

THE COMPARATIVE EFFECTS OF AUTOMATED RELAXATION
TRAINING AND SYSTEMATIC DESENSITIZATION ON TEST-ANXIETY
AMONG COLLEGE STUDENTS

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by

DENNIS ALAN VANDERPOOL

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CHAPTER I

INTRODUCTION

"Anxiety is the apprehension cued off by a threat to some value which the individual holds essential to his existence as a personality" (May, 1954, p. 191). May's definition of anxiety, as the apprehension cued off by a threat to the very essence of the personality, strongly emphasizes the meaningfulness of test-anxiety or any form of anxiety. One who experiences little test-anxiety may have difficulty recognizing it as a serious problem, but for the test-anxious individual, his anxiety and its effects do, indeed, present a serious problem.

May (1954) differentiated between two aspects of anxiety:

Normal anxiety is, like any anxiety, a reaction to threats to values the individual holds essential to his existence as a personality; but normal anxiety is that reaction which (1) is not disproportionate to the objective threat, (2) does not involve a repression or other mechanisms of intrapsychic conflict, and, as a corollary to the second point, (3) does not require neurotic defense mechanisms for its management, but can be confronted constructively on the level of conscious awareness or can be relieved if the objective situation is altered (p.194).

Neurotic anxiety, on the other hand, is a reaction to threat which is (1) disproportionate to objective danger, (2) involves repression (dissociation) and other forms of intrapsychic conflict, and as a corollary, (3) is managed by means of various forms of retrenchment of activity and awareness, such as inhibitions, the development of systems, and the varied neurotic defense mechanisms (p. 197).

Even though test-anxiety may be considered neurotic and hence, disproportionate to the objective threat, it remains proportionate to the subjective threat of the individual. Therefore, the subjective meaningfulness of test-anxiety is again emphasized but moreover, a direction is provided for therapy, that is, the desired therapeutic movement from a client's subjective conception of the threat posed by an examination and his disproportionate anxiety reaction, to a more objective concept of the risk involved in taking a test and the consequent proportionate reaction.

Test-Anxiety Theory

The following theory of test-anxiety was proposed by Mandler and Sarason (1952) who investigated drive states, the extensiveness of the anxiety experienced during the testing situation, and the relationship between anxiety responses and performance.

They assumed that drives evoked by the test were of two types. The first type were "drives which evoke responses relative to satisfying the requirement set by the task or experimenter" (p. 166). They refer to this type of drive as a task drive which was reduced by a task response.

The second type of drive was "a function of anxiety reactions previously learned as responses to stimuli present in the testing situation" (p. 166). These responses may have been of two types: (1) responses not directly associated with the testing situation, and (2) responses directly associated with completion of the task (equivalent to the task response mentioned above).

The anxiety responses not directly associated with the testing situation were more self-centered, as opposed to task-centered. "These responses may be manifested as feelings of inadequacy, helplessness, heightened somatic reaction, anticipation of punishment or loss of status and esteem, and implicit attempts at leaving the test situation" (p. 166). Consequently, these responses which interfered with task completion were incompatible with the task-oriented responses. Furthermore, persons with a high anxiety drive tended to make more anxiety responses not relevant to the task, whereas persons with a low anxiety drive tended to make more task-relevant anxiety responses.

In the same study, the authors found support for the preceding theoretical considerations:

1. The mean time scores on the Koh Block Design of the low anxiety group were better than those of the high anxiety group for the first five trials.
2. The variability of the high anxiety group was significantly larger than that of the low anxiety group" (p. 173).

These results were due to finding that persons with a high anxiety drive tended to make more anxiety responses not relevant to the task.

3. As the learning process proceeded, the anxiety drive of the high anxiety group tended to improve performance scores" (p. 173). These results were due to the strong reinforcement of the task-relevant anxiety responses by the high anxiety persons which increased the strength of these drive relative to those anxiety responses not relevant to the task.
4. An intervening report (success or failure) elicited improved performance for the low anxiety group but depressed scores for the high anxiety group (p. 173). Specifically,

for the high anxiety person, the optimal conditions were those in which no reference was made to the testing situation, while the optimal condition for the low anxiety group was one in which they received some indication of failure.

The previously discussed test-anxiety theory was substantiated by the following conclusions from a recent review of the literature (Wine, 1971).

Highly test-anxious persons typically perform more poorly on tests than do low-test-anxious persons, particularly when the tests are administered under stressful evaluation conditions. The literature reviewed in this article suggests that this performance difference is largely due to a difference in the attentional focuses of high-and-low-test-anxious persons during task performance. The low-test-anxious person is focused on task-relevant variables while performing tasks. The highly test-anxious subject is internally focused on self-evaluative, self-deprecatory thinking, and preception of his autonomic responses. Since the difficult tasks on which the test-anxious person does poorly require full attention for adequate performance, he cannot perform adequately while dividing his attention between internal cues and task cues (p 92).

Treatment of Test-Anxiety

The previous information on test-anxiety suggested that some form of treatment for test-anxiety was in order. In keeping with this suggestion, progressive relaxation and systematic desensitization have been chosen as the treatment methods for the purposes of this study.

Progressive relaxation. The initial investigation of relaxation, specifically, the effects and means of achieving, was conducted by Jacobson (1929). He noted "the neurotic individual has partly lost the natural habit or ability to relax" (p.31).

To overcome this problem, Jacobson devised the technique of progressive relaxation in which he taught patients how to recognize the contraction of a muscle group and then how to

relax it completely. By practicing the contraction of the different muscle groups, his patients became aware of the sensations associated with contraction and relaxation, and eventually learned to identify even the smallest contraction.

Initially, the patients were instructed to flex a particular muscle group steadily, avoiding contractions of other muscle groups. They were then told to relax this group, noticing that tensing involves effort while relaxation involves no effort, a letting go. It may have been helpful for some patients to take a casual attitude toward relaxation training, not caring whether they did well or not. Moreover, they are requested to relax further and further, past the point one would ordinarily associate with being relaxed.

Practice was essential for Jacobson's patients to learn the technique of progressive relaxation since as many as 100-200 sessions were necessary to learn the technique properly. In Jacobson's (1929) words: "Repetition is the keynote of the entire method of progressive relaxation" (p. 64). Jacobson (1929) also extended this technique to include differential relaxation. "Differential relaxation, accordingly, means a minimum of tensions in the muscles requisite for an act along with the relaxation of other muscles" (p. 83).

Jacobson (1929) believed there to be a direct casual relationship between anxiety and muscle relaxation and relied on this theory in the treatment of his patients. As Jacobson explains,

Mental and emotional activity always involve a motor element. By decreasing this motor element, relaxation apparently diminishes such activity. Nervous individuals tend to rehearse their griefs, difficulties and problems, considering incessantly

and perhaps incoordinately what to do about them; and this emotional reflection evidently is a fountainhead of nervous hypertension, which relaxation mechanically shuts off (p. 299).

Jacobson reaffirmed this position in a more recent statement in which he claimed that "objective and subjective data indicate conclusively that when the trained observer relaxes the neuromuscular elements apparently specific in any mental activity, the mental activity as such disappears accordingly" (Jacobson, 1970, p. 34).

Systematic desensitization. Wolpe (1958) patterned his therapeutic method after a study of children's fears by Mary Cover Jones, in which children were given food while a feared object was at some distance from them. The feared object was brought closer and closer to the child until it became a stimulus for food instead of a stimulus for fear. This process was referred to as counterconditioning. Similarly, Wolpe's reciprocal inhibition referred to the situation in which the performance of one response leads to a lessening of the strength of evocation of a simultaneous response. A specific instance of reciprocal inhibition was explicated in the following familiar principle: If a response antagonistic to anxiety can be made to occur in the presence of anxiety-evoking stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses, the bond between these stimuli and the anxiety responses will be weakened" (Wolpe, 1958, p. 71). (Wolpe's theory of reciprocal inhibition has been contested by a number of investigators; a discussion of this conflict ensues in Chapter II.)

In one of Wolpe's (1958) experiments with cats, he induced anxiety in the cats while in their cage and then

removed the symptoms by desensitization based on reciprocal inhibition. Desensitization proceeded by offering food to the cats outside of the cage until they were able to eat, and then offering food to them in situations which evoked increasing symptoms of anxiety, until finally, they were able to eat in the cage without anxiety. In this case, the food was the response antagonistic to anxiety, whereas the cage was the anxiety-evoking stimuli. Thus, a complete suppression of the anxiety responses occurred by pitting the eating against the anxiety-evoking stimuli, or cage, weakening the bond between the stimuli and anxiety responses.

According to Wolpe (1958), human neuroses obey essentially the same laws as the neuroses of his laboratory animals. Therefore, therapies based on the principle of reciprocal inhibition should be successful with human clinical cases. However, the response of eating used in the laboratory experiments was not appropriate to oppose the anxiety reactions of humans. Consequently, Wolpe developed the technique of systematic desensitization which utilized muscle relaxation, due to its anxiety-inhibiting effects, to oppose anxiety.

Desensitization consisted of presenting to the imagination of the deeply relaxed client the least anxiety-evoking item in a group of anxiety-evoking stimuli. This was done repeatedly until no anxiety was evoked and the extinction of the weak anxiety reaction generalized to the next item, thus, making extinction of this item easier to accomplish. This procedure was carried on until the strongest of the anxiety-evoking stimuli failed to evoke any anxiety.

One advantage of systematic desensitization over progressive relaxation was the shorter period of time involved in the treatment of a typical case. An average case using systematic desensitization took approximately ten to twenty-five sessions, compared to 100 to 200 with Jacobson's method (Wolpe, 1958). Wolpe (1958) explained the success of Jacobson's method as follows:

Apart from the non-specific therapeutic effects of interviewing (p. 193) from which Jacobson's patients are doubtless not immune, it would seem that his method succeeds because if a person can maintain differential relaxation all the time, he will obtain some measure of reciprocal inhibition of the effects of any anxiety-evoking stimuli he happens to encounter; and the repeated occurrence of such inhibitions will enable conditioned inhibition of the anxiety responses gradually to develop (p. 136).

Another limitation of progressive relaxation was that there was not enough control of the anxiety-evoking stimulus constellations; Wolpe's technique of systematic desensitization avoided this limitation (Wolpe, 1958).

The importance of systematic desensitization lied in its comparative effectiveness in alleviating neurotic anxiety. For example, Wolpe (1958) reported nearly 90% of his patients in a combined reciprocal inhibition series were apparently cured or much improved, as opposed to Eysenck's investigation of the Berlin Psychoanalytic Institute which resulted in 62% successes, or the 53% success rate for the investigation of the New York Hospital Series conducted by Hamilton and Wall.

Statement of the Problem

The focus of this investigation was to compare systematic desensitization and relaxation training as methods of reducing

test and general-anxiety. These two methods of treatment were used because they have been found to reduce anxiety, and specifically, test-anxiety (Johnson & Sechrest, 1968; Laxter & Walker, 1970; Laxter et al, 1969).

More specifically, pre and posttest measures of test and general-anxiety were utilized to examine the comparative effects of the two treatment methods.

Significance of the Investigation

Many students have performed poorly on examinations because the anxiety they have experienced in such situations interfered with their performance (Sarason, 1961; Sarason & Minard, 1962; I. Sarason, 1959). As a result, examinations have come closer, perhaps, to measuring the amount of anxiety a student has over a testing situation instead of measuring what it purports to measure.

In view of this situation, some form of treatment to alleviate test-anxiety, and thus increase academic performance, was in order. This investigation employed the use of two such treatments in an effort to study their individual and comparative effects.

Theoretical Framework

The theoretical framework was established in this section with regard to defining the following terms and specifying the research hypotheses appropriate to this study.

Definition of Terms. Several terms used throughout this investigation were defined in this section.

1. Progressive relaxation. A technique developed by Jacobson (1929) and applied to both physical and emotional disorders. The technique involves intensive relaxation training, as well as a

further emphasis on maintaining relaxation while participating in daily activities, i. e., not tensing those muscles not in use.

2. Reciprocal inhibition. "If a response antagonistic to anxiety can be made to occur in the presence of anxiety-evoking stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses, the bond between these stimuli and the anxiety responses will be weakened" (Wolpe, 1958, p. 71).
3. Extinction. The nonreinforcing of responses previously reinforced, which results in a decrease in the frequency of the responses.
4. Systematic desensitization. The therapeutic method based on the principle of reciprocal inhibition. The procedure involves the presentation of increasing amounts of anxiety-evoking stimuli in the presence of relaxation.
5. Hierarchy. A component of systematic desensitization in which a number of anxiety-evoking situations are ordered; the least disturbing situation is placed at the bottom of the list and the most disturbing at the top.
6. State-anxiety. "Characterized by subjective, consciously preceived feelings of apprehension and tension, together with activation of the autonomic nervous system" (Speilberger, 1968, p. 20).
7. Trait-anxiety. "The degree to which individuals are disposed to manifest A-state in response to various forms of stress" (Speilberger, 1968, p. 20).
8. Test-anxiety. "In essence, high test-anxious persons are characterized by acquired habits and attitudes that involve negative self-perceptions and expectations. These self-depreciation habits and attitudes dispose test-anxious persons to experience fear and heightened physiological activity in situations such as examinations in which they are being evaluated, and influence the manner in which they interpret and respond to events in the environment" (Speilberger, 1972, p. 14).

Research Hypotheses. The following research hypotheses were expected to occur on the basis of research relevant to the nature of the problem:

1. Systematic desensitization and relaxation training will be significantly effective treatments of test-anxiety.
2. Systematic desensitization will be a significantly more effective treatment of test-anxiety than relaxation training.
3. Systematic desensitization and relaxation training will have no significant effect upon state-anxiety.
4. Systematic desensitization and relaxation training will be significantly effective treatments of trait-anxiety.
5. Systematic desensitization will be a significantly more effective treatment of trait-anxiety than relaxation training.

CHAPTER II

REVIEW OF THE LITERATURE

The literature relevant to the proposed problem, that is, literature relevant to the comparative effects of relaxation training and systematic desensitization in the treatment of test- and general-anxiety, was reviewed in the following chapter. The literature was categorized into four major divisions: (1) literature concerning test-anxiety; (2) literature concerning relaxation training; (3) literature concerning systematic desensitization; (4) literature concerning the comparative effects of systematic desensitization and relaxation training.

Literature Concerning Test-Anxiety

The following literature concerning test-anxiety has been divided into the following sections: (1) test-anxiety and performance; (2) test-anxiety and situational conditions; (3) test-anxiety and self-focusing tendencies; (4) worry and emotionality as constituents of test-anxiety.

Test-Anxiety and Performance. "Highly test-anxious persons typically perform more poorly on tests than do low-test-anxious persons, particularly when the tests are administered under stressful, evaluative conditions" Wine, 1971, p. 92). The following research provided support for this statement with regard to a number of performance criteria: (1) intelligence; (2) academic achievement; (3) problem-solving tasks.

1. Intelligence. Most investigations have found a low negative correlation between intelligence and anxiety (Phillips, et al., 1972). For example, I. Sarason (1961) found a consistent negative correlation between test-anxiety and eleven of thirteen intelligence measures. Furthermore, the negative correlations with test-anxiety were stronger for aptitude test scores than for grade point averages, a finding supported by a number of studies (I. Sarason, 1957; S. Sarason & Mandler, 1952). Similarly, Sarason and Minard (1962) found low-test-anxious subjects to be superior to high-test-anxious subjects with regard to a short form of the WAIS. Moreover, I. Sarason (1959a) also found a negative correlation between test-anxiety and intelligence but not between general-anxiety and intelligence.
2. Academic achievement. Other investigations have been conducted concerning the effect of test-anxiety upon academic achievement, utilizing a variety of performance criteria. Speilberger (1962) found that students with high-test-anxiety and in the middle range of ability received lower grades, and a higher percentage of these students were academic failures, than students in the same range of ability but with low-test-anxiety. The high anxious students of low ability earned poor grades, irrespective of their anxiety level, but among the low ability group, a higher percentage of those students with high anxiety were academic failures than those students with low anxiety. For the students who demonstrated high ability, it seems that anxiety may have facilitated their academic performance. In view of these relationships, Speilberger (1962) offered the following encouragement: "To the extent that anxious students -- likely to be underachievers or academic failures can be identified early and offered effective therapeutic assistance, academic mortality rates resulting from emotional factors can be reduced" (p. 425).

Boor (1972) found no significant relationship between measures of test-anxiety and examination performance with the variance attributable to intelligence was accounted for or when the subjects were divided into groups of similar intelligence levels. He suggested that the negative correlation found between test-anxiety and examination performance can be explained by a simple relationship between these variables and intelligence. These results were consistent with the conclusion of Alpert and Haber (1960) concerning the relationship between anxiety and

intelligence. They contend that the negative correlation between anxiety and intelligence was due to a focus on a scale which predicted performance with regard to something other than aptitude. Thus, it was difficult to achieve the necessary objective measure of intelligence due to the anxiety confounding influence.

Both I. Sarason (1957) and S. Sarason and Mandler (1952) found test-anxiety to be negatively correlated with aptitude test scores but not with course grades throughout college. They postulated that anxiety may dissipate over the college years, resulting in the lack of a negative correlation between test-anxiety and college grades. An investigation by Leiter (1964) was consistent with such a theory as a result of his finding that test-anxiety was not a significant predictor of college grades. On the other hand, Allen (1972) found high trait-anxiety to be associated with lower grade point averages among his college subjects. He also found high anxiety (measured by the facilitating scale of the Anxiety Achievement Test) to be associated with higher grade point averages.

A comparative examination of the results found by S. Sarason and Mandler (1952), Reiter (1964), Allen (1972), and I. Sarason (1957) indicated that the test-anxiety-achievement relationship depended to a large extent upon the anxiety instrument. Desiderato (1969) provided support for this idea with a recommendation for the use of specific rather than general-anxiety scales as predictors of academic performance. The basis of Desiderato's recommendation was his finding that a forced choice form of the Manifest Anxiety Scale was unrelated to grade point average, whereas subjects at the extreme ends of the Alpert-Haber Scales of debilitating and facilitating anxiety showed significant differences in grade point averages.

Several other investigations have been conducted concerning the relationship between test-anxiety and academic performance, utilizing criteria other than college grades. For example, Paul and Eriksens' (1964) finding of a significant relationship between the Test Anxiety Questionnaire and Cooperative School and College Ability Test confirmed the findings of S. Sarason and Mandler (1952) and I. Sarason (1957, 1961a, 1963) with regard to the negative correlation between aptitude and anxiety. They provided three explanations for the basis of this relationship: (1) subjects who perform poorly used the anxiety scale

as a rationalization for their performance, instead of admitting that their ability is low. They discounted this explanation since they disregarded those subjects who were anxious during the examination; (2) subjects with high-test-anxiety "suffer impaired performance under testing conditions due to heightened physiological activity and self-depreciating ruminations which constitute interfering and distracting influences during the testing situation. This study supports this conclusion but only for Ss in the middle range of academic ability" (p. 480); (3) the low ability of the subjects resulted in anxiety over tests.

Further support for the detrimental effects of test-anxiety was provided by Wittmaier (1972). He concluded that college students with low-debilitating anxiety (Anxiety Achievement Test) have more effective study habits, and avoid delaying academic tasks more, than students with high-debilitating anxiety.

3. Problem-solving tasks. The effect of test-anxiety on a variety of problem-solving tasks was clearly indicated in the following statements: "Test-anxiety level is a significant determinant of performance on problem-solving tasks involving the manipulation of responses" (Harleston, 1962, p. 567). "The results indicate that anxiety interacts with irrelevant information to produce a difficult situation for the problem-solver" (West, et al., 1969, p. 52).

Relatively longer time required by test-anxiety Ss in solving problems has obvious implications on results obtained on tests where speed of performance is a significant consideration. Anxiety level seems to become a significant variable in test performance. It is particularly so on speed tests" (Sinha and Singh, 1959, p. 469).

Further evidence of the negative correlation between anxiety and performance on problem-solving tasks was provided by the following investigation. A high amount of anxiety (measured by the Test Anxiety Questionnaire) was found to hinder the performance, on a concept-formation task, of low intelligent subjects relative to the performance of low anxiety subjects of low intelligence (Fisher and Awrey, 1973). On a different type of task, maze-solution, Farber and Spence (1953) found the performance of the anxious subjects to be significantly poorer than that of the non-anxious subjects.

In view of the previously cited research, the effect of anxiety upon a variety of performance criteria, such as intelligence measures, academic achievement, and problem solving was clearly detrimental.

Test-Anxiety and Situational Conditions. Mandler and Sarason (1952) investigated feedback versus no-feedback conditions and found the optimal conditions for the high-test-anxiety group (measured by the Test Anxiety Questionnaire) to be the no-feedback conditions, whereas the optimal conditions for the low-test-anxiety group were the feedback conditions. Specifically, the performance of the low-test-anxiety group was facilitated by feedback in the form of both failure and success reports, but the failure reports provided the most facilitating conditions.

In a similar study, Mandler, Sarason, and Craighill (1952) examined stressful versus non-stressful conditions. In the stressful condition, the subjects were told that they would be able to easily complete the test in the allotted time, but they were placed in a situation where this would be impossible. The non-stressful condition involved telling the subjects that no one would be expected to finish in the allotted time. The results indicated that under the non-stressful conditions, the high-test-anxiety subjects performed better than under the stressful conditions, whereas the low-test-anxiety subjects performed better under the stressful conditions.

Several other similar investigations concerning test-anxiety and situational conditions have yielded results consistent with the two previously cited studies (Paul and Eriksen, 1964; Russel and I. Sarason, 1965; I. Sarason, 1958,

1959b, 1961b; I. Sarason and Palola, 1960; Silverman and Blitz, 1956). I. Sarason's (1958) investigation indicated that the performance of high-test-anxiety subjects was facilitated by reassurance, but the effect of reassurance on performance of low-test-anxiety subjects was detrimental. Silverman and Blitz (1956) based their conclusions on the suggestion that anxious persons did not respond adaptively to threat. Their defenses may have been inappropriate in the test situation or the strength of their defenses may have been such that they could not be adapted to the relatively small threat of the test situation.

Test-Anxiety and Self-Focusing Tendencies. "There is abundant evidence that the test-anxious person is more self-preoccupied and self-deprecatory than his low-test-anxious counterpart. It is also clear, in view of the research reviewed, that these self-focused tendencies are activated by the pressures of the testing situation" (Wine, 1971, p. 95).

The following studies provided a limited amount of that evidence. Doris and S. Sarason (1955) found that after failure, high-anxious subjects blamed themselves significantly more often than low-anxious subjects. Meunier and Rule (1967) also found a tendency for the test-anxious person to devalue his own performance. Similarly, high test-anxious subjects, became progressively more pessimistic about their performance even though they performed as well as the low-test-anxious subjects. Marlett and Watson (1968) and Ganzer (1968) both provide evidence that high-anxious subjects not only devalued their own performance, but that this tendency was active in the testing situation. Moreover, test-anxiety (Sarason and

Koenig, 1965) and debilitating anxiety (Walsh, 1968; 1969) found to be related to the incidence of negative self-references

The literature reviewed supports an attentional interpretation of the debilitating effects of test-anxiety on task performance. The highly test-anxious person responds to evaluative testing conditions with ruminative self-evaluative worry and, thus, cannot direct adequate attention to task-relevant variables" (Wine, 1971, p. 99).

Worry and Emotionality as Constituents of Test-Anxiety.

Liebert and Morris (1967) and Spiegler, et al., (1968) have proposed a division of test-anxiety into two constituents: (1) worry, or concern over performance, and (2) emotionality, or autonomic arousal. They devised a measure of worry and emotionality and found worry to be fairly constant when administered several days before an examination, immediately before an examination, and immediately after an examination, whereas emotionality was found to reach a peak immediately before an examination and declined rapidly immediately afterwards.

Doctor and Altman (1969) and Morris and Liebert (1969; 1970) examined the relationship between worry and emotionality, and task performance. There were no significant results involving emotionality and performance; however, worry, as well as task difficulty and timing, was negatively related to performance. Consequently, if one accepted the attentional interpretation of test-anxiety advocated by Wine (1970), worry could have been explained as more attentionally demanding and hence distracting from the task than emotionality.

Literature Concerning Relaxation Training

Relaxation training, as proposed by Jacobson, has been utilized in the treatment of test-anxiety; several studies involved in this effort were examined in this section.

Automated relaxation training with feedback and automated relaxation training without feedback have been shown to be equally effective in the treatment of anxiety with regard to objective measures, (motor movement and heartrate) and superior to an attention placebo group (Riddick and Meyer, 1973) However, the attention placebo group was equally or more effective than the other treatments for subjective measures, suggesting the importance of therapist reinforcement, expectations, etc.

Martin (1970) has also utilized automated relaxation training with the following results: "In hospital practice, dealing with rather more involved problems where further, supervised treatment (e.g., desensitization) may be required, the initial stages of relaxation have still been carried out in recorded sessions without undue problems" (p. 217).

In an investigation designed to reduce test-anxiety, Allen (1973) found relaxation and study counseling to be effective treatments, both individually and in groups, with regard to self-report-anxiety and academic performance. In another study designed to reduce test-anxiety, Russel and Sippich (1973) utilized a specialized form of relaxation training which involved pairing breath exhalations while relaxed with a self-produced cue word (in this case, the word was "calm"). The authors contended that one advantage of such a treatment over systematic desensitization is it's possible

utilization with a patient who lacked the visual imagery necessary for desensitization. Another advantage is the wider application of the technique to a greater number of situations than is possible with systematic desensitization. That is, the circumstances dictated by the anxiety hierarchy would not be a limitation with this specialized form of relaxation training.

Johnson and Spielberger (1968) found that relaxation training reduced the level of subjective anxiety (A-State) but had no influence on anxiety proneness (A-Trait). It was also concluded that the results supported Spielberger's hypothesis concerning the conceptualization of anxiety as two constructs, A-State and A-Trait. Hence, Spielberger's hypothesis, that A-State measures of anxiety were expected to decline immediately after relaxation training, while A-Trait measures were expected to remain unaffected by relaxation training, was supported.

Literature Concerning Systematic Desensitization

The examination of the literature concerning systematic desensitization, with special emphasis on the treatment of test-anxiety, was quite extensive. Consequently, this section has been divided as follows: (1) reciprocal inhibition, extinction or habituation? (2) expectancy change and reinforcement; (3) systematic desensitization and study counseling; (4) group desensitization; (5) specialized treatments of test-anxiety.

Reciprocal Inhibition, Extinction, or Habituation?

Lander and Mathews (1968) challenged Wolpe's theory of reciprocal inhibition as the basis for systematic desensitization. They proposed the following habituation theory:

This proposes that systematic desensitization may be regarded as habituation occurring when the rate of habituation is maximal; that is, when the level of arousal is as low as possible consistent with clear consciousness. Thus, the need to train the patient to relax is not because of the muscular relaxation induced per se, but because the instructions used and conditions inherent in relaxation training subserve the function of engendering a low level of arousal.

It can be seen that the model proposed is similar to the theory that desensitization is extinction but with the all important difference that level of arousal must be contemporaneously as low as possible: and it is of interest here that a recent review of the habituation phenomenon found no grounds for a distinction in the mechanisms underlying extinction and habituation (Thompson and Spencer, 1966, p. 417).

Support for this hypothesis was provided by Rachman (1968) who ascertained that muscle relaxation was not a necessary component of systematic desensitization. Instead, the vital force involved was a feeling of calmness which may have been inadvertantly induced by relaxation training, thus lowering the level of arousal. Rachman cited three reasons for this conclusion: (1) EMG levels and calmness are not necessarily correlated during systematic desensitization; (2) therapeutic effects can be attained even with brief muscular relaxation; and (3) in vivo desensitization (without muscular relaxation) is effective. Accordingly, a more efficient use of the systematic desensitization technique, with regard to time, should involve inducing calmness in the patient verbally, as opposed to the lengthy relaxation training typically used in desensitization. Of course, such a technique would not work with all patients since everyone would not be able to imagine calmness and thus become desensitized.

Rachman (1968) cited three investigations (Lomon and Edwards, 1967; Rachman, 1965; and Davison, 1968), to which additions can be made (Kondas, 1967; Wolpe, 1970), including one concerning test-anxiety (Freeling and Hemberg, 1970), to support his contention that systematic desensitization utilizing relaxation is a more advantageous technique in reducing anxiety than extinction (visualization without relaxation). Although conclusive evidence for the maximal habituation hypothesis was not provided by these results, since a low level of arousal may have or may not have been induced by training in muscular relaxation, the maximal habituation hypothesis provided a possible explanation for the efficacy of the reciprocal inhibition groups.

Van Egeren (1970) cited evidence in contrast to the above theory:

If the rate of habituation is maximal when the "level of arousal is as low as possible consistent with clear consciousness" (Lader and Mathews, 1968, p. 416), a significant negative correlation between habituation and spontaneous autonomic activity should be anticipated (Van Egeren, 1970, p. 254).

However, rate of habituation was not found to be inversely related to arousal level (Van Egeren, 1970); thus, habituation as an explanation for the autonomic changes resulting from imagining phobic scenes was questionable.

The parametric relations for the two are not the same: they are different in two important respects: (a) autonomic reactions to phobic imagery do not recover response strength after a wait of one week following cessation of phobic stimulation; (b) habituation of autonomic reactions to phobic imagery are directly proportional to stimulus strength (affectivity of scene) rather than the reverse (Van Egeren, Feather, and Hein, in press). Recovery of habituation reactions after the stimulus is removed and the inverse relationship between habituation and stimulus

strength are well documented parametric features of physiological habituation (Harris, 1943; Thompson and Spencer, 1966). Desensitization is different in these important respects from habituation (p. 254).

It is possible that extinction is responsible for the results achieved from systematic desensitization, since reciprocal inhibition techniques involve the procedure for classical extinction (Lomont, 1965). Lomont (1965) only found one experiment which clearly indicated any feature of reciprocal inhibition which could not be attributable to extinction. Furthermore, Lomont suggested that the type of extinction procedure utilized in systematic desensitization, that is, the therapeutic instructions which delay the subject's avoidance response, was more effective than free response avoidance extinction.

Contrary to previously cited studies supporting the superiority of reciprocal inhibition over extinction as an explanation for systematic desensitization, Cooke (1966) found no difference between desensitization with relaxation and desensitization without relaxation. Hence, this investigation provided no support for reciprocal inhibition theory as the basis for desensitization, while on the contrary, extinction remained a possible explanation for the results.

Consistent with Cooke, "no direct evidence has been found for one of the central postulates of reciprocal inhibition theory, that relaxation reduces or prevents autonomic anxiety responses associated with phobic imagery" (Mathews, 1971, p. 87). Moreover, relaxed subjects have been found to be more sensitive to phobic stimuli properties of controlled imagery than nonrelaxed SS, according to physiological analysis

(Chapman and Feather, 1971), contradicting Wolpe's explanation of muscle relaxation as a response antagonistic to anxiety. Hence, reciprocal inhibition was not the basic process involved in this study. Instead, Chapman and Feather (1971) suggested that the role of relaxation in systematic desensitization may have been to allow stimulus generalization to reduce and enhance discrimination learning.

Another possible explanation for the efficacy of muscle relaxation was that "it fairly reliably enhances the subjective reality of cognitive events and confers on them a measure of clarity and impact which is typically encountered only during in vivo stimulation" (Wickramasekera, 1972, p. 464).

Conclusions consistent with Chapman and Feather (1971) (with regard to the sensitivity of relaxed Ss to phobic imagery) and Wickramasekera (1972) (with regard to relaxation as an enhancer of phobic imagery) were provided in a review of the literature by Mathews (1971):

Lang (et al 1970) found evidence that a relatively large autonomic response to phobic images, followed by a rapid decay, is associated with a good treatment outcome. These results suggest the possibility that the rapid reduction of an initially large response is a critical factor in successful desensitization, and that relaxation may assist in bringing about this effect. Anecdotal evidence of the intense vividness of images experienced in a relaxed or drowsy state (hypnagogic imagery), and the recent work of Antrobus (1968) showing that the spontaneous occurrence of images increases as external information is reduced, both support the hypothesis that one of the effects of relaxation may be to increase the vividness of imagery experienced during desensitization.

Expectancy Change and Reinforcement. Factors other than the autonomic changes which occurred as a result of systematic desensitization also influenced the outcome of therapy.

Wilkins (1971) has attributed a major therapeutic benefit to the expectancy of therapeutic gain and to the therapist as a reinforcer of non-fear behavior. Marcia (et al, 1969) found a treatment which utilized most of the expectancy manipulating features of desensitization but not the technical aspects (relaxation, visualization, hierarchies) to be as effective as a typical systematic desensitization procedure. Leitenberg (et al, 1969) compared the effectiveness of a treatment group utilizing reinforcement, as well as expectancy of success, in combination with the technical aspects, versus a treatment group using only the technical aspects, and found the improvement in the former group to be significantly greater than that of the latter. The therapeutic benefit of systematic desensitization could not have been solely attributed to the effects of relaxation, visualization, and the presentation of hierarchies, alone. Conversely, the technical components have been shown to produce some therapeutic effect in the absence of expectancy of success or reinforcement (Oliveau, et al, 1969).

Systematic Desensitization and Study Counseling. Both a group counseling treatment and a behavior therapy treatment for college underachievement yielded positive results with regard to GPA (Doctor, et al, 1970); the systematic desensitization group experienced less anxiety than the other group, and the effects of the behavior therapy group generalized to non-academic situations, whereas the effects of group counseling did not.

These differences suggest that improved functioning among counseling group Ss may be due to changes

in the way the members think about problems, intellectually restructuring them, as it were. For Ss treated by behavior therapy, improved functioning may be related to the less disturbing physical feelings that are aroused when facing difficulties. This would enable the individual to approach problems more adaptively" (p. 89).

Allen (1971) and Mitchell and Ng (1972) found a combined desensitization and study counseling procedure to be more effective, with regard to test-anxiety and academic performance, than either desensitization or study counseling alone. Furthermore, the only significant reduction of test-anxiety was obtained for those groups given desensitization (Mitchell and Ng, 1972).

Group Desensitization. Group desensitization has been an effective treatment of test-anxiety among college students (Cohen, 1969; McManus, 1971; Taylor, 1971; Mitchell and Ingham, 1970; Donner and Guerney, 1969). Group desensitization was also found to be an effective method of improving the grades of junior high students with test-anxiety (Deffenbacher and Kemper, 1974). Donner and Guerney (1969) were successful with an automated group desensitization procedure, and in a five-month follow-up report, Donner (1970) found that the initial improvement was not only maintained but further gains were evident.

The comparative effects of group desensitization and group psychotherapy were investigated by Crighton and Jeru (1969) and Garrington and Ihli (1969), who found no significant differences between the two approaches. When a combined treatment of group systematic desensitization and group psychotherapy (Katahn and Strenger, 1966) and a combined

treatment of group desensitization and individual treatment (Suinn, 1968) were employed, they were found to be successful in the reduction of test-anxiety.

In conclusion, virtually all of the studies reviewed, concerning the effects of group desensitization on test-anxiety, showed a significant reduction in the level of test-anxiety among Ss.

Specialized Treatments of Test-Anxiety. The traditional technique for systematic desensitization has generally been a successful means of treating test-anxiety (Garrington and Cotler, 1960; McMillan and Osterhouse, 1972; Freeling and Shemberg, 1970; Johnson and Sechrest, 1968), but other techniques have been developed in an effort to improve systematic desensitization. For example, Emery and Krumoltz (1967) found systematic desensitization with individualized anxiety hierarchies and without individualized hierarchies to be an effective anxiety-reducing treatment of test-anxiety.

A fully automated systematic desensitization procedure was an effective treatment method for the reduction of test-anxiety (Hammar, et al, 1973; Mann, 1972). Furthermore, Harris Beck (1972) devised an effective procedure which not only utilized automated desensitization but, to a large extent, was self-administered by the client. Economy of therapist time was the obvious advantage of automated desensitization, but an additional beneficial aspect was the efficacy of automated desensitization with clients lacking in visual imagery. Automated desensitization obviated the need for clarity in visual imagery due to the presentation of aversive scenes on videotape.

Variations of systematic desensitization have been successfully utilized in the treatment of test-anxiety. For example, Prochaska (1972) concluded that implosive therapy (systematic desensitization utilizing the presentation of aversive scenes, by tape in this case, without relaxation or hierarchies) was a rapid means of reducing test-anxiety.

Another variation of systematic desensitization was used in a case report in which EMG feedback was used to relax the subject as well as provide an objective signal for anxiety during desensitization (Wickramasekera, 1972). As a consequence of the previously discussed variations of systematic desensitization, a therapist was allowed an increased freedom with respect to time demands.

Reactive inhibition therapy is a technique in which the client makes a concerted effort to experience his anxiety through an awareness of all of his unpleasant emotions and sensations, associated with the anxiety-producing stimulus (Graff, et al, 1971). Graff, et al, (1971) found this technique to be as effective as systematic desensitization in the treatment of test-anxiety and endorsed reactive inhibition as potentially more efficient than reciprocal inhibition therapy, since it was less complex.

The treatment of test-anxiety by systematic desensitization has also been adopted for use with a deaf client (Heaton and Berberick, 1973). The relaxing tone of voice typically used by the therapist was approximated by the use of color cues and smooth, monotonous presentations of printed instructions.

Literature Concerning the Comparative Effects of Systematic Desensitization and Relaxation Training

The comparative effects of systematic desensitization and progressive relaxation have been investigated by several authors. For example, Laxter (et al, 1969) found relaxation training per se more effective in reducing manifest-anxiety and as effective as desensitization in lowering debilitating test-anxiety among subjects in Grades 9-12. Further support for the effectiveness of relaxation training was given by Laxter and Walker (1970) who found a reduction in test-anxiety only among those students utilizing relaxation training. Freeling and Shemberg (1970) found relaxation training to be somewhat effective in the treatment of test-anxiety.

Contradictory evidence was provided by Johnson and Sechrest (1968) who found no difference between control and relaxation groups, with regard to GPA which was used as a measure of improvement in test-anxiety. However, the desensitization group showed significantly higher grades than either of the other two groups.

Rachman (1965) found the combined effects of desensitization and relaxation to be more effective in the treatment of a phobia than the separate effects of either relaxation or desensitization. Lang and Lazovik (1963) also studied the effects of muscle relaxation verses desensitization, in the treatment of a phobia, and found no significant change with muscle relaxation but did find desensitization to be effective. However, Laxter, et al, (1969) postulated that test-anxiety is more generalized than phobic-anxiety and further theorized

that generalized-anxiety is more susceptible to treatment by muscle relaxation than by desensitization. The rationale presented for this hypothesis was that relaxation training might establish associations with a larger number of stimuli than desensitization.

There was support for relaxation training as an important aspect in the reduction of test-anxiety. However, the evidence was not conclusive concerning the effects of relaxation training per se as a treatment for test-anxiety.

CHAPTER III

METHODOLOGY

The design of the investigation was established in this chapter; the following divisions were employed: (1) subjects; (2) instruments; (3) procedures; (4) statistical analysis; and (5) hypotheses.

Subjects

The subjects (Ss) participating in this investigation were thirty-one undergraduate students enrolled in Educational Psychology I at Kansas State University. For the purposes of this study, no discrimination was made according to sex, since there was a lack of sex differences in personality correlates of test-anxiety (McKeachie and Lin, 1971).

Subject Selection. Students in four (4) Educational Psychology I classes at Kansas State University were given the Suinn Test Anxiety Behavior Scale (STABS) as a screening device. The State-Trait Anxiety Inventory (STAI) was also administered at this time.

The thirty-three (33) students having the highest scores, among those scoring above one hundred thirty-four (134), were considered appropriate Ss for the purposes of this investigation. One hundred thirty-four (134) was selected since it represents the approximate mean of the initial test scores on the STABS for two sample groups of students (Suinn, 1969). The instruments were administered to the four (4) Educational Psychology I classes in order to locate thirty-three (33) Ss.

Thirty-three (33) Ss were then assigned to three groups according to the randomization procedure described by Edwards (1960). The three groups were the relaxation (RG), the desensitization group (DG), and the control group (CG). Several Ss refused treatment; thus, the students with the next highest scores on the STABS, but not below one hundred thirty-four (134), were selected.

Instruments

The Suinn Test Anxiety Behavior Scale. The Suinn Test Anxiety Behavior Scale (STABS) was designed for behavior therapy treatment or research and further to meet the following characteristics: "(1) serve either as a diagnostic tool, or as an aid for the development of the anxiety hierarchy, (2) normative data reported, and (3) data showing the change in scores which would occur without treatment" (Suinn, 1969; p. 325).

The STABS contained fifty (50) situations which may arouse varying intensities of anxiety. The subject was asked to report the amount of anxiety elicited (not at all, a little, a fair amount, much, very much) by the different situations. Such a rating system enabled the investigator to effectively form a hierarchy directly from the questionnaire. Furthermore, the items in the questionnaire covered a wide range of situations which made the questionnaire applicable to a wide variety of subjects.

Normative data were collected on two samples (Suinn, 1969): (1) 75 students enrolled in a large state university in Hawaii and (2) 158 students enrolled in a state university

in Colorado: mean scores for sample (2) were 122.00 (S.D. = 30.46) and 114.22 (S.D. = 32.56), respectively.

Test-retest reliability coefficients were 0.74 after a six-week interval for sample (1) and 0.78 after a four-week interval for sample (2).

The STABS was significantly associated with the Test-Anxiety Scale: $r = 0.59$ ($p = 0.001$ level) for sample (1) and $r = 0.60$ ($p = 0.001$ level) for sample (2).

The STABS performance was significantly correlated with the number of errors in course exams ($r = 0.24$, $p = 0.05$ level, sample 1) and final course grades ($r = 0.26$, $p = -0.005$ level, sample 1; $r = -.28$, $p = 0.02$ level, sample 2) in an introductory psychology course.

A score of 1 was given to a response of "not at all," 2 to "a little," 3 to "a fair amount," 4 to "much," and 5 to "very much," so that a high total score reflected a high degree of anxiety and vice-versa.

State-Trait Anxiety Inventory. The State-Trait Anxiety Inventory (STAI) was designed to measure two very different types of concepts. One such concept was state-anxiety, which varies as the organism experiences different situations. In other, words, the state of the organism, now, determines the amount of anxiety present. The second concept was that of trait-anxiety, which reflects a person's disposition to be anxious. In situations involving varying degrees of stress, there is likely to be a difference in the probability that anxiety will occur or if occurring, its intensity. These two concepts were described by Spielberger (1966) as follows:

Research findings suggest that it is meaningful to distinguish between anxiety as a transitory state and as a relatively stable personality trait, and to differentiate between anxiety states, the stimulus conditions that evoke them, and the defenses that serve to avoid them. There is considerable general agreement that anxiety states (A-states) are characterized by subjective consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system. Anxiety as a personality trait (A-trait) would seem to imply a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening, and to respond to these with A-state reactions disproportionate in intensity to the magnitude of the objective danger (p. 16, 17).

Speilberger's conception of anxiety was contained in the following framework. A stimulus that is perceived as threatening evokes an A-state reaction which may in turn initiate some form of behavior to deal with the threat. The A-state reaction may also evoke cognitive or motoric defense processes that serve to alter the cognitive appraisal of the stimulus. Hence, the stimulus is no longer perceived as a threat. On the other hand, A-trait reflects an individual's disposition to perceive certain situations as threatening.

The STAI consisted of a twenty (20) item measure of state-anxiety and a twenty (20) item measure of trait-anxiety. Each measure contained items which were responded to by marking (A) not at all, (B) somewhat, (C) moderately so, or (D) very much so. A score of 1 is given to those items marked A, 2 to B, 3 to C, and 4 to D. Thus, a score of 20 on each of the scales was associated with the lowest possible degree of anxiety, and a score of 80 was associated with the highest degree of anxiety.

In order to score the measures properly, it was necessary to rotate the values attached to several responses so that they were appropriately aligned with the directionality of the measure. For example, item 1 (I feel calm) and item 3 (I am tense) opposed each other with regard to the expected response. That is, if rotation was not applied, a person marking D for item 1 and A for item 3 would score 5 points on these two items, thus giving a false impression of the results. Item 1 should have been reversed to correspond with 1 point, instead of 4 points, since a high response on this item opposed anxiety. Likewise, items 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 26, 27, 30, 33, 36, and 39 should also have been reversed since they also opposed the directionality of the measure. This procedure for controlling response sets also protected against those Ss who circle the same response in an effort to score highly positive or negative (Tuckman, 1972).

Procedures

Those Ss assigned to RG and DG were contacted and invited to participate in a program designed to reduce test-anxiety in exchange for extra credit in their Educational Psychology I class. Those students who accepted the invitation were scheduled for five (5) treatment periods (one per-week for five (5) weeks). Furthermore, all Ss were given treatment during the same five (5) week interval. Those students assigned to the control group were not contacted at this time, and thus were unaware of their participation until administration of the posttests.

During the initial session and the following treatment sessions, Ss were instructed to sit at a classroom desk.

Laxter (et al, 1969) felt that this would facilitate the transfer of relaxation to the classroom.

Initial Session (RG). The first ten (10) minutes of the initial session consisted of a short interview (to obtain subjective feedback concerning Ss' anxiety over examinations), the signing of the client agreement (Appendix I), the presentation of the rationale and instructions, and answering any questions the Ss might have. During the next twenty-five (25) minutes of this session, the Ss were given relaxation training, modeled after Jacobson's (1929) technique of progressive relaxation. The relaxation instructions were recorded on tape and presented thusly to insure uniformity of training between the two treatment groups. During the next ten (10) minutes, the Ss were instructed to continue to relax solitarily. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned during the session.

Initial Session (DG). The first ten (10) minutes of the initial session consisted of a short interview (to obtain subjective feedback concerning Ss' anxiety over examinations), the signing of the client agreement (Appendix I), the presentation of the rationale and instructions, and answering any questions the Ss might have. During the next ten (10) minutes of this session, the Ss rank-ordered the twenty (20) items to be used as their hierarchy. The Ss were then given relaxation training, modeled after Jacobson's (1929) technique of progressive relaxation, during the last twenty-five (25) minutes of the session. The relaxation instructions were recorded on tape and presented thusly to insure uniformity of

training between the two treatment groups. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned during the session, in real-life situations.

Refer to Appendix II for a detailed description of the following four (4) treatment sessions.

Summary of the Middle Three Treatment Sessions. After the initial session, the Ss in RG participated in four (4) forty-five (45) minute individual sessions. Each session consisted of a short interview during the first five (5) minutes, a presentation of the relaxation training tape during the next twenty-five (25) minutes of the session, followed by fifteen (15) minutes of continued solitary relaxation. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned during the session.

After the initial session, those Ss assigned to DG participated in four (4) forty-five (45) minute individual sessions. A short interview was conducted during the first five (5) minutes of each session, followed by a presentation of the same twenty-five (25) minute relaxation tape presented to the Ss in RG. After the presentation of the tape, the counselor presented the stimulus hierarchy for fifteen (15) minutes; the stimulus hierarchy was derived from the STABS and rank-ordered by each S. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned during the session.

Data Collection. The STABS, used as a screening device, also served as one pretest, and the STAI (administered at

the same time as the STABS) served as another pretest.

During the final treatment session, RG, DG and CG were administered the two instruments which were utilized as post-treatment measures. Five (5) minutes were allowed for the completion of the posttest; hence, the fifteen (15) minutes of solitary relaxation in RG and the fifteen (15) minute presentation of the stimulus hierarchy in DG were both shortened to ten (10) minutes.

Statistical Analysis

A univariate analysis of variance described by Kerlinger (1964) was performed on the data:

1. A univariate analysis of variance for control, relaxation, and desensitization groups; and anxiety levels on data from the STAI (N = 31).
2. A univariate analysis of variance for the same factors as above on data from the STABS (N = 31).

The Scheffe' method (Ferguson, 1966) was used to determine which differences in mean values were significantly different.

Hypotheses

1. There is no significant statistical difference between RG and CG on pretest-posttest differences for the STABS.
2. There is no significant statistical difference between DG and CG on pretest-posttest differences for the STABS.
3. There is no significant statistical difference between RG and DG on pretest-posttest differences for the STABS.
4. There is no significant statistical difference between RG and CG on pretest-posttest differences for the STAI (state).
5. There is no significant statistical difference between DG and CG on pretest-posttest differences for the STAI (state).

6. There is no significant statistical difference between RG and DG on pretest-posttest differences for the STAI (state).
7. There is no significant statistical difference between RG and CG on pretest-posttest differences for the STAI (trait).
8. There is no significant statistical difference between DG and CG on pretest-posttest differences for the STAI (trait).
9. There is no significant statistical difference between RG and DG on pretest-posttest differences for the STAI (trait).

CHAPTER IV

RESULTS

Description of the Ss

The Ss for this study were thirty-three (33) undergraduate students enrolled in Educational Psychology I at Kansas State University. One S dropped out of DG after one session. Her STABS score of two hundred and five (205) was the highest measured. Her STAI (state) score was fifty-six (56) and her STAI (trait) score was forty-eight (48). One S in CG could not be reached for the posttest. Consequently, the total number of Ss participating in the study was reduced to thirty-one (31) (ten (10) in CG, eleven (11) in RG, and ten (10) in DG).

Analysis of Pretest-Posttest Differences for the STABS

A univariate analysis of variance for CG, RG and DG as described by Kerlinger (1964) was conducted on pretest-posttest differences for the STABS (Table I), and the analysis of this dimension resulted in a F-ratio of 23.6440 which was statistically significant at the 0.01 level.

A Scheffe' test for multiple comparisons for CG, RG and DG was conducted on pretest-posttest differences on the STABS.

The comparative effects of RG and CG on the pretest-posttest differences for the STABS was investigated, and the analysis of this dimension resulted in a value of 1.25 which was not statistically significant at the 0.05 level. As a

result of this finding, the null hypothesis that there is no significant statistical difference between RG and CG on pretest-posttest differences for the STABS was retained.

The comparative effects of DG and CG on the pretest-posttest differences for the STABS was investigated, and the analysis of this dimension resulted in a value of 21.50 which was statistically significant at the 0.01 level. As a result of this finding, the null hypothesis that there is no significant statistical difference between DG and CG on pretest-posttest differences for the STABS was rejected.

The comparative effects of RG and DG on the pretest-posttest differences for the STABS was investigated, and the analysis of this dimension resulted in a value of 13.18 which was statistically significant at the 0.01 level. As a result of this finding, the null hypothesis that there is no significant difference between RG and DG on pretest-posttest differences for the STABS was rejected.

Analysis of Pretest-Posttest Differences for the STAI (state)

A univariate analysis of variance for CG, RG and DG as described by Kerlinger (1964) was conducted on pretest-posttest differences for the STAI (state) (Table I), and the analysis of this dimension resulted in an F-ratio of 1.8255, which was not statistically significant at the 0.05 level.

A Scheffe' test for multiple comparison for CG, RG and DG was conducted on pretest-posttest differences on the STAI (state).

The comparative effects of RG and CG on the pretest-posttest differences for the STAI (state) was investigated, and the analysis of this dimension resulted in a value of

0.68 which was not statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant difference between RG and CG on pretest-posttest differences for the STAI (state) was retained.

The comparative effects of DG and CG on the pretest-posttest differences for the STAI (state) was investigated, and the analysis of this dimension resulted in a value of 1.80 which was not statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant statistical difference between DG and CG on pretest-posttest differences for the STAI (state) was retained.

The comparative effects of RG and DG on the pretest-posttest differences for the STAI (state) was investigated, and the analysis of this dimension resulted in a value of 0.30 which was not statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant statistical difference between RG and DG on pretest-posttest differences for the STAI (state) was retained.

Analysis of Pretest-Posttest Differences for the STAI (trait)

A univariate analysis of variance for CG, RG and DG as described by Kerlinger (1964) was conducted on pretest-posttest differences for the STAI (trait) (Table I), and the analysis of this dimension resulted in an F-ratio of 4.3724 which was statistically significant at the 0.05 level.

A Scheffe' test for multiple comparisons for CG, RG and DG was conducted on pretest-posttest differences on the STAI (trait).

The comparative effects of RG and CG on the pretest-posttest differences for the STAI (trait) was investigated, and the analysis of this dimension resulted in a value of 0.53 which was not statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant difference between RG and CG on pretest-posttest differences for the STAI (trait) was retained.

The comparative effect of DG and CG on the pretest-posttest differences for the STAI (trait) was investigated, and the analysis of this dimension resulted in a value of 4.23 which was statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant statistical difference between DG and CG on pretest-posttest differences for the STAI (trait) was rejected.

The comparative effects of RG and DG on the pretest-posttest differences for the STAI (trait) was investigated, and the analysis of this dimension resulted in a value of 1.90 which was not statistically significant at the 0.05 level. As a result of this finding, the null hypothesis that there is no significant statistical difference between RG and DG on pretest-posttest differences for the STAI (trait) was retained.

TABLE I

PRETEST-POSTTEST DIFFERENCES

Group	STABS		STAI (state)		STAI (trait)	
	mean	sd	mean	sd	mean	sd
CG	6.70	20.59	3.80	13.25	0.60	6.43
RG	21.55	22.83	8.91	5.77	3.36	5.78
DG	69.80	20.90	12.30	9.99	8.60	6.26
<hr/>						
	F-ratio		F-ratio		F-ratio	
	23.6440 **		1.8255		4.3724 *	

* Significant at the .05 level.

** Significant at the .01 level.

CHAPTER V

DISCUSSION AND SUMMARY

The findings of this investigation led to the following conclusions:

1. Systematic desensitization was a significantly effective treatment of test-anxiety, but relaxation training was not a significantly effective treatment of test-anxiety.
2. Systematic desensitization was a significantly more effective treatment of test-anxiety than relaxation training.
3. Systematic desensitization and relaxation training had no significant effects upon state-anxiety.
4. Systematic desensitization was significantly an effective treatment of trait-anxiety, but relaxation training was not a significantly effective treatment of trait-anxiety.
5. Systematic desensitization was not a significantly more effective treatment of trait-anxiety than relaxation training.

The discussion was categorized with regard to (1) the factors contributing to the results, (2) theoretical considerations, (3) suggestions for future research, and (4) a summary.

Factors Contributing to the Results

The factors contributing to the results of this investigation were categorized with regard to (1) test-anxiety (unexpected results), (2) test-anxiety (expected results), (3) state-anxiety, and (4) trait-anxiety.

Test-Anxiety (unexpected results). The assumption that relaxation training would be an effective treatment of test-anxiety was based upon the other investigations which yielded successful results with regard to the treatment of test-anxiety (Laxter, et al, 1969; Laxter and Walker, 1970). Several important differences between this study and those cited may have accounted for a portion of the discrepancy between the results of this investigation and those cited. For example, both studies cited did not utilize automated relaxation training as did this investigation. Therefore, one can speculate that relaxation training per se would have been a more effective treatment method if it would not have been automated. Perhaps the reason for the success of non-automated relaxation training was due to the increased amount of counselor-client contact for non-automated groups, as opposed to automated groups.

Another difference between the studies upon which the assumption was based and this study were the instruments. The STABS, used as a measure of test-anxiety in this investigation, was not employed in the other studies. Hence, the different anxiety scales, used in the various studies, may have measured different aspects of anxiety, therefore, rendering the studies incomparable. The studies upon which the assumption (that relaxation training would be an effective treatment of test-anxiety) was based were clearly too different from this investigation to have expected a verification of the assumption.

Test-Anxiety (expected results). Systematic desensitization and relaxation training were both expected to be

effective treatments of test-anxiety (measured by the STABS), however, only the effects of desensitization differed significantly from those produced by the control group ($p = 0.01$); this was revealed by the Scheffe' test for multiple comparisons. The effects produced by systematic desensitization were also significantly greater than those produced by relaxation training, with regard to test-anxiety ($p = 0.01$). Special emphasis should be attributed to these results due to their very high significance (much higher than that needed for significance at the 0.01 level); therefore, the efficacy of systematic desensitization in the treatment of test-anxiety and the failure of automated relaxation training in this regard is strongly suggested.

Further support for the effectiveness of the systematic desensitization treatment was provided by the subjective feedback given to the counselor. Several of the subjects in DG related the following comments, and other similar statements, at the conclusion of treatment: "I'm able to cope much better, now, with my exams." "Tests don't seem to bother me as much anymore."

The social factors (expectancy of success, therapist reinforcement, etc.) were not partialled out in this investigation. This limitation could have been overcome with a placebo group which effectively incorporated the social factors inherent in systematic desensitization. To a certain extent, the relaxation group served this function, since both RG and DG incorporated similar social factors. Since RG was not a significantly effective treatment of test-

anxiety, social factors can be eliminated as a major explanation for the effectiveness of systematic desensitization in this investigation.

More specifically, the two treatment groups both incorporated a short interview to obtain subjective feedback of the subjects' progress; the counselor reinforced any measure of success and encouraged the subjects to continue to apply what they learn, in their daily activities. Also, the rationale for both treatment groups contained the suggestion that the treatments have been successfully administered to other students. The expectancy of success and therapist reinforcement were akin to both treatment groups; therefore, it is likely that these social factors could have only minimally accounted for the difference in effectiveness for RG and DG.

The only difference between RG and DG with regard to social factors was the fact that the counselor spent more time with the subjects in DG as a result of the fifteen (15) minute presentation of the test-anxiety hierarchy for DG, versus the fifteen (15) minutes of continued solitary relaxation for RG. It is conceivable that this difference could have had an influence on the success of systematic desensitization but it is unlikely that this influence could account for the highly significant difference between RG and DG.

Another limitation of this investigation was the failure to incorporate treatment groups based upon a single technical aspect of systematic desensitization; relaxation, visualization of fearful scenes, and the anxiety hierarchy are

considered technical aspects of desensitization. Nevertheless, speculation concerning the factors influencing the results can be made on the basis of the existing procedure.

The major procedural difference between RG and DG was the presentation of the stimulus hierarchy for DG, versus the solitary relaxation for RG. Therefore, it is reasonable to consider this aspect of systematic desensitization as a potential factor contributing to the difference between the effectiveness of the two treatment groups. However, the visualization process alone cannot be cited as the major factor which contributed to these results; perhaps visualization was only effective or more effective when used in conjunction with relaxation. Whether the effects of systematic desensitization were attributable to the visualization of fearful scenes alone or visualization in conjunction with relaxation is an unanswered question in this investigation. However, visualization was at least associated with the successful systematic desensitization treatment, if not a factor which contributed to that success.

Another potential factor contributing to the effectiveness of systematic desensitization is cognitive exploration (Horowitz, 1970). Cognitive exploration was that part of systematic desensitization in which the client described and discussed his visualization experiences with the counselor. This enabled the client to discuss that which made him anxious, within the confines of a secure relationship. Thus, the realization that it was acceptable to think through these emotional concerns, instead of avoiding them, may have allowed the client to alleviate a portion of the fear of their consequences

One interesting tangential result is that the one subject who dropped out of either treatment group scored higher on the STABS than anyone tested; her score was 205 on the STABS. Her STAI (state) and STAI (trait) scores were 56 and 48, respectively, which were relatively high. Perhaps one reason for her decision to terminate counseling was her high level of test-anxiety which may have been at such a high level that it rendered the counseling situation intolerable.

State-Anxiety. Systematic desensitization and relaxation training were both expected to have no significant effect upon state-anxiety; the results of this investigation confirmed this assumption. The two treatment groups were assumed to have more lasting effects on anxiety reduction than was measured by state-anxiety. Moreover, the situational experiences of each subject at the time of pretest and post-test administration should have provided a better indication of state-anxiety than the effects produced by the treatments. Thus, the results confirmed the assumption that state-anxiety is not significantly influenced by relaxation training and systematic desensitization.

Trait-Anxiety. The factors contributing to the results of test-anxiety also apply to trait-anxiety; however, in order to avoid redundancy, only those factors relevant to trait-anxiety are discussed in this section.

Systematic desensitization and relaxation training were both expected to be significantly effective treatments of trait-anxiety, as measured by the STAI (trait). However, only the effects of DG differed significantly from those produced by CG ($p = 0.05$), as revealed by the Scheffe' test

for multiple comparisons, Furthermore, the effects produced by DG were not significantly greater than those produced by RG, with regard to trait-anxiety ($p = 0.05$).

Systematic desensitization was found to be a significantly effective treatment of trait-anxiety relative to CG. However, the effectiveness of systematic desensitization with regard to trait-anxiety did not approach the high level of significance found in the treatment of test-anxiety by systematic desensitization. This was not surprising due to the nature of the treatment for DG, that is, the highly specific nature of the treatment with regard to test-anxiety. Perhaps if the anxiety hierarchy would have contained items associated with general-anxiety instead of test-anxiety, the results would have been different.

On the other hand, RG did not incorporate any degree of test-anxiety specificity. In view of this important difference between the two treatment groups, it was not surprising that relaxation training came closer to approaching significance with regard to trait-anxiety than with test-anxiety. Perhaps, as Laxter (et al, 1969) suggested generalized anxiety is more susceptible to treatment by muscle relaxation than by desensitization. However, muscle relaxation failed to more effectively reduce general-anxiety (measured by the STAI (trait) than desensitization in this investigation, yet muscle relaxation was found to be a less effective treatment with regard to test-anxiety (measured by the STABS which is not a general measure of anxiety) than general-anxiety.

Theoretical Considerations

The theoretical considerations were discussed with regard to (1) visualization, (2) relaxation, and (3) test-anxiety.

Visualization. Support for the relationship between visualization and the successful systematic desensitization treatment was provided by Mathews (1971):

It can reasonably be concluded that predictable autonomic responses follow the imagination of fearful scenes, such as those used in desensitization, and that these responses decline systematically with repetition, even in the absence of relaxation training (p 82).

Why does simply imagining fearful scenes bring about a decrease in the level of anxiety associated with those scenes? A lessening of anxiety in this manner, that is, without relaxation, is suggestive of extinction as an explanation. However, such an explanation presupposes the analogous relationship between imagining fearful scenes and experiencing real-life situations. Support for this relationship was provided by Richardson (1969) with regard to quasi-sensory or quasi-perceptual experiences which refer to:

...concrete representations of sensory, perceptual, effective or other experiential states (e.g., hunger or fatigue).

It may well prove to be the case that a quasi-perceptual experience, in the form of a visual image, involves the reactivation of those neurological processes of the central nervous system that were activated during the original perceptual experience (p. 3).

Richardson also cited research to show that a simple belief in the warmth of an object held in the hand will raise the skin temperature of the hand. Thus, the consequence of

percepts and imagery may be more closely associated than is commonly believed.

Imagery and real-life situations appear to be closely associated; therefore, the effects produced by extinction (the nonreinforcing of responses, previously reinforced, resulting in a decrease in the frequency of the responses) in real-life situations may also be approximated by a traditional systematic desensitization technique which employs visualization. Extinction may provide a basis for the explanation of the effects produced by systematic desensitization in this investigation. However, conclusive evidence supporting extinction was not provided, since the isolated effects of visual imagery were not investigated. Consequently, the utilization of relaxation training in conjunction with visualization allows the consideration of other theories, such as reciprocal inhibition and habituation. However, the limitations of this investigation make it impossible to derive conclusions with regard to the theoretical basis of the results.

Relaxation. Horowitz (1970) described the hypnagogic state in the following manner: "Image formation changes in quality and quantity as alertness wanes. At first, the speed of thinking slows and inclination to daydream increases. Images become more frequent and more vivid" (p. 31).

If one associates the hypnagogic state with a relaxed state, increased imagery characteristic of the hypnagogic state is also characteristic of the state of relaxation achieved during systematic desensitization. Consequently,

a possible function of relaxation in systematic desensitization is to enhance a person's visual imagery, a contention supported by Wickramasekera (1972). Thus, the effectiveness of relaxation in the systematic desensitization technique may be dependent upon the predisposition to visual imagery of the individual subjects. That is, subjects who have a well-developed capacity for visualization may have less need for relaxation training in systematic desensitization, while subjects who are poor visualizers may depend more on relaxation to enhance their visual imagery in order to obtain success with systematic desensitization.

Another plausible explanation for the effectiveness of relaxation in systematic desensitization is that relaxed subjects have been found to be more sensitive to phobic stimuli properties of controlled imagery than non-relaxed subjects (Chapman and Feather, 1971); this finding contradicts Wolpe's contention that relaxation inhibits anxiety. This function of relaxation, as an agent which sensitizes one to anxiety, may be an important aspect of systematic desensitization, as Mathews suggested:

Lang (et al, 1970) found evidence that a relatively large autonomic response to phobic images, followed by a rapid decay, is associated with a good treatment outcome. These results suggest the possibility that the rapid reduction of an initially large response is a critical factor in successful desensitization, and that relaxation may assist in bringing about this effect.

Test-Anxiety. Assuming systematic desensitization reduces the anxiety experienced in the testing situation, how does that affect the individual's performance on exams?

According to an attentional interpretation of anxiety and performance:

The low-test-anxious person is focused on task-relevant variables while performing tasks. The highly test-anxious subject is internally focused on self-evaluative, self-deprecatory thinking, and perception of his autonomic responses. Since the difficult tasks on which the test-anxious person does poorly require full attention for adequate performance, he cannot perform adequately while dividing his attention between internal cues and task cues (Wine, p. 92).

Accordingly, a reduction in the level of test-anxiety by systematic desensitization may allow the individual to attend more fully to the task-relevant variables, thus improving his performance.

Suggestions for Future Research

Even though RG was a reasonably effective placebo group with regard to social factors in this investigation, other studies would be much improved by incorporating a placebo group specifically designed to partial out the social factors inherent in systematic desensitization. Technical aspects, such as relaxation and visualization, could also be partialled out in an effort to isolate the effects of the different components. These suggestions for future research have already been investigated a number of times; nevertheless, conclusive evidence concerning their results has not yet been provided. Further studies of this type would enhance our understanding of the theoretical basis of systematic desensitization and consequently facilitate advances in the application of the technique.

Another technical aspect of systematic desensitization which could be investigated is the effect of different types

of hierarchies on the effectiveness of systematic desensitization. Even though Emery and Krumboltz (1967) found no differences in the effectiveness of standard and individual hierarchies, it is conceivable that they do make a difference in some cases. The subjects in this investigation utilized hierarchies derived from the STABS; they rank-ordered the twenty most anxiety-evoking items from the measure. Several students complained of the difficulty of this task due to their inability to relate to certain items. A hierarchy derived from the personal experiences of subjects would appear to have been a more facilitative device; facilitative in the sense that it might have been an aid to the client's ability to visualize the items from the hierarchy as well as increase the potential effectiveness of the generalization process.

A combination of systematic desensitization and study counseling provides another potential area for research in test-anxiety, especially since other investigations have successfully combined the two methods (Allen, 1971; Mitchell and Ng, 1972). It would appear that poor examination performance is not only potentially improved by the reduction of test-anxiety but also by a counseling program in study techniques. Research in this area could combine different variations of the two approaches in an effort to further the academic potential of students.

Perhaps an even more valuable area for research is the development of new and innovative treatment techniques. In this regard, Lazarus and Serber (1968) criticized the indiscriminate use of desensitization:

In part, the growing tendency to administer desensitization techniques also indiscriminately may stem from a widespread belief that all neuroses are persistent unadaptive anxiety responses. However, one should not ignore maladaptive behavior which is not a consequence of anxiety but the result of inadequate learning (p. 216).

May we reiterate the need for a broad spectrum behavior therapy approach as a replacement for the narrow S-R formulations that currently typify so much of the field (p. 218).

To a certain extent, research involving new behavior therapy techniques and variations have already been researched. For example, short-term desensitization therapy (Suinn, 1970a) and marathon desensitization groups (Suinn, 1970b) have been found to be successful anxiety-reducing treatments. Other techniques have been successfully developed for clients who cannot effectively use relaxation; these treatments utilize muscular activity (Lazarus, 1965) and anger (Goldstein et al, 1970) as anxiety-inhibiting responses instead of relaxation. Moreover, numerous other techniques such as relaxation rehearsal (Wells, 1970), cognitive modification (Meichenbaum, 1972), and directed experience techniques (Gibbons, 1970) were further variations of systematic desensitization.

These new variations have widened the already broad spectrum of behavior therapy approaches, but the behavior therapist should be aware of the severe limitations of his approach. For example, behavior therapists definitely regard the client's symptoms as passive rather than creative, tend to ignore the therapist-client relationship, and consider the dynamics of therapy in generalities (Horowitz, 1970). Perhaps a wider consideration with regard to these

concerns and others would enhance the effectiveness of behavior therapy; this is an appropriate question for research to investigate.

Summary

Several factors contributing to the results were considered. Relaxation training and desensitization were both expected to be effective treatments of test-anxiety. However, only systematic desensitization was found to be. Furthermore, systematic desensitization was also a significantly more effective treatment of test-anxiety than relaxation training. It was suggested that relaxation training might be more effective if it was not automated. The effects of relaxation training might also be detected more rapidly by a different measure of anxiety than those utilized in this study.

The potential factors contributing to the effectiveness of systematic desensitization with test-anxiety were discussed with regard to visualization in conjunction with relaxation, and cognitive exploration. Social factors were given little support for influencing the results. The results confirmed the assumption that state-anxiety is not significantly influenced by relaxation training and systematic desensitization. Systematic desensitization and relaxation training were both expected to be significantly effective treatments of trait-anxiety. However, only systematic desensitization was found to be effective. Furthermore, the effects of the desensitization treatment did not significantly differ from those of relaxation training. These results were discussed with regard to the test-anxiety

specificity of the desensitization treatment, versus the non-specific nature of relaxation training with regard to test-anxiety.

The limitations of this investigation made it impossible to derive conclusions concerning the theoretical basis of the results. However, it was suggested that a reduction in the level of test-anxiety by systematic desensitization may allow the student to attend more fully to the task-relevant variables, thus improving his performance.

Suggestions for future research were also discussed.

APPENDIX I

CLIENT AGREEMENT

I, _____, agree to voluntarily participate in a research project, concerning test-anxiety and conducted by Dennis Vanderpool, a Master of Science Candidate in the Counseling Psychology Program at Kansas State University.

My participation requires that I fulfill the following conditions:

1. I agree to participate in five 45-minute counseling sessions (one per-week for five-weeks) designed to reduce my anxiety over tests.
2. I am not or will not participate in any type of counseling or psychotherapy during the course of my participation in this research project.
3. I agree to complete the two anxiety scales to be administered during the last counseling session.
4. In return for my participation, I will receive extra credit in my Educational Psychology I class. I may withdraw from the project at any time, but will fail to receive any extra credit if this occurs.

APPENDIX II

TREATMENTS

The general procedure for the relaxation and desensitization groups followed closely the general procedure described by Johnson and Sechrest (1968).

Relaxation Group

After the initial session Ss participated in four (4) forty-five (45) minute individual sessions. Each session consisted of a five (5) minute interview, followed by the twenty-five (25) minute presentation of the relaxation tape, and fifteen (15) minutes of continued solitary relaxation. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned in the session.

The posttests were administered during the last five (5) minutes of the final session; hence, the fifteen (15) minutes of solitary relaxation were shortened to ten (10) minutes.

The following rationale was given to RG during the initial treatment session:

The emotional reactions that you experience are a result of your previous experiences with people and situations; these reactions oftentimes lead to feelings of anxiety, or tenseness, which are really inappropriate (Paul, 1966, p. 116).

We will be using a relaxation procedure designed to reduce your anxiety.

The relaxation procedure is based upon years of work that was started in the 1930's by Dr. Jacobson. Dr. Jacobson developed a method of inducing relaxation that can be learned very quickly, and which will allow you to become more deeply relaxed than ever before. Of course, the real advantages of relaxation is that the muscle systems in your body cannot be both tense and relaxed at the same time; therefore, once you have learned the relaxation technique, it can be used to counter anxiety, tenseness, and feelings like those you experience in the testing situation (Paul, 1966, p. 166).

Consequently, I'll be asking you to practice relaxation between our meetings in order to help you to eliminate tensions and anxiety over examinations.

The relaxation procedure which you will be listening to on tape will teach you how to become more and more aware of the feelings of relaxation. I will let you know when the session is over.

Desensitization Group

After the initial session, those Ss assigned to DG participated in four (4) forty-five (45) minute individual sessions. During the first five (5) minutes of each session, there was a short interview (to obtain subjective feedback concerning Ss's anxiety over examinations), followed by a presentation of the same twenty-five (25) minute relaxation tape presented to RG. After the presentation of the tape, the counselor presented the stimulus hierarchy which was derived from the STABS in the following manner:

During the initial treatment session, the twenty (20) most anxiety-evoking items were selected by each S, from the fifty (50) situations contained in the STABS, as his hierarchy. Each S then rank-ordered the items in his hierarchy according to the amount of anxiety that he attached to each item, with the most anxiety-evoking item placed at the top of the list and

the least anxiety-evoking item at the bottom. At the end of the forty-five (45) minute session, the Ss were encouraged to practice the procedures learned during the session, in their daily activities.

The posttests were administered during the last five (5) minutes of the final session; hence, the fifteen (15) minute presentation of the stimulus hierarchy was shortened to ten (10) minutes.

The presentation of the hierarchy was performed as follows:

...present each item in the hierarchy, specifying all major aspects of the image. Allow 10 seconds to elapse after each presentation, then instruct the subject to "stop visualizing that, and go on relaxing". Continue suggestions of warmth, relaxation, lack of tension, heaviness, etc., for 30 to 45 seconds, and again present the image. Present each item in the hierarchy at least twice. If the subject does not signal anxiety, and the therapist does not detect anxiety during two 10 second presentations of an item, move on to the next item in the hierarchy.

If, on the other hand, the subject signals anxiety or the therapist detects anxiety in the subject, immediately instruct the subject to "stop visualizing that, and go on relaxing". Continue with suggestions of relaxation (at least 1 minute) until the subject reports as deep a relaxation as before. Then inform him that you will shorten the presentation so that anxiety will not occur. Then present the same item again for a period of only 3 to 5 seconds. If anxiety is still aroused, drop back to a 10 second presentation of the previous item in the hierarchy. If, however, the 3 to 5 second presentation does not arouse anxiety, give 30 to 45 seconds of relaxation suggestions, and present the same item again for 5 seconds, then 10 seconds, then 20 seconds. If the item can be presented for 20 seconds, move on to the next item in the hierarchy.

Never end a session with a presentation that arouses anxiety. Approximately 5 to 10 minutes before the end of a session, either stop with a successful item, or go back to the previous item in the hierarchy. "Awaken" the subject, and

discuss the session with him, reassuring him about any difficulties that may have come up. If by some quirk any of the presentations are nullified, or they do not carry over into real-life, rapidly repeat those items in the next session. Normally, each session will begin with a single presentation of the last successfully completed item (Paul, 1966, p. 121/123).

Reference was made to signaling anxiety. The subjects were to signal anxiety by raising their index finger approximately one inch.

The following rationale was given to the desensitization group:

The emotional reactions that you experience are a result of your previous experiences with people and situations; these reactions oftentimes lead to feelings of anxiety or tenseness which are really inappropriate. Since perceptions of situations occur within ourselves, it is possible to work with your reactions right here in the office by having you image or visualize those situations.

The specific technique we will be using is one called desensitization. This technique utilizes two main procedures: relaxation and counterconditioning. The relaxation procedure is based upon years of work that was started in the 1930's by Dr. Jacobson. Dr. Jacobson developed a method of inducing relaxation that can be learned very quickly, and which will allow you to become more deeply relaxed than ever before. Of course, the real advantage of relaxation is that the muscle systems in your body cannot be both tense and relaxed at the same time; therefore, once you have learned the relaxation technique, it can be used to counter anxiety, tenseness, and feelings like those you experience in the test situation.

Relaxation alone can be used to reduce anxiety and tension, and I'll be asking you to practice relaxation between our meetings. Often, however, relaxation is inconvenient to use, and really doesn't permanently overcome anxiety. Therefore, we combine the relaxation technique with the psychological principle of counterconditioning to actually desensitize situations so that anxiety no longer occurs.

The way in which we will do this is to determine the situations in which you become progressively more anxious, building a hierarchy from the least to the most anxious situations with regard to taking a test.

Then I will teach you the technique of progressive relaxation, and have you practice this. You will see how this operates in a few minutes when we actually start training. After you are more relaxed than ever before, we will then start counterconditioning. This will be done by having you visualize very briefly, while you are deeply relaxed, the situations that normally arouse anxiety, these situations gradually become desensitized, so that they no longer make you anxious. We start with those situations that bother you the least, and gradually work up to the test itself. Since each visualization will lower your anxiety to the next, a full-fledged anxiety reaction never occurs.

Most of these procedures will become clearer after we get into them. Do you have any questions before we continue? (Paul, 1966, p. 166/117)

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THE COMPARATIVE EFFECTS OF AUTOMATED RELAXATION
TRAINING AND SYSTEMATIC DESENSITIZATION ON TEST-ANXIETY
AMONG COLLEGE STUDENTS

by

DENNIS ALAN VANDERPOOL

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The purpose of this study was to investigate the comparative effects of systematic desensitization and relaxation training on test- and general-anxiety.

The subjects for this investigation were thirty-one undergraduate students, enrolled in Educational Psychology I at Kansas State University. Three different treatments were administered: (1) no-treatment control group (CG); (2) relaxation training group (RG); and (3) systematic desensitization group (DG).

The Suinn Test-Anxiety Behavior Scale, also used as a screening device, and the State-Trait-Anxiety Inventory were used as pre and posttests. The data were analyzed, using a univariate analysis of variance. The Scheffe' test for multiple comparisons was used to determine which differences in mean values were significantly different.

Several factors contributing to the results were considered. Relaxation training and desensitization were both expected to be effective treatments of test-anxiety. However, only systematic desensitization was found to be a significantly effective treatment of test-anxiety. Furthermore, systematic desensitization was also a significantly more effective treatment of test-anxiety than relaxation training. It was suggested that relaxation training might be more effective if it were not automated. The effects of relaxation training might also be detected more readily by a different measure of anxiety than those utilized in this study.

The potential factors contributing to the effectiveness of systematic desensitization with test-anxiety were discussed

with regard to visualization in conjunction with relaxation and cognitive exploration. Social factors were given little support for influencing the results.

The results confirmed the assumption that state-anxiety is not significantly influenced by relaxation training and systematic desensitization. Systematic desensitization and relaxation training were both expected to be significantly effective treatments of trait-anxiety. However, only systematic desensitization was found to be effective. Furthermore, the effects of the desensitization treatment did not significantly differ from those of relaxation training. These results were discussed with regard to the test-anxiety specificity of the desensitization treatment, versus the non-specific nature of relaxation training with regard to test-anxiety.

The limitations of this investigation made it impossible to derive conclusions concerning the theoretical basis of the results. However, it was suggested that a reduction in the level of test-anxiety by systematic desensitization may allow the student to attend more fully to the task-relevant variables, thus improving his performance.

Suggestions for future research were also discussed.