was not designed to compare the
difference between structured and unstructured treatments.
Golden (1975) did find a significant interaction between locus
of control and therapist versus self induced systematic de-
sensitization of test anxiety. With self report of test anxiety
as the dependent variable, he found that internals reduced
their anxiety best with self induced systematic desensitization.
Similar results were found with externals and the therapist
induced procedure.

Watson and Baumal (1967) were the first of several researchers
to examine the interaction of locus of control and the situation
in learning performance tasks. In their study, Watson and
Baumal had 30 internals and 30 externals learn a list of paired-
associate nonsense syllables either under instructions that those
associations learned would later serve as avoidance responses subject to their learning skill, or would sometimes serve as avoidance responses to be determined by chance. They found that internals made significantly more errors in the chance condition and externals made significantly more errors in the skill condition. They concluded that people perform best when locus of control and environmental situations are congruent, and they proposed that subjects become anxious in incongruous situations. Houston (1972) replicated this finding. Baron, Cowan, Ganz, and McDonald (1974) found a similar interaction between I-E expectancy and type of performance feedback. In a form discrimination task, internals performed superiorly to externals under a condition of self-discovery of success (intrinsic feedback), and externals performed better than internals when unverifiable praise was used (extrinsic feedback). And finally, in an interesting study, Browning (1976) also found that locus of control - hypnotic input congruence generated significantly higher behavioral scores and improved performance on a clinical task for both internals and externals. Congruence in this study existed when internals received an "I am" procedural input and externals a "You are" strategy.

The ability to monitor and change specific physiological responses may also be related to internal-external locus of control. The logical assumption is that persons who hold strong locus of control expectancies will have differing responses to
attempts to control their own internal physical states. Results of several studies show that internals are more sensitive to internal states and learn control more quickly when compared with externals in physiological biofeedback paradigms. Johnson and Meyer (1974) and Wagner, Bourgeois, Levenson, and Denton (1974) demonstrated this in alpha conditioning and GSR biofeedback respectfully. Gaston (1977) found that, although there was no difference between internals and externals in baseline EMG, internals achieved lower EMG levels than externals in a biofeedback paradigm. In terms of vascular response, Blankstein and Egne (1977) found that internals were superior to externals in both raising and lowering their heart rate with biofeedback given sufficient training.

Several studies suggest that internals and externals may be using different mental strategies in biofeedback learning. Fotopoulus (1971) reported internal subjects to be more capable than externals of increasing heart rate without either reinforcement or feedback, whereas externals could only increase heart rate under a reinforcement paradigm. In another biofeedback study, Ray (1974) found that in the initial stages of training internals were better able to increase their heart rate but externals were better able to decrease their heart rate. Several self-report questionnaires seemed to indicate that internals and externals adopted different strategies for controlling heart rate. Cromwell, Butterfield, Brayfield, and
Curry (1977) in their work with I-E/cardiovascular relationships noted that internals may respond to opportunities to work individually and externals may need structure or outside influence. DeGood (1975) found this to be the case. He studied 24 internals and 24 externals under one of two aversive shock avoidance procedures. Half of the subjects could escape shock by asking for a rest period, and half had rest periods imposed by the experimenter. Control over initiation of rest had an arousal-reducing effect on systolic blood pressure for all subjects. Diastolic blood pressure change appeared to be a function of an interaction of I-E expectancies and the situation. Elevations were lowest when personal and situational factors were congruent, that is, for internals in conditions of self-initiation or rest and for externals under imposed rest.

In the research literature, there are a number of studies which do not support Strickland's congruence theory. It is interesting to note that all of these studies are unpublished dissertations. Johnson (1976) compared the differential effectiveness of autogenics and stimulus control in reducing sleep onset insomnia in internal and external locus of control clients. Thirty-two clients were divided into internals and externals and randomly assigned to one of the two treatment groups. All clients showed significant improvement. There were no differences between the treatments; internals showed more improvement than externals, and there was no interaction effect.
Meinster (1974) investigated the interaction of locus of control and type of therapy on the response to treatment for social anxiety. Two behavioral treatments were involved which were thought to coincide with the extreme control expectancies. A self-reinforcement therapy was internally oriented, and a systematic desensitization treatment was the external mode. Twenty-six students who sought help were divided into the two groups. There were no differences between the two groups on the dependent measures and observations, and there was no interaction between treatment and locus of control. It should be noted that neither of these two studies selected extreme subjects on the I-E personality dimension.

Two studies examined test anxiety and the differential effectiveness of two different treatments for internal and external subjects. Neither study showed a significant interaction. Martinez (1978) used two systematic desensitization procedures which differed in whether self-control or therapist control suggestions were used. Neunuebel (1978) used an automated systematic desensitization and a cognitive behavior modification procedure as his two treatments.

Three additional studies are in conflict with the notion of matching locus of control and treatment situations. Sadowsky (1975) investigated the effects of structure and locus of control on encounter group process and found no interaction between the two. Maiuro (1978) examined the effect of self
versus externally attributed systematic desensitization procedure and locus of control in the treatment of speech anxiety and found that locus of control was not a significant predictor of therapeutic outcome for these procedures. Noble (1978) found no interaction between locus of control and subject versus therapist control over termination of an aversive stimulus in a snake phobia desensitization procedure.

In summarizing the research related to Strickland's congruence theory, the bulk of the literature does support her idea that matching of locus of control and situations maximizes behavior change. An interaction between these two variables has been found in studies of group and individual psychotherapy, behavior modification, relaxation training, learning tasks, and physiological responding. However, there are some studies which do not support Strickland's theory. Most of the studies which conflict with the congruence theory have employed relaxation or systematic desensitization as the treatment. None of these conflicting studies has used physiological measures of relaxation, however. It also seems that those studies which have not found an interaction between locus of control and treatment situations have not used extreme internal-external groups but have divided their subjects in half. To this date, there has not been a study which has used both subjective and physiological measures to examine the interaction of locus of control and the structure of relaxation training.
Psychological Differentiation

The concept of psychological differentiation appears similar to the concept of locus of control. H.A. Witkin and his colleagues have been researching this dimension for more than 30 years. This cognitive dimension reflects the degree to which people function autonomously of the world around them. People at one extreme of the dimension are likely to have internal frames of reference available to them that they use in articulating incoming information. People at this extreme are said to be field independent. People at the opposite extreme are likely to use external frames of reference and are less active in processing incoming information. They are said to be field dependent.

The concepts of field dependence and field independence originated in classical laboratory experiments concerned with the relative importance of inner versus visual field cues to the perception of the upright in space. Witkin (1949) devised a situation which became known as the Tilting-Room - Tilting-Chair Test. In this test, a person seated within a small tilted room is required to adjust his body to the upright from an initially tilted position. In carrying out this task, people at one extreme adjust the body close to the upright, regardless of the orientation of the surrounding room, indicating that the body is experienced as discrete from field and that information from within the body itself provides the main referent for
judging body position. This extreme was labeled field independent. Other people, at the opposite extreme, tilt the body far toward the axis of the tilted room around them, indicating that the body is not experienced separately from its surroundings and that the external field is used as the main referent for judging body position. This extreme was labeled field dependent.

Another situation which was used to establish the field dependent-field independent concept was the rod and frame test. It requires the subject to bring a tilted rod, centered within a tilted frame, to the upright. Here again, some people tend to use the external field as the main referent for judging rod position, aligning the rod with the tilted frame in order to perceive the rod as straight; others, using the field position of the upright body as a referent, bring the rod close to the vertical. People tend to be consistent across these and other similar tasks in degree of reliance on external field or self as basis for perception; or they tend to show field dependent or field independent cognitive styles (Witkin and Goodenough, 1977).

A relationship between psychological differentiation and locus of control could be anticipated on the basis of the apparent similarities between the constructs. Specifically, research on the pairing of field dependents and field independents with different kinds of therapy bears a relation
to this study. Greene (1972) found that clients perceived the relationship as more positive when their cognitive style was congruent with the therapists'. Also, therapists chose treatment methods which were congruent with their clients' cognitive style: supportive for field dependent and self-awareness for field independent. Folman (1973) also found that patient-therapist pairings in which both parties were field dependent or field independent liked each other better and also stayed in therapy longer than dissimilar or incongruent pairings. Similarly, Karp, Kissin, and Hustnyer (1970) found that alcoholic patients selected for insight psychotherapy were significantly more field independent than patients selected for more structured (pharmacologic) therapies. Witkin, Lewis, and Weil (1968) found therapists to respond to field dependent patients with more active direction than they used with field independent patients. Also Koff (1972) questioned patients prior to their entering psychotherapy and found that field dependents expected advice and guidance from their therapists to a significantly greater extent than field independent patients.

These studies would seem to point to the similarity of field dependence with external locus of control and field independence with internal locus of control. They also seem to imply a sort of congruence theory similar to the one examined in this study, with field dependent people responding to
structured situations and field independent people responding to situations in which they have more responsibility. However, despite the superficial similarities between locus of control and psychological differentiation, a number of studies have shown no relationship between these two constructs. Rotter (1966) found no significant correlation between locus of control and one measure of differentiation. Four additional studies have also found no relationship between locus of control and various measures of psychological differentiation (Chance and Goldstein, 1971; Lefcourt and Telegdi, 1971; Pottinger, 1972; and Tobacyk, Broughton, and Vaught, 1975).

Lefcourt and Telegdi (1971) proposed that using a combination of these empirically unrelated but theoretically relevant factors would result in more precise prediction. They found significant interactions between locus of control and differentiation on two measures of cognitive activity and verbal productivity. Congruent groups (internal-field independent and external-field dependent) did significantly better than incongruent groups (internal-field dependent and external-field independent). Tobacyk, Broughton, and Vaught's (1975) study supported Lefcourt and Telegdi's findings. The two congruent groups demonstrated better personality adjustment on a real self, ideal self Q sort than did the incongruent groups. However, three later studies found no interaction between locus of control and psychological differentiation.
Gormanous (1976), Erickson (1976), and Meck (1978) all tested Lefcourt and Telegdi's congruence theory and found no significant differences between the congruent groups and the incongruent groups on various measures of personality adjustment.

In conclusion, although the constructs of psychological differentiation and locus of control appear similar by description, research has yet to indicate any relationship between the two.

Relaxation Training

Progressive relaxation is a technique developed by Edmund Jacobson. Jacobson, a physician, began work in 1908 to develop a physiological method of combating tension and anxiety. In circulatory and nervous disorders, he noted that prescribed rest was a vital component of the treatment. However, he found that rest did not always result in relaxation and that some people were unable to relax. Jacobson termed this "residual tension" and technically described this phenomena as neuromuscular hypertension evidenced by hyperactivity of reflexes, muscle excitability, spastic condition of smooth muscles, tremor and restlessness (Jacobson, 1938). The essential purpose of progressive relaxation was to eliminate residual tension.

Jacobson concluded from his early investigations that tension involved the effort manifested in the shortening of muscle fibers, that tension occurred when a person reported
"anxiety", and that such anxiety could be removed by eliminating the tension. Relaxation of muscle fibers was seen as the direct physiological opposite of tension and was, therefore, a logical treatment for the overly tense or anxious person. Jacobson discovered that by systematically tensing and releasing various muscle groups and by attending to the different sensations of tension and relaxation a person could eliminate muscle contractions and experience a feeling of deep relaxation.

The progressive relaxation procedure developed by Jacobson was very lengthy and time consuming. The basic procedure involved 15 muscle groups. Each group was dealt with for from one to nine hour-long daily sessions before proceeding to the next group, for a total of 56 sessions of systematic training (Jacobson, 1962). The goal of the training was to acquire a discriminative "muscle sense" so that muscle tension was recognized by the subject and thereupon relaxed. Jacobson described several applications for progressive relaxation including cardiac disorders, chronic insomnia, and neurasthenia (nervous hypertension with fatigue). He reported that he commonly found a reduction or elimination of symptoms within one or two months of relaxation treatment (Jacobson, 1938).

Joseph Wolpe is generally credited with popularizing relaxation training; he modified Jacobson's procedures and applied them in the treatment of phobic disorders. Wolpe's technique of systematic desensitization uses relaxation to
reduce anxiety associated with specific objects or events. Wolpe considered anxiety and relaxation as incompatible responses, and in systematic desensitization anxiety provoking stimuli are presented while the subject is relaxed (Wolpe, 1958 and 1973).

Wolpe modified Jacobson's relaxation procedure to make it briefer. Usually about six relaxation training sessions are conducted with daily home practice between sessions. Wolpe's work resulted in a much more efficient relaxation program and a great reduction in therapy time devoted to training.

Borkovec, Grayson, and Cooper (1978) reported two experiments designed to determine the efficacy of progressive relaxation beyond demand/suggestion effects. In their first study, 43 overly anxious college students showed no change in their self-monitoring of daily tension percentage and severity for a four week baseline period in either a no-treatment or a demand condition. Subjects given four subsequent sessions of progressive relaxation did report significant reductions in tension, which were maintained at a seven month follow-up. The second study included 36 overly tense college students and compared no-treatment condition to a group given nine sessions of progressive relaxation. Counterdemand instructions (subjects told not to expect any change) were in effect for the first seven sessions. Relaxation produced reductions in daily tension percentage significantly superior to no-treatment
during the counterdemand period, and the treatment effects were maintained at a five month follow-up. These results suggest that some active ingredient within progressive relaxation contributed to the subjects' improvement, independent of demand/suggestion effects. It should be noted that no treatment effects were found on several during session physiological measures.

There appear to be no differential effects between internal and external locus of control subjects in their response to relaxation training. Harrell (1977) investigated the physiological nature of progressive relaxation and its effectiveness in reducing stress reactions. He found progressive relaxation superior to self-relaxation in reducing physiological activity during stress conditions. However, he found that locus of control was not related to the reduction of physiological stress responses. Phillips (1976) also found no difference between internals and externals in their responsiveness to biofeedback relaxation training.

**Taped versus live relaxation training.** A review of the literature implies no clear advantage for either live or taped relaxation training. Only three studies in the literature refer to taped home practice of relaxation training. The first study was reported by Migler and Wolpe (1967). In this case study, the client recorded his own relaxation instructions and successfully carried out his own desensitization at home.
Denholtz (1970), in another case study, reported the successful use of tape-recorded relaxation instructions between treatment sessions to enhance therapeutic effectiveness. Dawley (1975) reported a third case study in which taped relaxation techniques were utilized in home practice with successful results. Although these three case studies imply effectiveness for tape-recorded home practice, this has not to this point been put to a scientific test and compared with home practice of relaxation without a tape.

Most of the research has focused on therapist presence versus taped instructions during the relaxation training sessions. Dawley, Floyd, and Smith (1974) reviewed 37 studies pertaining to self-administered, minimal therapist contact, and automated behavior therapy and concluded that recorded relaxation training is a viable treatment approach. This conclusion was based principally on four studies. Donner and Guerney (1969), Donner (1970), and Devine (1974) found that both live and taped presentations of a test anxiety desensitization procedure significantly reduced self-report of anxiety over control groups, but there were no differences between the live and the taped groups. Evans and Kellam (1973) treated 24 phobic patients in either a live or a taped desensitization procedure. They also found that both treatments were beneficial and that there were no differences between the live and the taped procedures.
A number of studies since the review by Dawley, Floyd, and Smith (1974) have supported the conclusion that taped relaxation training is as effective as live training. Three studies showed no difference between live and taped relaxation in the desensitization of public speaking anxiety, phobias, and insomnia (Busch, 1979; Branhan and Katahn, 1974; Gersham and Clouser, 1974). Several other studies have directly compared the physiological and subjective effects of live and taped relaxation training. Rober (1978) compared the effectiveness of live, video-taped, and audio-taped group relaxation training on the ability to reduce physiological arousal and self-report measures of anxiety. Sixty-eight undergraduates completed the six-week relaxation training, which included one training session per week and daily home practice. GSR and state anxiety were significantly decreased over a control group, and there was no difference between live and taped conditions. Israel and Beiman (1977) also found that live and taped relaxation significantly reduced physiological variables (heart rate, respiration rate, and muscle tension) and that there was no difference between the live and taped groups. Live relaxation, however, did significantly reduce subjective tension more than taped. Two additional studies report the physiological effectiveness of taped and live relaxation training but show no additional effectiveness in reducing subjective anxiety over control/placebo conditions. Riddick and Meyer (1973)
and Sammons (1975) report significant reductions in heart rate and EMG, respectively, with relaxation training over placebo groups. In both studies, there were no differences between taped and live training. However, in both studies, the treatment conditions were no different than the placebo conditions in reducing subjective anxiety.

Three studies differ significantly from the bulk of the literature on the comparative effectiveness of live and taped relaxation training. Paul and Trimble (1970) reported a study in which relaxation training tapes were evaluated against the same procedures conducted in the traditional live therapist format. Effectiveness of the two techniques was evaluated by physiological measures (muscle tension, heart rate, respiration rate, GSR) and self-report data. They reported that taped relaxation was "significantly inferior" to the live procedure in terms of physiological data but not in terms of the subjects' subjective reports. It should be noted that the authors used a "post hoc" comparison of the data. The study (Paul and Trimble, 1970) only obtained data on the taped relaxation procedures; this data was then compared to other data collected more than a year previously in another study. The authors also appear to have failed to control for the time variable in the acquisition of relaxation. They conducted only two sessions with each subject.
Beiman, Israel, and Johnson (1978) also found live training significantly superior to taped training on three of four physiological variables (heart rate, GSR, and EMG). Their training consisted of five sessions and daily home practice over 20 days. No difference was found between taped and live training on a subjective anxiety measure. Quayle (1979) also found live relaxation training to be superior to taped on physiological parameters.

In summary, there has been no research comparing taped and non-taped home practice of relaxation. Case studies have implied that taped home practice is an effective procedure in relaxation training. In reference to the procedure used in relaxation training sessions, the majority of the literature suggests that there is no difference between live and taped training. There are several studies however which report contradictory findings and suggest that live training is superior to taped in producing physiological relaxation.

The effect of relaxation on EMG, skin temperature, and state and trait anxiety. Many studies have shown that muscle tension or EMG is reduced as a result of progressive relaxation training. Jacobson (1962) in fact defines this condition as relaxation. Most studies have used frontalis EMG as the measurement. The studies which have demonstrated reduced EMG as a function of relaxation training are Quayle (1979); Beiman, Israel, and Johnson (1978); Miller and Bornstein (1977);
Schandler and Grings (1976); Weiher (1975); Israel and Beiman (1977); Sammons (1975); and Paul and Trimble (1970).

One study has shown a generalization effect or increasingly reduced EMG over time (Reinking and Kohl, 1975). They demonstrated that practice influenced the training in that in 15 training sessions EMG (measured during the last minute of each session) decreased progressively over time.

Several studies have indicated that peripheral skin temperature is increased as a result of relaxation training (Jacobson, Manschreck, and Silverberg, 1979; Quayle, 1979; Cauthen and Prymak, 1977; Eschette, 1977; and Ciouf, 1974). None of these studies has addressed whether the increased skin temperature generalizes over time because of the relaxation training.

Subjective self-report of anxiety is uniformly reduced with relaxation training. The literature has shown that sometimes this decrease is no different from the reduction in anxiety reported by control groups. In terms of the state-trait anxiety dimension, Robar (1978), Weiner (1977), Ollendick and Murphy (1977), Stoudemire (1975), and Stoudemire (1973) have all found relaxation training to reduce state anxiety but not trait anxiety. However, one study did find trait anxiety reduced as a result of five sessions of progressive relaxation training (Beiman, Israel, and Johnson, 1978).
Summary

A review of the literature indicates that a majority of the research supports Strickland's congruence theory. An interaction between locus of control and the type of situation or treatment has been found in the areas of psychotherapy, behavior modification, performance learning tasks, and physiological responding. However, there are some studies which conflict with Strickland's congruence theory. These conflicting studies have usually employed relaxation training or systematic desensitization as the treatment situation, and these studies have not included physiological measures in their research. The one study which did utilize physiological data in evaluating the interaction of locus of control and types of relaxation training produced positive but inconclusive results (Ollendick and Murphy, 1977). The present study does compare the effectiveness of a structured and an unstructured relaxation training procedure for internal and external locus of control subjects on both physiological and subjective measures of anxiety.

A review of the relaxation literature was conducted to determine if relaxation training was an appropriate treatment for testing Strickland's theory. That review indicated that there is no difference in the effectiveness of relaxation training for internal and external locus of control subjects. Therefore, relaxation training would seem to be a neutral
test of the congruence theory.

The present study used a taped home practice of relaxation as a structured treatment and an individualized home practice as the unstructured treatment. No studies have compared these two methods of home practice; however, a majority of the literature indicates that there is no difference in taped and live procedures when utilized in training sessions. Therefore, the literature suggests that there will be no systematic differences between the unstructured and the structured relaxation methods used in this study.
CHAPTER III
METHODOLOGY

Subjects

The population to which the results of this study was generalized was all undergraduate college students of moderate trait anxiety who are either extreme internals or extreme externals. The subjects in this study were obtained through undergraduate psychology and sociology classes conducted during the Summer and Fall 1979 quarters at Utah State University. A pool of 565 students in these classes were screened to obtain subjects for this study. Students in these classes were given the Nowicki-Strickland Locus of Control Scale (ANSIE) and the State-Trait Anxiety A-trait scale (STAI). At the same time, the pool of students was also given a questionnaire designed to inquire about health or medical problems (see Appendix A). There were three criteria for selecting subjects from the pool of students: (1) score at least one standard deviation above (externals) or below (internals) the mean on the ANSIE, (2) score among the highest on STAI trait anxiety, and (3) have no ongoing health or medical problems.

For the pool of 565 students, the mean ANSIE score was 7.69 with a standard deviation of 4.05. The mean STAI A-trait score was 38.28 with a standard deviation of 8.18.
Forty internal and forty external subjects were selected. The cutoff for identifying potential internal subjects was an ANSIE score of four or less; the cutoff for identifying potential external subjects was an ANSIE score of 12 or greater. From these potential internal and external students, 40 internals and 40 externals with the highest STAI A-trait scores (which indicated they were the highest in trait anxiety) were selected as subjects. The mean ANSIE score for the 40 internal subjects was 2.86, and the mean ANSIE score for the 40 external subjects was 15.35. On the STAI A-trait scale, the 40 internal subjects had a mean of 38.68, and the 40 externals had a mean of 49.10. Externals as a group were much higher in trait anxiety.

The 80 subjects were contacted via phone by the experimenter. The treatment procedure was briefly explained to them, and they were asked to participate in the study. Their participation was completely voluntary. It was explained that they would receive extra credit in their psychology or sociology class and a paperback book on relaxation if they completed the entire treatment.

A total of 80 subjects were utilized in this study, with half being internals and half externals. The internals and externals were randomly assigned to one of the two treatment groups: the taped, structured home practice or the individualized, unstructured home practice of relaxation. Each of the four groups (internal/tape, internal/no tape, external/tape,
external/no tape) was then composed of 20 subjects.

The subjects ranged in age from 17 years to 33 years, with a mean age of 19.6 years. The sample consisted of 57 females and 23 males.

Three subjects dropped out of the study after the first relaxation training session. All three commented that they did not have the time to make a commitment to the training. The three were replaced with three more subjects who met the selection criteria.

On the physiological measure of skin temperature, the data for 20 of the subjects was not used in the analysis. These were subjects during the Summer 1979 quarter. For these 20 subjects, the skin temperature thermistor was attached to the meaty portion of the middle finger of the right hand. As training progressed, it was noticed that the thermistor would loosen during the relaxation technique after the tense/release cycle for the forearm. Analysis of the data from these subjects indicated that skin temperature was decreasing instead of increasing as a result of the relaxation. These results were the opposite of those expected from the research literature. For the 60 subjects run during the Fall 1979 quarter, the procedure was changed, and the thermistor was attached to the fleshy, outside portion of the right hand. In this position, the thermistor did not pull as a result of the relaxation
technique. As a result, in analyzing the skin temperature data, there was a total of 60 subjects, with 15 in each group.

Measures

Internal and external locus of control subjects were selected from students' scores on the adult form of the Nowicki-Strickland locus of control scale (ANSIE). This test is composed of 40 items with reading difficulty no higher than the fifth grade level (Appendix B). The 40 questions were answered either yes or no, and the scale is keyed such that the higher the score, the more external the locus of control orientation. Split-half reliability studies have found correlations ranging from .74 to .86. For college subjects, test-retest reliability for a six-week period was $r = .83$ (Nowicki and Duke, 1974).

Support for the concurrent validity of the ANSIE comes from significant positive correlations between the scale and Rotter's Locus of Control Scale (.70 and .48). Also, the ANSIE and the Rotter scale are similarly related to personality needs (Duke and Nowicki, 1973). These results suggest that the two measures are assessing the same construct, but not in an identical manner. Social learning theory also predicts that externality is related to psychological maladjustment. If ANSIE is an accurate measure of locus of control subjects who score in an external direction should also show more evidence of maladjustment than internals. Externality on the ANSIE was
positively related to the Eysenck Neuroticism scale (.36 and .32) and the Taylor Manifest Anxiety scale (.34 and .40) (Nowicki and Duke, 1974). Duke and Mullins (1973) found significant differences between psychotic, hospitalized nonpsychotics, and staff workers on the ANSIE.

The ANSIE was chosen over the more widely used Rotter Internal-External Locus of Control Scale (Rotter, 1966) for several reasons. In terms of reliability, the ANSIE has higher coefficients of internal consistency and stability than Rotter's scale. The Rotter scale has been criticized for its significant relationship to social desirability, its poor relationship to achievement, and its difficult reading level. Studies have shown that ANSIE scores were not related to social desirability (Nowicki and Strickland, 1973) and were negatively related to achievement (as social learning theory would predict) (Duke and Nowicki, 1974).

The State-Trait Anxiety Inventory (STAI) was used to measure each subject's self-report of anxiety. This questionnaire is composed of scales for measuring two distinct anxiety concepts: state and trait anxiety. State anxiety is defined as a situational or transitory emotional state or condition characterized by subjective feelings of tension and apprehension and heightened autonomic nervous system activity. Trait anxiety is conceptualized as a relatively stable characteristic of anxiety proneness (Spielberger, 1966). In one scale of 20 items, the examinee
is instructed to describe how he generally feels (trait anxiety); in the other, which is also 20 items, one is asked how he feels at that particular moment in time (state anxiety). The state anxiety of A-state scale was administered before the first relaxation training session and after the fifth training session. The trait anxiety or A-trait scale was used to help select subjects and was also administered after the fifth training session. Spielberger, Gorsuch, and Lushene (1970) in the STAI manual reported coefficients of internal consistency for the STAI ranging from .83 to .92. The test-retest reliability of the trait scale was relatively high (.73 to .88), but stability coefficients for the state scale tended to be low (.16 to .54), as would be expected for a measure designed to be influenced by situational factors.

Two factor analytic studies supported the construct validity of the STAI despite the differing stabilities for the A-state and A-trait scales (Bartsch and Nesselroade, 1973; Nesselroade and Cable, 1974). These studies utilized a manipulative factor-analytic design which resulted in recognizable anxiety dimensions interpretable in terms of the state-trait distinction. Spielberger, Gorsuch, and Lushene (1970) cited two studies to support the construct validity of the A-state scale. In one, scores were significantly higher under an imagined stress condition than under normal instructions and conditions. In another study, the A-state scale was given under four different experimental
conditions; the results showed a relaxation period being lowest, followed by a normal situation, an exam condition, and finally an aversive movie. Metzger (1976) also examined the reliability and the construct validity of the STAI. He found stability coefficients similar to those originally reported and found that the A-state scale did discriminate between high and low stress situations. Evidence for the concurrent validity of the STAI A-trait scale was demonstrated by its moderately high correlation from .75 to .85 with the IPAT Anxiety scale and the Taylor Manifest Anxiety scale (Spielberger, Gorsuch, and Lushene, 1970).

There were two physiological measures of relaxation: peripheral skin temperature and electromyography or EMG. A higher peripheral skin temperature is associated with activation of the parasympathetic nervous system, the autonomic antistress processes of conserving physiological energy. This relaxed parasympathetic response results in vasodilatation of the blood vessels near the surface of the skin. A lower skin temperature is associated with the sympathetic nervous system activation or the "fight or flight response" and results in vasoconstriction of surface blood vessels. The dependent measure was the skin temperature of the fleshy, outside part of the right hand. Skin temperature was recorded at the beginning of each training session for a six minute baseline period and immediately following each session for six minutes. The mean temperature for each
of these two periods was calculated for each subject, for each of the five training sessions.

EMG is a measure of the electrical activity in the muscle. A higher EMG microvolt level indicates increased muscle tension, and conversely a lower EMG microvolt level indicates a more relaxed muscle. EMG was monitored on the frontalis or forehead muscle. EMG was recorded at the beginning of each training session for a six minute baseline period and immediately following each session for six minutes. The mean EMG for each of these two periods was calculated for each subject, for each of the five training sessions.

The final measure of relaxation was the number of home practice sessions actually reported. Each subject kept a diary of their home practice of the relaxation exercises. The diary contained the date, time, posture, and location of practice along with any feelings or problems experienced during the session. The diaries were collected at the weekly training sessions, and the number of practice sessions were computed for each subject. The importance of daily practice of relaxation has been emphasized by Jacobson (1962), Wolpe (1973), and Bernstein and Borkovec (1973). A high frequency of home practice would seem to be indicative of successful, motivating training.
Apparatus

Peripheral skin temperature was monitored by an Autogen 2000 biofeedback thermometer. The thermistor was attached to the fleshy, outside part of each subject's right hand. Subjects were not given feedback as to their skin temperature; the Autogen 2000 was used only for monitoring and recording purposes. Skin temperature was recorded in degrees Fahrenheit.

EMG was monitored by an Autogen 1700 electromyograph biofeedback unit. Standard gell-type electrodes were placed on the forehead of each subject in the standard position for frontalis muscle recording. The two positive electrodes were placed approximately one inch above each eye, and the ground electrode was placed between the two positive electrodes. Frontalis muscle activity was registered in microvolts. Again, subjects were not given feedback as to their muscle tension.

An Autogen 5600 Data Acquisition Center was used to compile the data from the Autogen 2000 and the Autogen 1700. This computer provided a printout with the mean baseline period and the post training period for both EMG and skin temperature. It also provided the experimenter with a digital, instantaneous reading of EMG or skin temperature during the training sessions.

Subjects received the relaxation training in a consulting room on the fourth floor of the Education Building. The room was sound attenuated and temperature controlled. Subjects were seated in a reclining chair and instructed to rest with their feet apart and their arms resting on the arms of the chair.
A cassette taped presentation of the relaxation technique was used with all subjects during each training session. The cassette player was equipped with a remote switch located in an adjoining room behind a one-way mirror. The remote switch allowed the experimenter to turn on the tape after the six minute baseline period and to turn off the tape at the end of the training.

**Procedures**

Both taped and individual home practice groups received identical laboratory relaxation training. A few minutes were set aside at the beginning of the first session to introduce the subject to the research procedures (Appendix C). First of all, each subject was given a brief history and description of progressive relaxation training. Some of the benefits of relaxation training (tension headache, test anxiety, etc.) were reviewed. The EMG electrodes and the skin temperature thermistor were shown and explained to the subject, and it was explained that these devices were completely safe and could not shock the subject. Then the experimenter explained the importance of the subject completing all five sessions of the training. The subject was reminded that, if he completed the entire training, he would receive a paperback book on relaxation and extra credit in his class. Subjects were then asked to sign an informed consent agreement (Appendix D) which emphasized their commitment to the study.
Each subject was then given the STAI A-state scale. Then the skin temperature thermistor and EMG electrodes were attached. Subjects were instructed to rest with their eyes closed for approximately six minutes. They were told that then a tape would start and they were to follow the instructions on the tape. They were instructed to continue resting with their eyes shut without going to sleep for approximately six minutes after the tape stopped. The experimenter then left to the adjoining room to monitor the physiological data. The standard training was then conducted (see below).

At the end of the first session, the method of home practice was explained to the subject. For those subjects in the taped home practice group who did not have access to a cassette player, one was checked out to them for their use during the study. The diary procedure was explained, and each subject was given an appointment slip for the next session.

The relaxation training was Jacobson's (1938) progressive relaxation training as outlined by Bernstein and Borkovec (1973). The progressive relaxation training consisted of training subjects to concentrate on systematically relaxing different muscle groups of the body. The relaxation training was presented to all subjects by a 12 minute audio cassette tape. A taped presentation was used to ensure standardized training for all subjects. A complete transcript of the tape is provided in Appendix E. All subjects received five training sessions,
one per week. Five sessions has been shown to be a sufficient time for effective training (Quayle, 1979).

The following sequence of procedures occurred at each of the five training sessions. First, the skin temperature thermistor and the EMG electrodes were attached. Any problems with the home practice were discussed. During this period of approximately five minutes, the skin temperature and EMG level stabilized. A six minute baseline reading for both EMG and skin temperature was taken while the subject rested with his eyes closed. Then the 12 minutes tape recorded relaxation technique was presented. Finally, while the subject continued to rest with eyes closed, another six minute measurement of EMG and skin temperature was taken. The EMG and skin temperature apparatus was then removed.

The two treatment groups differed only in their home practice of relaxation. The structured or audiotaped home practice group received a cassette tape identical to the laboratory training tape. Subjects in this group were instructed to listen to this tape and practice once daily for 12 minutes. They also completed a structured, multiple-choice diary of their home practice sessions; this diary included date, time, posture, and place of practice and any feelings, problems, or comments about the session (see Appendix F). For those subjects who did not have access to a cassette player, a deck was checked out to them for their use during the study.
The unstructured or individual home practice group also practiced the relaxation daily for 12 minutes. They were instructed to follow the procedure presented in the laboratory training sessions. However, they were encouraged to experiment and develop their own strategies for achieving maximal relaxation within the presented framework. The subjects were given examples of different modifications and strategies, i.e., starting with feet and working up, using music, etc. They were asked to practice daily on their own without an audi-tape. This group completed an unstructured daily diary of the home practice sessions by following an outline of the information requested (see Appendix G).

Immediately after the fifth training session, the STAI A-state and A-trait scales were given to all subjects. Each subject was given a copy of You Must Relax by Edmund Jacobson. Each subject was then debriefed as to the purpose of the study.

Analysis

To test for significant differences in EMG and skin temperature, a four factor analysis of variance with repeated measures on two dimensions (Winer, 1962) was employed. The four main effects were: (1) internal and external locus of control, (2) the structured and the unstructured home practice of relaxation, (3) the five training sessions, and (4) before and after each training session. Of prime interest were the interactions
between locus of control, the structure of the treatment, and the two time measures of the relaxation training.

To test for significant differences in state and trait anxiety, a three factor analysis of variance with repeated measures on one dimension (Winer, 1962) was used. The three main effects were: (1) internal and external locus of control, (2) structured and unstructured home practice of relaxation, and (3) pre and post treatment. The interaction of the three factors was of primary interest.

A two-way analysis of variance was used to determine if there was a difference between the four groups in the frequency of reported home practice.

All hypotheses were tested at the .05 level of significance.
CHAPTER IV
RESULTS

The purpose of this study was to examine the theory that behavior change is enhanced by matching locus of control with therapeutic treatment. This thesis was tested by comparing the effectiveness of a structured and an unstructured home practice of relaxation for internal and external locus of control subjects. The objective of this study was to determine if there was an interaction between locus of control and the structure of the home practice in the acquisition of relaxation training. The effectiveness of the relaxation training was determined by five dependent variables: EMG, skin temperature, state anxiety, trait anxiety, and number of practice sessions reported. Each of the dependent measures will be discussed below in terms of the previously stated hypotheses.

In describing the various analyses of variance, the main effects will be discussed first followed by the interaction effects. Each main effect represents one factor averaged across all the other factors. For example, the main effect of before and after each training session would evaluate the difference between before and after each session averaged across the five weeks, across internal and external locus of control subjects, and across subjects who received structured and unstructured home practice.
The EMG hypotheses were that there is no difference in EMG among the five training sessions and across the five training sessions between (1) internal and external locus of control subjects, (2) subjects who received a structured and those who received an unstructured home practice of relaxation, and (3) before and after each training session. Also, it was hypothesized that there are no interaction effects. The data on EMG for the 80 subjects was analyzed by using a four factor analysis of variance with repeated measures on two dimensions. The analysis of EMG is presented in Table 1.

Three of the five research hypotheses were rejected. There were differences in the EMG level among the five training sessions, $F(4,76) = 9.187, p < .01$. Figure 1 shows the changes in EMG for the five training sessions. The largest decrease in EMG was from week one to week two.

There was a difference between the EMG level at the baseline period before each training session and the post period after the session, $F(1,19) = 48.502, p < .01$. EMG decreased from 2.67 at baseline to 1.99 during the post training period (see Figure 2).

These two significant main effects indicate that the relaxation training was effective in reducing EMG. The EMG level decreased from before each training session to after the training session as was expected. Also, EMG decreased over time
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*p < .05.

**p < .01.
Figure 1. Weeks for EMG

Figure 2. Time for EMG
or over the five weeks of training.

The null hypotheses were retained for the main effects of locus of control and the structure of the training. There was no difference between the internals and the externals on EMG, $F(1,76) = 1.779, \ p > .05$. Also, there was no difference between the subjects who received the structured training and those who received an unstructured training on EMG, $F(1,76) = 1.253, \ p > .05$.

There was a significant interaction between the structure of the training and weeks (across the five training sessions) on EMG, $F(4,627) = 4.065, \ p < .01$. Figure 3 depicts this interaction. The unstructured treatment was more effective than the structured treatment in reducing EMG from the first to the second training session.

There was also a significant interaction between time (before and after the session) and weeks (across the five training sessions) on EMG, $F(4,627) = 2.526, \ p < .05$. This interaction is illustrated in Figure 4. EMG decreased more from the first to second session in the baseline period before training than in the post period immediately after the training.

The expected interaction between locus of control, the structure of the treatment, and the measures of relaxation (time and weeks) was not significant.
Figure 3. Structure and Weeks for EMG

Figure 4. Time and Weeks for EMG
Skin Temperature

The skin temperature hypotheses were that there is no difference among the five training sessions and across the five training sessions between (1) internal and external locus of control subjects, (2) subjects who received a structured and those who received an unstructured home practice of relaxation, and (3) before and after each training session. It was also hypothesized that there are no interaction effects. The data on skin temperature for the 60 subjects was analyzed by using a four factor analysis of variance with repeated measures on two dimensions. The analysis of skin temperature is presented in Table 2.

Two of the five research hypotheses were rejected. There were differences in skin temperature among the five training sessions, $F(4,56) = 3.157, p < .05$. Figure 5 shows the changes in skin temperature for the five sessions. There is an increase from the first session to the fifth session. The decrease in temperature on the third session is inconsistent with the general pattern of responding.

There was a difference in skin temperature between the baseline period before the training session and the post period immediately following the session, $F(1,14) = 31.409, p < .01$. Skin temperature increased from 86.78 at the baseline period to 87.93 during the period immediately following training. This change is illustrated in Figure 6.
Table 2

Analysis of Variance For Skin Temperature

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*p < .05.

**p < .01.
Figure 5. Weeks for Skin Temperature

Figure 6. Time for Skin Temperature
These two significant main effects indicate that the relaxation training across all subjects was effective in increasing skin temperature. Skin temperature increased from baseline during the training session, and it increased over the five weeks of training.

The null hypotheses for the main effects of locus of control and structure of training were retained. There was no difference between internal and external locus of control subjects on skin temperature, $F(1, 56) = 0.327, p > .05$. Likewise, there was no difference between subjects who received a structured treatment and those who received an unstructured treatment on skin temperature, $F(1, 56) = 0.753, p > .05$.

There were no interaction effects. The expected interaction between locus of control, structure of treatment, and the measures of relaxation (time and weeks) was not significant on skin temperature.

State Anxiety

The state anxiety hypotheses were that there is no difference in state anxiety between (1) pre and post treatment, (2) internal and external locus of control subjects, and (3) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there are no interaction effects. The data for state anxiety for the 80 subjects was analyzed using a three factor
analysis of variance with a repeated measure on one dimension. The analysis for state anxiety is presented in Table 3.

All three of the main effect hypotheses were rejected. There was a difference in state anxiety between pre and post treatment, $F(1,19) = 95.246, p < .01$. This main effect indicates that all groups, when averaged together, changed in state anxiety (see Figure 7). The mean A-state score for pre-treatment was 41.68, and the mean for post-treatment was 28.18. This significant decrease in state anxiety indicates that the relaxation training was effective in reducing state anxiety.

There was a difference between internal and external locus of control subjects on state anxiety, averaged across pre and post treatment, $F(1,76) = 8.372, p < .01$. Externals had higher state anxiety than internals. The mean A-state score for externals was 36.66, and the mean score for internals was 33.19.

There was a difference in state anxiety, averaged across pre and post treatment, between the structured and the unstructured treatments, $F(1,76) = 5.435, p < .05$. Subjects in the structured home practice treatment had higher state anxiety than those who received an unstructured home practice. The mean A-state score for the structured group was 36.33, and the mean for the unstructured group was 33.53.

There were no interaction effects. The interaction between locus of control and structure of training over the treatment period was not significant for state anxiety.
Table 3

Analysis of Variance For State Anxiety

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</table>

*p < .05.

**p < .01.
Figure 7. State Anxiety

Figure 8. Trait Anxiety
Trait Anxiety

The trait anxiety hypotheses were that there is no difference in trait anxiety between (1) pre and post treatment, (2) internal and external locus of control subjects, and (3) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there are no interaction effects. The data for trait anxiety for the 80 subjects was analyzed using a three factor analysis of variance with a repeated measure on one dimension. The analysis for trait anxiety is presented in Table 4.

Three of the four research hypotheses were rejected. There was a difference in trait anxiety between pre and post treatment, \( F(1,19) = 42.857, p < .01 \). This main effect indicates that all groups, when averaged together, changed in trait anxiety (see Figure 8). The mean A-trait score for pre-treatment was 43.89, and the mean for post-treatment was 38.38. This significant decrease in trait anxiety indicates that the relaxation training was effective in reducing trait anxiety.

There was a difference between internal and external locus of control subjects on trait anxiety, averaged across pre and post treatment, \( F(1,76) = 45.431, p < .01 \). Externals had higher trait anxiety than internals. The mean A-trait score for externals was 45.31, and the mean for internals was 36.95.
### Table 4

Analysis of Variance For Trait Anxiety

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**p < .01.
There was a significant interaction between locus of control and time or pre and post treatment on trait anxiety, $F(1,57) = 6.492, p < .01$. This interaction is illustrated in Figure 9. Externals decreased in trait anxiety more than internals.

**Number of Reported Practice Sessions**

The final hypothesis was that there is no difference in frequency of reported home practice between (1) internal and external locus of control subjects and (2) subjects who received a structured and those who received an unstructured home practice of relaxation. It was hypothesized that there is no interaction effect. The data on the number of practice sessions for the 80 subjects was analyzed by using a two-way analysis of variance. The analysis of the number of reported practice sessions is presented in Table 5.

All of the research hypotheses were retained. There was no difference between internals and externals in the number of practice sessions reported, $F(1,76) = 1.692, p > .05$. There was no difference between subjects in the structured and the unstructured home practice of relaxation in terms of number of practice sessions, $F(1,76) = 0.387, p > .05$. There was no interaction effect, $F(1,76) = 0.720, p > .05$. 


Figure 9. Locus of Control and Pre and Post Treatment for Trait Anxiety
Table 5

Analysis of Variance for Number of Reported Practice Sessions

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Summary

The results indicate that the relaxation training in this study was effective in reducing physiological and subjective anxiety. EMG decreased from the baseline period before each training session to the post period after the training session and also decreased over the five weeks of training. Skin temperature increased from the baseline period before each training session to the post period after the training session and also increased over the five weeks. Both state and trait anxiety were reduced from pre treatment to post treatment.

The expected interaction between locus of control, the structure of the treatment, and the time measures of relaxation was not significant on any of the dependent measures.
Several interactions were significant. On EMG, the unstructured group decreased more than the structured group from the first to the second session. EMG also decreased more from the first to second session in the baseline period before the training session than in the post period immediately following the training session. Externals decreased more in trait anxiety as a result of the treatment than did internals.
CHAPTER V
DISCUSSION

This study evaluated the theory that behavior change is enhanced by matching locus of control with therapeutic treatment (Strickland, 1978). This notion was tested by comparing the effectiveness of a structured and an unstructured home practice of relaxation for internal and external locus of control subjects. Forty internals and 40 externals were randomly assigned to either a structured or an unstructured training. The relaxation training consisted of five weekly laboratory training sessions and daily home practice. The home practice consisted of either a structured or an unstructured approach to relaxation. The effectiveness of the relaxation training was measured by five dependent variables: EMG, skin temperature, state anxiety, trait anxiety, and a number of reported home practice sessions. Strickland's congruence theory predicted that internals would respond better to the unstructured training and externals to the structured technique.

Evaluation of Findings

The expected interaction between locus of control and the structure of the treatment was not found in this study. In terms of relative effectiveness, there was no significant difference between the structured and the unstructured home practice of relaxation for internal and external locus of control.
control subjects. The expectation that internals would most effectively learn relaxation with an unstructured approach and externals would gain maximum benefits from a structured treatment was not fulfilled on any of the five dependent measures.

The results do indicate that the treatment of relaxation training was effective in reducing both physiological and subjective anxiety in the subjects. EMG decreased from before each training session to after the training session and also decreased over the five seeks of treatment. Similarly, skin temperature increased from before each training session to after the training session and increased over the five weeks. Both state and trait anxiety were reduced from pre to post treatment.

Implications

There are a number of factors which need to be examined in light of the lack of evidence in this study to demonstrate an interaction between locus of control and the structure of the treatment. One must question the theory that congruence between locus of control and the structure of the treatment increases behavior change. Strickland's theory was based largely on studies which showed a preference by internals and externals for a certain structure of treatment. Preference for structure of treatment was not investigated in this study. It could be that there is an interaction between a person's locus of control and their preference for a structured or an unstructured treatment, but this preference does not enhance the actual behavior change.
Another explanation could be that there is an interaction as Strickland predicts but that this interaction accounts for so little of the variance in a person's behavior that the application of the interaction is not efficient or feasible. Rotter's social learning theory postulates that locus of control expectancy is only one of three factors determining behavior. The reinforcement value of the relaxation training could have varied among the subjects. This is in fact likely given the differences in initial trait anxiety scores among the subjects (see "Subjects" section later in the chapter). The value of the reinforcement could have been controlled to some extent by using subjects who requested help to relax. Also, subjects could have been asked how important the relaxation training was to them. In future research on locus of control, reinforcement value needs to be assessed and controlled.

Another possible confounding factor related to reinforcement value is the interaction of the reinforcers with locus of control. It is possible that the external reinforcers (extra credit and the paperback book) affected the external locus of control subjects. Internal locus of control subjects could have been affected by the internal reinforcement of the feelings of relaxation and reduced stress. If this pattern of reinforcement did occur, it could have obscured the interaction between locus of control and the structure of relaxation training.
The psychological situation is the third variable in the prediction of behavior in Rotter's theory. Although this study attempted to hold the situation constant for all the subjects through using standardized procedures, each subject's internal perspective of the situation could not be controlled. So according to social learning theory, the variables of reinforcement value and psychological situation could have accounted for most of the variance in behavior.

Locus of control is a generalized expectancy variable within Rotter's social learning theory. Generalized expectancies are most predictive in novel or ambiguous situations. Since none of the subjects had any previous experience with relaxation training, the situation was new to the subjects initially. The novelty of the treatment probably diminished quickly as the subjects practiced the relaxation daily. According to social learning theory, if one has experience in a specific situation, then his expectancy is specific to that situation. After the subjects had practiced a number of times, their specific expectancy related to the relaxation training would predominate behavior more than the generalized expectancy of locus of control.

Another factor which could have affected the outcome was the effect of the relaxation training on locus of control. Relaxation training is commonly classified as a self-control procedure. If it is teaching self-control, one would expect
the subjects to become more internal in their locus of control orientation. Studies which have looked at change in locus of control have found a shift toward internality following relaxation training (Cox, Freundlich, and Meyer, 1975; Ryan, 1976; Babcock, 1977). Strickland thought that the interaction of locus of control and the structure of the treatment explained more behavior than the shift to internality. The present study suggests that in a self-control treatment such as relaxation training the shift to internality is a more important factor than the congruence of locus of control and the structure of the treatment.

The present study also addressed the Client X Method interaction model (Bergin and Strupp, 1972; Kiesler, 1971). The matching of the treatment modalities with the clients' personality dispositions did not maximize the therapeutic treatment in this study.

In examining the implications of this study, one must look at the methodology of the study to determine if the congruence theory was fairly tested. The general areas of treatment, subjects, and measures will be discussed.

Treatment. Relaxation training was used in this study as the treatment in examining Strickland's congruence theory. The nature of relaxation training is one factor which might have contributed to the failure to find the expected interaction in this study. The results showed that the relaxation training
was effective in reducing physiological and subjective anxiety in every group. In general, locus of control was not a factor in learning relaxation; both internals and externals learned relaxation as reflected by EMG, skin temperature, and self-report of anxiety. Both methods of relaxation training, structured and unstructured, were effective in teaching relaxation also. It could be that relaxation training is a technique which is readily and effectively learned by most people, no matter what type of person or which specific technique is used. Benson (1975) has proposed that relaxation is a general response of which most people are capable. This idea is similar to Yates' (1975) view of systematic desensitization. Yates found that, although systematic desensitization clearly works, none of the specific components of systematic desensitization are necessary or sufficient for successful treatment; a number of modifications of the procedure work just as effectively.

If relaxation is a response which most people can quickly and competently learn, then its usefulness as a procedure with which to compare differential effectiveness among groups is diminished. One cannot clearly discriminate levels of learning if most people respond similarly.

This could explain why six of the seven studies in the literature which failed to support Strickland's congruence theory had utilized relaxation training or systematic desensitization as a treatment. Only one study out of eight which has
examined the interaction of locus of control and relaxation training has found a definitive interaction (Golden, 1975), and that study used only self-report as a dependent variable. The present study along with the results of the research literature suggest that relaxation training is refractory to the interaction predicted by Strickland's congruence theory.

Another methodological problem could have been that the two treatments were not different enough from each other. Because the unstructured home practice subjects went through the taped exercises during the training sessions, their home practice could have been similar to the structured home practice subjects. An alternative treatment, which would make the groups more distinct, would be to instruct the unstructured subjects to relax any way they could and provide no specific exercises during the training or practice.

A related question would be whether relaxation was effectively taught the subjects in this study. If the treatment was not effective, then the general research question was not examined and no interaction would be expected. It appears, however, that relaxation training was effectively taught in this study. It was expected that EMG level would drop from the baseline before the training session to the six minute period after the relaxation exercise. This was the case in the present study (Figure 2). It was also expected that EMG level would decrease over the five weeks of training. Again,
this pattern was found in the present study (Figure 1). These
results indicate that muscle tension as measured by EMG was
reduced as a result of the relaxation training. There was an
interaction between time and weeks which indicated that sub-
jects decreased in EMG from the first to the second session
more in the baseline period than in the post session period
(Figure 4). This interaction is probably a function of
heightened anxiety by subjects during the initial training
session. The present study did examine the effect of relaxa-
tion training on EMG more extensively than most of the previous
research. Commonly in the literature, the studies on relaxa-
tion have only examined change in EMG from the first to the
last training session (Quayle, 1979; Beiman, Israel, and
Johnson, 1978; Paul and Trimble, 1970). Only one other study
(Reinking and Kohl, 1975) has demonstrated that EMG decreased
progressively over time.

The data on peripheral skin temperature also indicated that
the relaxation training was effective in reducing autonomic
arousal. Skin temperature increased from baseline during the
training session (Figure 6), and it increased over the five
weeks of training (Figure 5). Both of these changes were in
the predicted direction. During the third training session,
there was a decrease in skin temperature which was not expected
(Figure 5). There is no apparent reason for this deviation from
the pattern. Room temperature was controlled during the five
weeks of training. It could be that subjects were becoming bored with the procedure. A number of subjects did inquire of the experimenter if they would be doing the same thing every session. Skin temperature did increase progressively during the fourth and fifth training sessions. The present study again examined the change in skin temperature more thoroughly than most of the previous research. The studies in the literature have compared skin temperature on the first and last training sessions (Quayle, 1979; Cauthen and Prymak, 1977). The present study was the first to examine the change over the five weeks.

As expected by Spielberger's theory (1966) and the relaxation research literature, state anxiety was reduced as a result of the relaxation training (Figure 7). Trait anxiety also decreased from pre to post treatment (Figure 8). This change was not expected and will be discussed later in this chapter.

Subjects also reported practicing the relaxation technique quite consistently at home. On the average, they practiced five out of every six days. This would seem to imply that the relaxation training was rewarding enough to motivate the subjects to practice. This result should be interpreted cautiously, however, since the data was unverified self-report of practice. A number of subjects did comment though that they found the training very useful and would continue with it. Several subjects reported improvement in various physical
symptoms (tension headache, low back pain), and one subject later reported that the relaxation helped her in the delivery of her baby.

The present study was the first in the literature to compare a taped and an individualized home practice of relaxation. Three case studies have suggested that taped home practice is useful and effective (Migler and Wolpe, 1967; Denholtz, 1970; Dawley, 1975). The results of this study indicate that there is no difference between the two home practice methods in terms of skin temperature, trait anxiety, or number of reported home practice sessions. In examining EMG, the unstructured or individualized home practice resulted in further reduction in EMG from the first to the second session than the taped or structured home practice method (Figure 3). This result suggests that initially the individualized home practice results in less muscle tension than the taped home practice. The individualized practice instructions may have led to the subject becoming more involved in the training. Also, the taped practice may have become boring to the subjects after seven times.

There was also a difference between the taped and the individualized practice in terms of state anxiety. Averaged over the pre and post treatment, the individualized group had significantly less state anxiety than the taped group. These results imply that regarding state anxiety there is an advantage to using an individualized approach to home practice.
To summarize the comparison of the taped and the individualized methods of home practice of relaxation, there are no striking differences between the two. In the first week, the individualized approach is more effective in reducing EMG; however, across the five weeks there is no difference between the individualized and the taped home practice. The individualized approach also had a lower state anxiety than the taped method. However, the individualized method did not reduce anxiety more than the taped method. Also, the difference between the two methods is small and of questionable practical significance. It should be noted that the comparison between these two methods of home practice was made with a sample of extreme internals and externals, and generalizations cannot be made beyond this population from this study.

Subjects. One factor which could have affected the outcome of this study was the classification of the subjects. In order to test the research hypotheses, internal and external subjects had to be selected and used. If the subjects were not extreme internals and externals, the research question of this study would not have been examined, and an interaction would not be expected. The ANSIE was used to select internal and external locus of control subjects. The construct validity of the ANSIE seems adequate. Subjects were selected from those students who scored more than one standard deviation either above (externals) or below (internals) the mean on the ANSIE. The procedure
differed from many in the literature which simply divided their sample into half internals and half externals. The experimenter had proposed that extreme groups would better examine the research question.

There is data to demonstrate that internals and externals were selected. Social learning theory would predict that externals would be higher than internals in both state and trait anxiety. This was the case in this study.

Another factor related to the subjects which could have affected the outcome was the anxiety level of the subjects. Physiological variables were not a criterion for selection, and consequently most subjects began the training with normal EMG and skin temperature levels. The results (Figures 1 and 5) are suggestive of a "floor effect" in which subjects could not physiologically reduce their EMG or increase their skin temperature any further. If this was the case, the expected interaction could have been missed because the range of physiological responding was compressed.

Subjects were selected by picking those who had the highest trait anxiety from the extreme locus of control groups. This procedure resulted in selection of a number of subjects of normal trait anxiety who were not one standard deviation above the mean of the STAI A-trait scale. In fact, the mean A-trait score for the internal group was approximately equal to the mean score for the entire screening sample. Since this study used a number
of subjects of average trait anxiety, the probability of producing significant reductions would be reduced.

Subjects were also normal volunteer students. They were not clinically motivated to reduce their anxiety levels. The subjects in this study were primarily extrinsically motivated (extra credit). Most of the subjects in the research literature were selected from populations who requested help for a certain problem (insomnia, phobias, etc.). It is suggested that individuals who are intrinsically motivated would probably begin with more anxiety, have a better chance of reducing their anxiety, and be more likely to show an interaction between locus of control and the structure of the treatment.

It should be noted that the procedure to motivate subjects to complete the study worked well. In obtaining a sample of 80 subjects, only three students dropped out of the treatment once they had begun training. This would seem to be a small attrition rate considering the demands required of the subjects by the experimental treatment. A strong motivational package was built into the selection and treatment in an attempt to reduce the attrition rate. Within the limits of the extreme locus of control groups, trait anxiety was used as a selection criteria in an attempt to select a sample motivated to complete the treatment. Extra psychology or sociology credit was given for participation in the study. Also the subjects were given a paperback book upon completing the training. In the introduction,
the potential benefits of relaxation training were explained. The experimenter stressed the scientific importance of the subjects' completing the program. Finally the subjects signed an informed consent agreement which emphasized their commitment to the program. The motivational package could be used as a model for reducing attrition in future research studies.

Measures. One unexpected finding was that trait anxiety, as measured by the STAI A-trait scale, decreased as a result of the treatment. The change was greater than the standard error of measurement for the STAI. This result raises questions concerning the validity of the state-trait construct and of the STAI measure. Spielberger (1972) defines state anxiety as a transitory emotional condition characterized by feelings of tension and apprehension and by activation of the autonomic nervous system. He defines trait anxiety as a relatively stable, enduring individual difference in anxiety proneness or difference between people in the tendency to respond to situations perceived as threatening with elevations in state anxiety intensity. Spielberger (1972) speculated that childhood experiences influenced the development of individual differences in trait anxiety. The present study suggests that the level of trait anxiety as measured by the STAI is not that stable or enduring. It appears to have changed significantly within a five week period. A number of factors need to be examined in light of this change.
One possible explanation is that the treatment in this study was so intense and extensive that it affected a change in the trait anxiety personality trait. The treatment did involve five training sessions plus daily home practice. The one other relaxation study which reduced trait anxiety also utilized daily home practice (Beiman, Israel, and Johnson, 1978). Five studies have found relaxation training to reduce state anxiety but not trait anxiety. One of these (Robar, 1978) did include home practice. At this point, it is not certain whether a five week training in progressive relaxation with daily home practice is a strong enough treatment to result in trait anxiety change.

Another factor could be that there is no difference between the concepts of state and trait anxiety. In the present study, these two constructs responded to the treatment in a very similar manner (Figures 7 and 8). The reductions in state and trait anxiety were consistent with the reductions in the physiological measures of anxiety, which is what one would expect for state anxiety. The present study would seem to question Spielberger's theory which distinguishes between state and trait anxiety.

Another related explanation could be that the STAI A-trait scale is not a valid measure of trait anxiety. It changed in this study as Spielberger would predict state anxiety to change.
Finally, trait anxiety could have decreased because of the demand or suggestion effect of the treatment. Subjects could have responded in a manner which they thought the experimenter expected. The work of Rosenthal and Rosnow (1969) suggests that this is likely especially because the sample was composed of volunteers. The potential benefits of relaxation training were explained at the beginning of the study, and this could have also contributed to a demand effect. No placebo control group was used in the present study; this would have clarified the demand effect question on trait anxiety.

There was an interaction between locus of control and time or pre and post treatment on trait anxiety (Figure 9). Externals decreased more in trait anxiety than internals. Externals began the study with much higher trait anxiety, and the results could reflect a floor effect in which there is a minimal level at which people report trait anxiety.

Limitations

There are several limitations evident in this study. First of all, the subjects were not clinically motivated and did not request treatment to reduce anxiety. The sample was composed of normal college students who were of average or moderate trait anxiety. Generalization to other populations is limited to
normal, volunteer college students of extreme internal or external locus of control orientation.

The use of a normal population restricted the improvement which could be made by the subjects. Physiologically, the subjects began the study with normal EMG and skin temperature levels. These variables are limited in how far they can be changed in the relaxed direction. A similar floor effect was indicated for trait anxiety. This study selected extreme subjects in terms of locus of control and sacrificed using subjects with higher physiological and subjective anxiety. It is possible that an interaction between locus of control and the structure of the treatment could be demonstrated if subjects were clinically selected and then divided into internals and externals.

A second weakness of this study is the questionable validity of the trait anxiety measure. Trait anxiety was reduced as a result of the treatment, and this result is contradictory to state-trait anxiety theory. Trait anxiety is defined as a stable, enduring personality variable which should not change over the course of five weeks. Although the STAI is the best measure available, the generalizability of this study is limited because of the inconsistency of the STAI's construct validity.

The reduction in trait anxiety could be due to demand or suggestion effect. This study did not include a placebo control group which would have identified any change in trait anxiety.
beyond demand/suggestion effect. The inclusion of a placebo control group would have clarified this point.

Finally, the treatment in this study may have been too repetitive to demonstrate the interaction between locus of control and the structure of the treatment. After the subjects had practiced the relaxation a number of times, they developed specific expectancies for reinforcement in that situation. If this occurred, the specific expectancies would preempt the generalized expectancy of locus of control. Consequently, locus of control would not be interacting with the structure of the treatment for much of the study.

Recommendations

It is recommended that the congruence theory be further researched. Specifically, it is recommended that:

1. The congruence theory be examined with a treatment other than relaxation training. Relaxation training, because it is a readily acquired generalized response, may be one treatment which is refractory to the interaction between locus of control and the structure of the treatment.

2. The present study be replicated with a clinical sample and/or a sample selected for having high physiological and subjective anxiety scores. Subjects may have to be divided as to locus of control rather than selected on the basis of extreme locus of control scores.
3. The present study be replicated with the unstructured relaxation subjects instructed to relax on their own throughout the training sessions and the home practice. The unstructured subjects would then be provided with absolutely no structure for relaxing.

4. A study be conducted to compare taped and individualized home practice of relaxation with a clinical group.

5. The validity of the STAI A-trait scale be reexamined.

Summary

This chapter has evaluated the research findings, examined the implications and limitations of this study, and recommended areas for further research. In general, no support was found for the theory that congruence of locus of control and the structure of the treatment enhances behavior change. Specifically, the matching of locus of control with a structured or an unstructured home practice of relaxation did not improve the acquisition of the relaxation training. Thus this matching procedure is not recommended when the treatment is relaxation training. Relaxation training may be too readily an acquired response to use in comparing differential effectiveness. It is recommended that future research examine the interaction between locus of control and the structure of relaxation training with a clinical population. It is also recommended that further research verify with a clinical population the finding in this
study that there is no practical difference between the taped and individualized home practice of relaxation training.
REFERENCES


Branhan, L., & Katahn, M. Effectiveness of automated desensitization with normal volunteers and phobic patients. Canadian Journal of Behavioral Sciences, 1974, 6, 234-245.


Kilmann, P.R., & Sotile, W.M. The effects of structured and unstructured leader roles on internal and external group participants. *Journal of Clinical Psychology, 1976, 32*, 848-856.


Metzger, R.L. A reliability and validity study of the State-Trait Anxiety Inventory. *Journal of Clinical Psychology*, 1976, 32, 276-278.


Nuenuebel, P.M. The differential impact of systematic desensitization and cognitive behavior modification upon internal and external test anxious subjects. *Dissertation Abstracts International*, 1978, 38, 5035B.

Noble, C.A. Effects of subject versus therapist control over termination of the aversive stimulus and beliefs in internal or external locus of control on the efficacy of the desensitization procedure. *Dissertation Abstracts International*, 1978, 38, 3409B.


Sadowsky, R.S. The effects of structure and perceived locus of control on group process. Dissertation Abstracts International, 1975, 36, 3068B.


PERSONAL HISTORY

NAME: ___________________ AGE: _____ SEX: _____

1. Are you presently in good physical health? ________

2. Are you presently under any type of medical treatment? ________
   If so, explain:

3. Have you ever had any health problems such as heart murmur, high blood pressure, diabetes, asthma, tuberculosis, ulcers, seizures, etc.? ________
   If so, explain:
APPENDIX B
INSTRUCTOR'S NAME: __________________________ PHONE: __________________________

DIRECTIONS: Answer each of the 40 questions according to how you believe. Circle either "yes" or "no" for each question.

yes no 1. Do you believe that most problems will solve themselves if you just don't fool with them?

yes no 2. Do you believe that you can stop yourself from catching a cold?

yes no 3. Are some people just born lucky?

yes no 4. Most of the time, do you feel that getting good grades meant a great deal to you?

yes no 5. Are you often blamed for things that just aren't your fault?

yes no 6. Do you believe that if somebody studies hard enough he or she can pass any subject?

yes no 7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?

yes no 8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do?

yes no 9. Do you feel that most of the time parents listen to what their children have to say?

yes no 10. Do you believe that wishing can make good things happen?

yes no 11. When you get punished does it usually seem its for no good reason at all?

yes no 12. Most of the time do you find it hard to change a friend's (mind) opinion?

yes no 13. Do you think that cheering more than luck helps a team to win?
yes  no  14. Did you feel that it was nearly impossible to change your parent's mind about anything?

yes  no  15. Do you believe that parents should allow children to make most of their own decisions?

yes  no  16. Do you feel that when you do something wrong there's very little you can do to make it right?

yes  no  17. Do you believe that most people are just born good at sports?

yes  no  18. Are most of the other people your age stronger than you are?

yes  no  19. Do you feel that one of the best ways to handle most problems is just not to think about them?

yes  no  20. Do you feel that you have a lot of choice in deciding whom your friends are?

yes  no  21. If you find a four leaf clover, do you believe that it might bring you good luck?

yes  no  22. Did you often feel that whether or not you did your homework had much to do with what kind of grades you got?

yes  no  23. Do you feel that when a person your age is angry at you, there's little you can do to stop him or her?

yes  no  24. Have you ever had a good luck charm?

yes  no  25. Do you believe that whether or not people like you depends on how you act?

yes  no  26. Did your parents usually help you if you asked them to?

yes  no  27. Have you felt that when people were angry with you it was usually for no reason at all?

yes  no  28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?

yes  no  29. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?
yes no 30. Do you think that people can get their own way if they just keep trying?

yes no 31. Most of the time do you find it useless to try to get your own way at home?

yes no 32. Do you feel that when good things happen they happen because of hard work?

yes no 33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?

yes no 34. Do you feel that it's easy to get friends to do what you want them to do?

yes no 35. Do you usually feel that you have little to say about what you get to eat at home?

yes no 36. Do you feel that when someone doesn't like you there's little you can do about it?

yes no 37. Did you usually feel that it was almost useless to try in school because most other children were just plain smarter than you are?

yes no 38. Are you the kind of person who believes that planning ahead makes things turn out better?

yes no 39. Most of the time, do you feel that you have little to say about what your family decides to do?

yes no 40. Do you think it's better to be smart than to be lucky?
INTRODUCTION TO FIRST SESSION

1. History of relaxation training:

    Jacobson (1930's)
    Popularity in recent years.

2. Description of relaxation training:

    Tense-release cycle
    Concentration on difference in the feeling of tension and relaxation.

3. Explain possible benefits of relaxation training: tension headache, insomnia, hypertension, public speaking anxiety.

4. Demonstration of EMG electrodes and skin temperature thermistor.
    Reassure subject of no shock.

5. Stress importance of completing all five training sessions.
    At the end, subject will receive (1) extra credit and (2) paperback book on relaxation.

6. Sign informed consent agreement.


8. Attach thermistor and electrodes.

9. Explain to subject to rest for six minutes with eyes closed, then follow instructions on 12 minute tape, then continue resting for six minutes after the tape stopped.
INFORMED CONSENT AGREEMENT

I hereby consent to participate as a subject in a research study of relaxation training. I understand that I am expected to participate in home practice of relaxation daily and a laboratory training session once per week. I understand that my name and any identifying information will remain anonymous.

I understand that I will receive extra credit in my psychology class if I complete all of the training sessions. I have been informed of the potential benefits of relaxation training and of the importance of completing all five sessions of this project. I understand that I will receive a paperback book on relaxation upon completion of all five training sessions.

I understand that I am free to withdraw my consent at any time.

Name (print)

Signature

Phone

Address

Date
RELAXATION SCRIPT

You should be resting comfortably with your legs uncrossed, your arms at your side, and your eyes closed (pause). Begin by focusing your attention on the muscles of your right hand and forearm . . . . Tense the muscles in your right hand and forearm by making a tight fist, now (5 sec) . . . . notice the feeling of tension in your right fist and lower arm . . . Now relax (20 sec) . . . . let all the tension go . . . . Tense these muscles again by making a tight fist, now (5 sec) . . . . feel the tension . . . . and relax (20 sec) . . . . notice the difference between tension and relaxation.

Shift your attention to your right upper arm. Tense these muscles by pressing your elbow down, now (5 sec) . . . . feel the tightness . . . . and relax (20 sec) . . . . enjoy the sensation as these muscles loosen . . . . Tense these muscles again by pressing your elbow down, now (5 sec) . . . . hold it . . . . and relax (20 sec) . . . . notice the relaxation flowing into these muscles.

Now focus your attention on the muscles of your left hand and forearm. Tense these muscles by making a tight fist, now (5 sec) . . . . notice the tension . . . . and relax (20 sec) . . . . notice the difference between tension and relaxation . . . . Tense these muscles again by making a tight fist, now (5 sec) . . . . and relax (20 sec) . . . . become aware of the warm feelings of relaxation.
Now shift your attention to your left upper arm. Tense these muscles by pressing your elbow down, now (5 sec) . . . . and relax (20 sec) . . . . focus all your attention on the feeling of relaxation as it flows into these muscles . . . . Tense these muscles again by pressing your left elbow down, now (5 sec) . . . . feel the tension . . . . relax (20 sec) . . . . let those muscles unwind and become smooth.

Focus your attention on the muscles of your forehead. Tense these muscles by raising your eyebrows as high as you can, now (5 sec) . . . . notice the tightness . . . . and relax (20 sec) . . . . attend only to the feeling of relaxation . . . . Tense these muscles again by raising your eyebrows as high as you can, now (5 sec) . . . . and relax (20 sec) . . . . notice the difference between the tension and the relaxation.

Shift your attention to the muscles of your central and lower face. Tense these muscles by squinting your eyes and clenching your teeth, now (5 sec) . . . . feel the tension . . . . relax (20 sec) . . . . focus on the feeling in these muscles as they become more and more relaxed . . . . Tense these muscles again by squinting your eyes and clenching your teeth, now (5 sec) . . . . and relax (20 sec) . . . . notice the very warm and pleasant feelings of relaxation.

Now focus on the muscles of your neck. Tense these muscles by pulling your head down into your shoulders, now (5 sec) . . . . relax (20 sec) . . . . just let these muscles go, noticing the
difference between tension and relaxation . . . . Tense these muscles again, now (5 sec) . . . . and relax (20 sec) . . . . just enjoy the sensation as these muscles become more and more relaxed.

Focus on the muscles of your shoulders, chest, and upper back. Tense these muscles by pulling your shoulders back in an attempt to make your shoulder blades touch. Do this now (5 sec) . . . . feel the tension . . . . relax (20 sec) . . . . let those muscles go; notice your calm and regular breathing . . . . Tense these muscles again by pulling your shoulders back, now (5 sec) . . . . and relax (20 sec) . . . . notice what it is like as the muscles become more and more deeply relaxed.

Shift your attention to your right leg. Tense the muscles in your thigh by counterposing the one large muscle on top of the thigh with the two smaller ones underneath. Also tense your right calf by bending your foot toward your head. Tense both your right thigh and calf, now (5 sec) . . . . feel the tension . . . . relax (20 sec) . . . . notice the difference between the tension and the relaxation . . . . Tense the muscles in your right leg again, now (5 sec) . . . . and relax (20 sec) just enjoy the feelings of deep, complete relaxation.

Now focus on your left leg. Tense the muscles in your thigh by counterposing the one large muscle on the top of the thigh with the two smaller ones underneath. Also tense your calf by bending your foot toward your head. Tense both your thigh and calf, now (5 sec) . . . . and relax (20 sec) . . . . allow
the tension to flow out and the relaxation to deepen . . . .
Tense the muscles in your left leg again, now (5 sec) . . . . and
relax (20 sec) . . . . more and more deeply and completely
relaxed.

Attend to the sensation of relaxation you can feel through-
out your whole body . . . . . . . Rest with your eyes closed
without going to sleep.
DIARY

Each individual is required to keep a diary of the relaxation sessions daily. This diary will provide a record of your practice sessions and enable you to determine if you are making progress.

Fill out the following information for each day you actually practice. Turn in your diary at the weekly training sessions.

Name: ____________________________
Date: ____________________________

Time at beginning of session: (check one) ___ 7:00AM-11:00AM

___ 11:00AM-3:00PM

___ 3:00PM-7:00PM

___ 7:00PM-12:00AM

Posture: (check one) ___ lying

___ sitting

Location: (check one) ___ Home/bedroom

___ Home/living room

___ Outside

___ Other, explain ____________________________

Did you experience any sensations, feelings, or thoughts during the practice session ___ yes ___ no If yes, explain ______________

Did you encounter any problems during the session? ___ yes ___ no If yes, explain ____________________________
Name: ____________________________

Date: ____________________________

Time at beginning of session: (check one) ________________________________
- 7:00AM-11:00AM
- 11:00AM-3:00PM
- 3:00PM-7:00PM
- 7:00PM-12:00AM

Posture: (check one) ___lying ___sitting

Location: (check one) ___Home/Bedroom
- Home/Living room
- Outside
- Other, explain ____________

Did you experience any sensations, feelings, or thoughts during the practice session? ___Yes ___No If yes, explain ____________________________

Did you encounter any problems during the session? ___Yes ___No If yes, explain ____________________________

Date: ____________________________

Time at beginning of session: (check one) ________________________________
- 7:00AM-11:00AM
- 11:00AM-3:00PM
- 3:00PM-7:00PM
- 7:00PM-12:00AM

Posture: (check one) ___lying ___sitting

Location: (check one) ___Home/Bedroom
- Home/Living room
- Outside
- Other, explain ____________

Did you experience any sensations, feelings, or thoughts during the practice session? ___Yes ___No If yes, explain ____________________________

Did you encounter any problems during the session? ___Yes ___No If yes, explain ____________________________
DIARY

Each individual is required to keep a diary of the relaxation sessions daily. This diary will provide a record of your practice sessions and enable you to determine if you are making progress.

Record the following information for every day you actually practice on the paper provided. Turn in your diary at the weekly training sessions.

Write down the following information:

Name (top of page)

1. Date
2. Time at beginning of session
3. Posture (lying or sitting) and location of practice
4. Sensations, feelings, and thoughts experienced during the practice session
5. Problems, if any, encountered
VITA

May 1980

PERSONAL DATA

Name: Bevan Todd Graybill
Home Address: 707 Riverview
Logan, Utah 84321
Office Address: Counseling & Testing Office
Utah State University
Logan, Utah 84321
Date of Birth: June 27, 1953
Marital Status: Married
Children: one

EDUCATION

1975 B.A. with Highest Honors
University of Oklahoma
Norman, Oklahoma
Undergraduate GPA: 3.9/4.0
Major: Psychology
Minor: Political Science

1979 M.S.
Utah State University
Logan, Utah
Graduate GPA: 3.88/4.0
Major: Combined Professional-Scientific Psychology

1981 Ph.D.
Utah State University
Logan, Utah
Major: Combined Professional-Scientific Psychology (APA approved)

HONORS & AWARDS

Phi Beta Kappa
Phi Kappa Phi
Phi Eta Sigma

PROFESSIONAL AFFILIATIONS

Present Associate Member, American Psychological Association
1977-1979 Student Affiliate, American Psychological Association
PROFESSIONAL EXPERIENCE


1976  Instructor in Health, Cameron University, Lawton, Oklahoma.

1976-1978  Therapist and milieu staff, Hillside School, Logan, Utah. Individual and group psychotherapy with psychotically disturbed adolescents in a JCAH accredited psychiatric residential treatment facility. Supervisor: Curt Canning. (practicum position)

1977-1978  Graduate Assistant, Counseling & Testing Center, Utah State University, Logan, Utah. Supervisor of peer counseling program. Supervisor: Keith Checketts.

1977-1978  Case Coordinator, Clinical Services, Exceptional Child Center, Utah State University, Logan, Utah. Involved intake interviews, psychological assessment, formulation of treatment plans, and consultation with parents of children with behavioral and educational problems. Supervisor: Phyllis Cole. (practicum position)

1978  Psychological Assessment Consultant, Edith Bowen Elementary School, Utah State University, Logan, Utah. Developed a method of selecting gifted students in a laboratory school; this included intelligence, achievement, personality, and creativity assessment.

1978-1979 (summers)  College-Level Examination Program (CLEP) Test Administrator, Counseling & Testing Center, Utah State University, Logan, Utah. Supervisor: Keith Checketts.
1978-1980 Graduate Assistant, Counseling & Testing Center, Utah State University, Logan, Utah. Individual psychotherapy, crisis intervention, and marital therapy with neurotic college student population. Also, career and academic counseling with college students. Supervisors: William Dobson, Elwin Nielsen, and Michael Bertoch. (practicum position)


SPECIAL TRAINING

1976 Completed week long workshop "Making a Difference with Youth" by the National Drug Education Center and Human Resources Development Institute at the University of Oklahoma Health Sciences Center, Norman, Oklahoma.

RESEARCH AND PUBLICATIONS

1978 Grant proposal entitled "Meeting Needs of Adult Learners" for $45,190. Submitted to Utah State Board of Education. (not funded)

1979 Master's thesis "The Effectiveness of a Comprehensive Peer Counseling Program on Academic Adjustment," Utah State University. Chairman: Elwin Nielsen, Ph.D.