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THE EFFECTS OF HIERARCHY CONTENT VARIATIONS IN THE SYSTEMATIC DESENSITIZATION OF HIGH TEST ANXIOUS COLLEGE STUDENTS OF DIFFERING SELF REPORTED STUDY HABITS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Steve G. Ferguson, A.B., M.A.

* * * * *

The Ohio State University
1974

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CHAPTER I

INTRODUCTION

One of the most frequently mentioned concerns of college students is distress over academic performance (Spielberger, 1966). Considering that to a large extent a student's academic standing is contingent upon his adequate performance on examinations, it is not surprising that numerous students experience anxiety in conjunction with testing situations. Students' experiences of examination anxiety may range from a slight nervousness to a severe agitation including such symptoms as nausea, headaches, and memory losses. According to Spielberger (1966) students' self-reports have indicated that they often feel that their anxiety has a debilitating effect on their performance and thus they fail to demonstrate competencies commensurate with their preparation and ability. A number of studies have provided empirical support for the position that high anxiety may have an adverse effect on the academic performances of some students (Alpert and Haber, 1960; Paul and Erikson, 1964; Walsh, Engbretson, and O'Brien, 1968). These studies have reported significant negative correlations between test anxiety scale
scores and performances on classroom examinations. Considering the importance of academic success to students and the possible adverse effects of test anxiety, the reduction of test anxiety appears to be a worthwhile therapeutic goal for at least some students.

Indeed, in recent years an increased effort on the part of researchers has been evidenced in regard to the development of treatment programs designed to alleviate students' test anxiety and subsequently enhance academic performance. Various combinations and alterations of a variety of treatment procedures have been investigated, including group counseling (Doctor, Aponte, Burry, and Welch, 1970; Spielberger and Weitz, 1964), study skills training (Allen, 1971; Osterhouse, 1969), systematic desensitization (Allen, 1971; Cohen, 1969; Crighton and Jehu, 1969; Donner and Guerney, 1969; Emery and Krumboltz, 1967; Freeling and Shemberg, 1970; Garlington and Cotler, 1968; Ihli and Garlington, 1969; Johnson and Sechrest, 1968; Katahn, Strenger and Cherry, 1966; Kondas, 1967; Mann and Rosenthal, 1969; McManus, 1971; Mitchell and Ingham, 1970; and Suinn, 1968), imposive therapy (Prochaska, 1971), and reactive inhibition therapy (Graff, Maclean, and Loving, 1971).
The focus of this study centered on the most widely utilized treatment procedure, systematic desensitization. Researchers have investigated the efficacy of systematic desensitization with and without other treatments, with individuals and groups, with various degrees of standardized and progressive hierarchies, with and without therapists, and with various treatment time periods.

Available data concerning the efficacy of systematic desensitization in the reduction of test anxiety and in the improvement of academic performance is conflicting. A number of researchers have reported that systematic desensitization is effective in reducing the level of self-reported test anxiety but is not effective in facilitating improved academic performance (Emery and Krumboltz, 1967; Garlington and Cottler, 1968; Kondas, 1967; Suinn, 1968). Other experimental results seem to indicate that systematic desensitization is effective in facilitating improved academic performance but not in reducing the level of self-reported test anxiety (Donner and Guerney, 1969; Johnson and Sechrest, 1968). Also, some researchers have found systematic desensitization effective in both the reduction of test anxiety and the improvement of academic performance
The confusion of the available data concerning the efficacy of systematic desensitization in reducing test anxiety and in improving academic performance is due, at least in part, to methodological confoundings, non-uniform measures of test anxiety, and uncontrolled client characteristics. Allen (1971) stressed the need for more well-controlled studies in the area of treatment for test anxiety. According to Allen, at a minimum, such studies should meet the requirements of:

1. the use of more than one therapist
2. complete factorial crossing of therapist and treatments
3. the use of appropriate control groups
4. the use of multiple dependent measures, preferably drawn from the self-report, physiological, and performance domains
5. precise specification of the content and procedures used in each type of therapy, and
6. the designation of a constant number of sessions for all therapeutic techniques (Allen, 1971, 282-83).

In a well controlled study, Allen (1971) found that combined systematic desensitization and study counseling was more effective in reducing physiologically measured anxiety and improving academic and examination performance.
than either technique alone. Also desensitization and study counseling were not reliably more effective than the placebo procedure in improving academic performance. While this study provides support for the position that a combined systematic desensitization and study counseling approach is more effective than systematic desensitization treatment alone in the alleviation of test anxiety and the improvement of academic performance for a sample of undergraduate volunteers, it does not answer the question of whether or not a combined systematic desensitization and study counseling approach is more effective than systematic desensitization treatment alone for all types of students. At least theoretically, for some types of students systematic desensitization may prove to be as effective and more economical than combined systematic desensitization and study skills counseling. However, little is known about the influence of various student characteristics in the treatment of test anxiety. While studies investigating the efficacy of test anxiety reduction treatments with students differing in general anxiety (Mitchell and Ingham, 1970), neuroticism (Mitchell, 1971), and emotional and cognitive components of test anxiety (Osterhouse, 1969 and 1972) have
presented inconclusive data, no reported research on the systematic desensitization of test anxiety has controlled for the possible influence of students' motivation or study habits. However, the studies indicating that combined systematic desensitization and study counseling most effectively alleviates test anxiety (Allen, 1971; Doctor et al., 1970; Donner and Guerney, 1969; McManus, 1971) suggest that for some students poor study habits may be a contributing factor to high test anxiety. Pursuing this train of thought, it seems that high test anxiety students having efficient study habits might profit maximally from systematic desensitization treatment without emphasis on effective study procedures while high test anxiety students having poor study habits might need both systematic desensitization and study skills training. One of the aims of this study was to investigate the efficacy of systematic desensitization in the alleviation of test anxiety with students of differing self-reported study habits.

While investigators have examined the efficacy of various alterations and components of systematic desensitization in the alleviation of test anxiety, there remains an interesting question concerning the content of hierarchy
items in the systematic desensitization of test anxiety. The question is what is the relative value of presenting dynamic versus symptom cues hierarchies in the desensitization of test anxiety? In counter conditioning procedures, success is purportedly contingent upon the accurate identification and neutralization of the primary stimulus determinants of emotional behavior (Bandura, 1969, 462). Similarly, in psychodynamic methods the alleviation of anxiety is facilitated by the identification and eradication of underlying stimulus determinants of emotional behavior (not generally conceptualized in these terms). Admittedly, though behavioral and psychodynamic methods may involve some similar therapeutic aspects, such as warmth, modeling, and reinforcement, the focus of therapeutic intervention is different in behavioral and psychodynamic approaches. In a behavioral approach, attention is focused on a person's symptoms. Rather than searching for unconscious motivations, attempts are designed to therapeutically modify external behaviors. In contrast, psychodynamic formulations assume that anxiety is generated internally by the arousal of unconscious impulses which are displaced and projected onto environmental objects.
Thus, in discussing the treatment of test anxiety, two types of cues associated with test anxiety are important in this study, symptom cues (representing external environmental influences and behaviors associated with symptoms) which are important from a behavioral perspective and dynamic cues (representing internal stimuli, such as thoughts, imagery, and impulses, which are repressed) which are important from a psychodynamic perspective.

In accordance with behavioral formulations which denote symptoms as the appropriate focus of therapeutic interventions, hierarchies utilized in systematic desensitization generally consist of symptom cues. However, at least two researchers (Bandura, 1969; Prochaska, 1971) have suggested that it would be worthwhile to investigate the extent to which high anxiety is extinguished when desensitization is directed toward either the high anxiety stimuli themselves or the hypothesized internal threats. Prochaska (1971) investigated the efficacy of implosive therapy in the alleviation of test anxiety utilizing a symptom group, a dynamic group, a general anxiety group, a placebo group, and a no treatment group. He found that, following three sessions of treatment presented via tape recorders, the
symptom and dynamic groups, when compared to the three control groups, improved significantly on Wonderlic Intelligence scores, grade-point averages, and reported level of anxiety on final examinations but not on the Alpert-Haber Test Anxiety Scale. Prochaska concluded that test anxiety may consist of anxiety attached to both symptom and dynamic cues. An interesting question generated by Prochaska's study is, if test anxiety consists of a combination of anxiety attached to both symptom and dynamic cues what will be the effect of treatment procedures utilizing a combination of symptom and dynamic cues? Whether such a treatment will result in an additive effect is an issue that can be investigated. Also the question of whether or not dynamic cues can be effectively utilized in other treatments for test anxiety, besides implosive therapy, such as systematic desensitization seems to be an important question.

Objectives

Considering the previously mentioned views of Bandura (1969) and Prochaska (1971), this research was undertaken to accomplish the following objectives:
1. To investigate the effectiveness of symptom and dynamic cues hierarchies in the systematic desensitization of test anxiety.

2. To investigate the effectiveness of programmed systematic desensitization as a treatment procedure for the alleviation of test anxiety with students having different levels of self-reported study habits.
CHAPTER II
BACKGROUND

As indicated in Chapter I, this study was designed to investigate the efficacy of systematic desensitization, utilizing a variety of hierarchies, in the alleviation of high test anxiety with college students of differing self-reported study habits. In order to further clarify and extend the basis for this study, studies investigating the efficacy of systematic desensitization in the alleviation of test anxiety will be reviewed. Also literature pertinent to this study in the areas of the formation of test anxiety and the influence of anxiety on performance will be reviewed.

Desensitization Treatment

Systematic desensitization as a treatment procedure was developed by Joseph Wolpe (1957). In actuality, he adopted some procedures used by earlier researchers, relaxation (Jacobsen, 1938) and counterconditioning (Jones, 1924) and ingeniously utilized them along with the innovative technique of visualization. Within a Wolpian
framework, systematic desensitization involves the following procedures:

1. training in deep muscle relaxation (Jacobsen, 1938) or the utilization of some procedure to induce relaxation (e.g., hypnosis)
2. the formation of a hierarchy consisting of anxiety-provoking stimuli ordered from least to most aversive
3. the simultaneous presentation of relaxation and hierarchy items

The underlying rationale for desensitization, according to Wolpe (1958) is explained by the principle of reciprocal inhibition whereby the strength of the relaxation induced inhibits the occurrence of the anxiety associated with the presented hierarchy item. Theoretically, in order for reciprocal inhibition to occur, hierarchy items must be paired with relaxation and the intensity of anxiety provoked by the imagined scenes must be controlled so that the extent of anxiety experienced by subjects never significantly reduces the level of their obtained relaxation. While the efficacy of desensitization is firmly supported in the literature, the accuracy of Wolpe's formulations regarding the scientific basis of desensitization has been challenged (Bandura, 1969).
The literature regarding the efficacy of desensitization in the alleviation of test anxiety is both contradictory and inconclusive due to the numerous criteria employed to evaluate the efficacy of desensitization and the multiple methodological confoundings apparent in many of the reported studies (Allen, 1972). Also, while positive results generally accrue from systematic desensitization, the psychological principles governing desensitization as well as the contributions of its constituent components are unclear. Furthermore, though the literature strongly suggests that desensitization is an effective treatment for the alleviation of test anxiety, more research is necessary before such questions as under what circumstances, by whom, and with what students is this treatment most effective in alleviating test anxiety?

In an attempt to further clarify and define the parameters associated with the effective treatment of test anxiety by systematic desensitization, studies utilizing a variety of criteria, procedures, and populations will be examined. In a sense, such studies have progressed from attempts to establish the efficacy of desensitization to efforts designed to delineate parameters associated with
the efficacy of desensitization and to compare competing behavioral treatment strategies. The discussion will examine these developments.

**The Efficacy of Systematic Desensitization in the Alleviation of Test Anxiety**

A few studies have been performed to simply demonstrate that systematic desensitization is effective in alleviating the test anxiety of college students (Paul, 1964; Garlington and Cotler, 1968). While the results of these studies seem to suggest that desensitization is an effective treatment for test anxiety, cause and effect relationships are not clear.

Paul (1964) reported a small study which served as a pilot investigation for later, more extensive projects. Eleven students in an introductory psychology course at the University of Illinois served as subjects. All had high debilitating test anxiety according to the Mandler-Sarason Test Anxiety Questionnaire (TAQ) and all were in the 70 percent middle ability range. Five Ss were assigned to the treatment group and six to the control group. Treatment group Ss received individual desensitization by the author
between the first and second course examination, and control Ss were not contacted further. In a posttreatment assessment based on performance on the second course examination, the treated group improved examination scores from the first (pre) to second (post) exams significantly more than the untreated controls. Furthermore, in a follow-up assessment, based on final examination scores eight weeks later, treatment Ss improved their examination scores (x = +7.5) while control Ss decreased on examination scores (x = -8.0), and the difference between groups was highly significant. While this study indicates that treatment was effective in facilitating academic performance, no conclusions can be made about the effectiveness of systematic desensitization per se because of the possibility of within-class confounding of therapist characteristics and nonspecific treatment effects. Also, Paul (1969) stressed that while self-reports of subjects as well as other empirical research, suggests that improved performance was due to a reduction of anxiety (see Paul and Eriksen, 1964), no direct post-treatment assessments of anxiety were performed.

Another study, serving as a simple test of the effectiveness of systematic desensitization in the alleviation
of test anxiety is that of Garlington and Cotler (1968). Participants were 35 freshmen female volunteers. Four graduate students served as therapists. Ss were randomly assigned to desensitization and no-contact control groups. Desensitization treatment Ss met for nine or ten sessions. Results indicated that Ss treated by desensitization reported less test anxiety ($p < .05$) following treatment than did no-contact control Ss. There were no significant differences between the control Ss and the treatment Ss on a final examination and grade-point-averages following treatment.

Another study provides some limited data on the use of desensitization in the treatment of test anxiety. Katahn, Strenger, and Cherry (1966) reported a study of group desensitization involving other group procedures as well. Ss were drawn from second year psychology courses taught by Katahn at Vanderbilt University. On the basis of scores in the upper 25 percent of the distribution on Sarason's Test Anxiety Scale (TAS), 45 students were selected to participate in this study. Of the 45 students, 22 indicated a desire to receive treatment. Due to schedule conflicts 6 of the 22 were assigned to a "volunteer control group"
and the remaining 16 to treatment groups. The 23 students who were not interested in treatment served as a "non-volunteer control group." The Ss were selected over a period of two consecutive semesters, with one treatment group being treated each quarter. Assessment procedures involved pre and post measures of TAS scores and GPA's.

Treatment groups met for eight one-hour sessions with a therapist and co-therapist. The senior author was a therapist in both groups (as well as professor in the course). The junior authors, both graduate students, served as co-therapists. None of the therapists had previous experience in desensitization. In addition to the use of co-therapists a number of unusual procedures were utilized in the group treatment. The first two sessions involved training in relaxation and the formation of hierarchies as well as discussions and encouragement to purchase a book on problems of college students. Also, both the hierarchy construction and relaxation procedures were most unusual. The sessions were conducted in a seminar room around a table. Ss essentially constructed their own hierarchies, which were limited to ten items, and seem to have contained multiple themes in addition to
examination items. Also, relaxation was actually individual relaxation in the group and not group relaxation. The focus on muscle groups proceeded "from the toes to the head," with about 5 seconds tension, exerting pressure against the therapists, followed by instructions to "relax slowly."

The remaining sessions (3-8) consisted of discussions about study skills and professors during the first 40 minutes and desensitization proper during the last 20 minutes. During desensitization proper, Ss chose three items from their hierarchy and visualized them each three times for 5-10 seconds regardless of the amount of anxiety experienced. By the fourth session, Ss were also instructed to use in vivo differential relaxation.

Results indicated that treated groups showed significantly greater improvement on GPA and significantly greater reductions on TAS scores than controls. However, the authors noted a number of problems with this study which place serious limitations on the findings. Since the major therapist was also the instructor for Ss, additional influence could have entered into sessions. Also, desensitization treatment effects were confounded by nonspecific treatment effects as well as bibliotherapy and
study skills discussion so that no conclusions can be drawn concerning the effects of desensitization per se. Furthermore, a selection bias seems evident in the control groups in that Ss who were unmotivated or had unusual schedules served as controls. Considering the latter methodological difficulties, it is impossible to determine the exact effects of group desensitization. However, this study can be taken as providing suggestive support for the efficacy of group desensitization.

The above studies (Paul, 1964; Garlington and Cotler, 1968; and Katahn, et al., 1966), considered together, seem to indicate that desensitization may be effective in alleviating the test anxiety of some students, although none of these studies serve as definitive indicators of this. Additional studies, while providing further data in support of systematic desensitization, have investigated variations in treatment in order to further clarify cause-effect relationships and further establish the parameters of desensitization treatment.
Parameters of Desensitization Treatment

Group versus Individual Treatment

Some support exists for the position that group desensitization may be as effective as individual desensitization (Lazarus, 1961; Paul and Shannon, 1966). Also, a study by Ihli and Garlington (1969) focused on the effectiveness of group and individual desensitization in the reduction of test anxiety. Ss were 14 freshman and sophomore females who had indicated fear of at least 9 of the 16 items on the Sarason Test Anxiety Scale (TAS). Ss were randomly assigned to three treatment groups. Group 1 (n=5) received group desensitization with a standardized arrangement of a composite hierarchy presented on 3x5 cards. Group 2 (n=5) also received group desensitization but each S received an individually arranged order of the composite hierarchy, also on 3x5 cards. Ss of Group 3 (n=4) received individual desensitization in which presentation of individually arranged hierarchy items was verbal. Analyses of pre-post changes in self-reported test anxiety on TAS revealed a significant decrease for all treatment Ss (p < .001). Furthermore, the authors state that the lack of
interaction effects and group differences indicate that (1) the group method of desensitization was as effective as the individual method and (2) that using a standardized order of the composite hierarchy was as effective as allowing each individual to order the hierarchy used. Nevertheless, these results should be considered carefully considering the loss of three Ss from Group 2, along with the initially small n's. Also the lack of control groups, the possibility of nonspecific treatment effects, and the absence of additional assessment procedures for test anxiety reduction seriously attenuate the strength of the authors' conclusions.

Additional support for the effectiveness of group desensitization of test anxiety is provided by Suinn (1968). Thirty-two Ss, drawn from an introductory psychology class, participated in the study. Ss were randomly assigned to group desensitization and no-treatment control groups. Three graduate students served as therapists. The mean number of sessions attended by treatment Ss was 10.7. Results indicated that desensitization Ss reported significantly less anxiety following treatment than the control Ss.
Evaluation of the Components of Desensitization in the Treatment of Test Anxiety

A number of researchers have studied the effects of various components of desensitization in the alleviation of test anxiety (Johnson and Sechrest, 1968; Freeling and Shemberg, 1970; Laxer, Quarter, Kooman, and Walker, 1969; Laxer and Walker, 1970; and Aponte and Aponte, 1971).

Johnson and Sechrest (1968) reported a study of treating test anxiety with Ss selected from undergraduate psychology courses at Northwestern University on the basis of course grades as well as debilitating Alpert-Haber test anxiety scores. Ss agreeing to participate (n=23) were randomly assigned to one of two treatment groups to receive five weekly sessions of (1) systematic desensitization or (2) continued relaxation training. An additional ten students meeting the selection criteria served as a no-contact control group which was unaware of its participation. The first author served as the therapist for both groups and was apparently inexperienced both clinically and with desensitization at the beginning of treatment. Desensitization procedures were detailed in a manual after
Paul (1964) but involved some procedural differences in both relaxation training and desensitization proper. Changes were made in the order and timing of the relaxation procedures and two separate hierarchies (a 7-item quiz hierarchy and an 11-item major exam hierarchy) were presented to Ss. The first hierarchy was presented to Ss during sessions 2 and 3, and the second hierarchy was started during the third and continued through the fourth and fifth sessions. The relaxation group received the same relaxation instructions as the desensitization group; however, during the second through fifth sessions, after inducing relaxation, the therapist instructed Ss to continue relaxing for the remainder of the session and left the room. This latter procedure suggests that desensitization group Ss may have been exposed to some nonspecific treatment effects different from relaxation group Ss. Results were analyzed by analyses of covariance and multiple comparisons, indicating that improvement on a standardized multiple choice final examination was significantly greater for the desensitization group than the relaxation or the no-contact control groups. Analyses of pre and post test anxiety scale scores, obtained a few months after treatment, revealed no
significant differences between groups. To explain this latter finding, the authors suggested that students' verbal labeling may be better established than the actual referent behavior and thus not easily changed or that students responded to the test anxiety scale more in general terms than in regard to a specific examination. While this study suggests cause-effect relationships for systematic desensitization and improved target behavior, the results are somewhat confused due to the lack of positive results on the test anxiety scale and the failure to administer the scale prior to the final examination. Also, the relaxation group partially controlled for therapist characteristics and nonspecific treatment effects but the amount of attention and "ritual" was not adequately controlled. In actuality, this study cannot be taken as providing definitive evidence of the efficacy of systematic desensitization in the alleviation of test anxiety although desensitization treatment was effective in improving academic performance. It is interesting to note that this is the only study in which desensitization treatment apparently facilitated academic performance improvement but did not reduce self-reported test anxiety. Again, the
results might have been different if the posttreatment assessment of test anxiety had been more closely associated with the final examination, both in time and test instructions.

In a study similar to that of Johnson and Sechrest (1968), Freeling and Shemberg (1970) investigated the efficacy of various components of desensitization in the reduction of test anxiety as determined by the Test Anxiety Questionnaire (TAQ). In an effort to more completely evaluate the components in the systematic desensitization paradigm, particularly as related to the treatment of test anxiety, Freeling and Shemberg randomly assigned 30 high test anxious Ss (25 female and 5 male) to three groups: (1) systematic desensitization, (2) relaxation, and (3) visual imagery. The systematic desensitization group met for a total of six sessions. During the first sessions Ss ranked a 15-item hierarchy and listened to a 25-minute relaxation tape following Wolpe and Lazarus (1966). During the next five sessions, desensitization proper was accomplished. Hierarchy items were presented repeatedly for 10 to 25 seconds beginning with the least anxiety-evoking item and progressing only as fast as the slowest S. No
more than four new items were presented in any one session and the anxiety hierarchy was completed by the end of the sixth session. The visual imagery group also met for six sessions. The first session consisted of the anxiety hierarchy item ranking-procedure. During the remaining five sessions, Ss visualized hierarchy items and were yoked to the systematic desensitization group so that the number and duration of exposures was the same for both groups. The visual imagery group differed from the systematic desensitization group only in that the former received no instructions in relaxation. The relaxation group also met for six sessions. During the first session, Ss received relaxation training and were instructed to practice relaxation daily. For the remaining five sessions, Ss were instructed in relaxation and requested to visualize 15 neutral nature scenes, presented so that the number and duration of exposures were the same as for the other two groups.

Analyses of the results of this study indicated that pre-post reductions in self-reported test anxiety were significant only for the systematic desensitization group. Also, while posttreatment differences between the systematic
desensitization and visual imagery groups on self-reported test anxiety were significantly different in favor of the systematic desensitization group, no posttreatment differences existed between the relaxation and systematic desensitization groups. Furthermore, while there were no significant differences between groups on pre-post changes in performance on anagram tasks, the visual imagery group had significant improvement from pre to post performance on the anagram tasks ($p < .05$). Interpretations of the results of this study are difficult to make because of the lack of clarity in the literature concerning the efficacy of components of desensitization in treating target behavior. While this study suggests that systematic desensitization is more effective than either relaxation or visual imagery in reducing self-reported test anxiety, some methodological difficulties, including lack of control data and possible therapist specificity and subject expectancy influences, preclude any firm conclusions. Also, this study reiterates the need for further research into the role of subject characteristics in the treatment of test anxiety and inconsistencies reported concerning changes in self-reported test anxiety and performance.
measures. More research is needed to understand why some Ss in the relaxation group had reductions in self-reported test anxiety equal to that of Ss in the desensitization group. Possibly, such results could be explained by the unintentional contiguous association of relaxation responses with anxiety-provoking stimuli either within or outside the sessions, or perhaps some generalization of relaxation effects occurred. As equally difficult to explain is the improvement of the visual imagery group on the anagram tasks. Perhaps, at least for some Ss, it is easier to visualize without relaxation instructions (see Aponte and Aponte, 1971) and visualization may be particularly important in anagram tasks. Conceivably, visual imagery group Ss could have profited from treatment due to a type of implosive therapy (Prochaska, 1971).

Two other studies concerning the importance of component aspects of desensitization will be examined. Both of these studies utilized high school students as Ss and thus the results may not be directly applicable to college students. Laxer, Quarter, Kooman, and Walker (1969) investigated the efficacy of relaxation as a technique in the reduction of test anxiety. A total of 33 Ss in each
of three treatments (relaxation, desensitization, and control) met daily for 20 minutes for a period of six weeks. Debilitating test anxiety, facilitating test anxiety, manifest anxiety, and grade point average were measured both prior to, and after completion of, treatment. When the means for each criterion were analyzed, the results indicated that only in the case of manifest anxiety were the treatment effects significant (p < .05). Orthogonal comparisons revealed that the relaxation group had considerably lower manifest anxiety than the control group, while there were no significant differences between the relaxation and desensitization groups or between the desensitization and control groups. For debilitating and facilitating test anxiety, results were in the indicated direction but non significant (p < .07 and < .15, respectively). No significant differences or consistent trend were indicated by analyses for the academic performance criteria. The authors concluded that relaxation training, as one of the two components of desensitization, may account at least partly for the effects of the combined treatment. They offered as a plausible explanation for the effectiveness of relaxation the possibility that "Ss in a relaxed state might
inadvertently imagine anxiety-provoking stimuli and form new associations between these stimuli and relaxation. For Ss in the relaxation per se condition the new associations might have been more general than those for Ss who were systematically desensitized (Laxer et al., 1969, 451)."

A subsequent study by Laxer and Walker (1970) provided additional data on the importance of relaxation in the systematic desensitization of test anxiety. They randomly divided a sample of 119 high-test-anxious Ss into six different conditions: Systematic Desensitization, Relaxation Alone, Simulation Alone, Relaxation Simulation, Attention Control, and No Treatment Control in order to test the possibility that the efficacy of systematic desensitization could be attributed to a general reduction in anxiety as a result of relaxation training, to simple extinction of non-reinforced fear responses, or to the operation of placebo factors rather than to counter-conditioning.

Ss met in small groups of 3-5 students. Sessions for each treatment condition lasted for 20 minutes. Each group met three times per week for the first four weeks then two times per week for a second four-week period, com-
prising a total of twenty sessions. Three trained counse-
lors administered the treatment program. The treatment
procedures were as follows:

1. Relaxation Alone. Ss were taught to relax
using Jacoben's (1938) technique. Training for
the first week consisted of tensing exercises,
followed by deep muscle relaxation for the
remaining 7 weeks.

2. Systematic Desensitization. Ss received train-
ing in muscle relaxation for the first 3 ses-
sessions. During the next 17 sessions relaxa-
tion was followed by the presentation of a
21-item hierarchy associated with the writing
of exams.

3. Simulation Alone. Ss were told that the more
experience one has with a feared object or
situation, the less anxiety he will have toward
the feared stimulus. Each session was entirely
devoted to the taking of tests and Ss received
no feedback about performance so as to avoid
reinforcing any anxiety responses.

4. Relaxation Simulation. Ss in this treatment
received relaxation training and tests. The
treatment was similar to the Systematic Desen-
sitization treatment except that the hierarchy
was replaced by tests from the Simulation
condition.

5. Attention Control. Ss in this treatment spent
their time in small discussion groups talking
about current events and social values. This
treatment was designed as a control for
attentional and expectancy factors.

6. No Treatment Control. Ss in this group were only
administered pre and post measures.
All subjects were assessed on pre and post anxiety and performance measures. These included the facilitating and debilitating scales of the Alpert-Haber Achievement Anxiety Scale (AAS), the Taylor Manifest Anxiety Scale (TMAS), GPA's for Christmas and final examinations, and four sections of the Standardized Tests of Educational Process (STEP).

In analyzing the results, an intercorrelation analysis was performed, including all pretest and posttest measures. Any measures correlating .80 in both pretest and posttest were averaged. After this procedure, four dependent variables remained: AAS difference score (Debilitating minus facilitating), MAS, STEP 1 (Math and Science) and STEP 2 (Reading and Writing). Analyses of covariance were performed for each of these dependent measures. A significant difference between conditions was found only for the test-anxiety measure (p < .001). Further comparisons indicated that both the systematic desensitization and relaxation alone conditions differed significantly from the control (p < .025 and p < .05, respectively).

These findings were interpreted as indicating that at least some of the beneficial effects produced by systematic
desensitization may be attributable to the generalized effects of relaxation training. Their findings seem contradictory to results reported by Davison (1968) and Johnson and Sechrest (1968). Laxer and Walker explained the differences between their results and the results of Davison (who concluded that treatment is effective only when both elements of systematic desensitization are present) as possibly being accounted for by the level of manifest (generalized) anxiety of Ss. Ss in the study of Laxer and Walker had high generalized anxiety; Ss in Davison's study may not have. While the explanation given by Laxer and Walker seems feasible it is also possible that differences between these studies could be accounted for by differences in procedures. That is, Laxer and Walker's Ss in the relaxation condition were instructed only in relaxation and not in visualization while Davison's Ss were instructed to visualize neutral scenes. Thus it seems likely that counterconditioning could occur for Ss in the study by Laxer and Walker due to an unintentional pairing of aversive scenes (which Ss may have just naturally visualized since they had no instructions to do otherwise) than for Ss in Davison's study where specific instructions
were given. Davison's procedure of pairing relaxation with neutral scenes appears to be a better way of controlling for the effects of relaxation or conversely of controlling for the effects of utilizing an aversive cues hierarchy.

Concerning apparent conflicting results of the study by Laxer and Walker with those of Johnson and Sechrest (1968), Laxer and Walker offered no explanation. They noted only that Johnson and Sechrest found that systematic desensitization significantly affected examination scores while neither desensitization nor relaxation influenced anxiety measures. It is difficult to compare these two studies because different criteria and different procedures were utilized. However, it seems likely that differences in results are due to procedural differences. For example, Laxer and Walker utilized performance measures of questionable adequacy due to the fact that the inconsequential nature of their tests probably evoked little anxiety. Also, Johnson and Sechrest obtained measures of test anxiety a number of weeks after treatment had ended.

One other study provides some important information on the importance of the components of desensitization. Aponte and Aponte (1971) studied the efficacy of group pre-
programmed systematic desensitization without the simultaneous presentation of aversive scenes with relaxation training. Four treatment groups were delineated: (1) pre-programmed systematic desensitization, (2) non-simultaneous (scenes presented prior to muscle relaxation), (3) relaxation, and (4) no-treatment control.

A total of 70 Ss participated. All Ss were classified as high-anxious on the Suinn Test Anxiety Behavioral Scale or STABS (Suinn, 1969) and matched on (1) ACT scores, (2) size of high school attended, and (3) declaration of major field of study. All groups met for five weekly sessions and followed similar procedures to the extent that different treatments allowed.

Treatment procedures for the systematic desensitization group involved (1) discussion of rationale, (2) training in relaxation following Jacobsen (1938), and (3) desensitization proper which involved the presentation of 22 hierarchy items each six times—twice for 5 seconds, twice for 10 seconds, and twice for 20 seconds. Also, self reports of relaxation and visualization were obtained after each of the five treatment sessions, and during sessions Ss pressed telegraph keys whenever they experienced anxiety.
Procedure for the non-simultaneous group consisted of the following: (1) discussion, (2) scene visualization, and (3) relaxation training. The rationale for this treatment was identical to that presented to Group 1 Ss except that no mention was made of the simultaneous pairing of relaxation with visual imagery. Following the brief periods of discussion, Ss were presented scenes identical to those presented to Group 1 in the same order and for the same time sequence. Ss also were instructed to press telegraph keys whenever they experienced anxiety. After the presentation of scenes, Ss listened to the same relaxation tape used for Group 1. Also Ss were instructed to rate their relaxation and visualization after each treatment session.

Ss in the relaxation procedure group received, after discussion, only training in relaxation. They were not asked to visualize scenes. After sessions, they rated their relaxation. The last of the four groups (no-treatment control group) did not undergo therapeutic treatment. However, pre and post measures were obtained from this group as well as the other groups.

Pre and post measures for all groups were obtained on six criteria: the STABS, a modified form of the Test
Anxiety Questionnaire (TAQ) developed by Liebert and Morris (1967), five items from the S-R scale (Endler, Hunt and Rosenstein, 1962), Fear Survey Schedule or FSSII (Greer, 1965), freshman English course grade, and overall GPA.

Analyses of variance indicated that significant differences existed between groups on pre-post change scores on the STABS. While there was no significant difference between the programmed systematic desensitization and non-simultaneous groups, there was a significant difference between the programmed systematic desensitization and relaxation groups ($p < .025$) and between the non-simultaneous and relaxation groups ($p < .005$). These results indicate that both the preprogrammed systematic desensitization and non-simultaneous groups had significantly greater improvement than the relaxation only treatment. No comparisons were given with the no-treatment control group. However, from the data, it appears that the relaxation only treatment group may have improved significantly more than the no-treatment control group suggesting, as Laxer and Walker concluded, that part of the effectiveness of systematic desensitization seems due to the generalization of relaxation effects.
There were no significant differences between treatment groups on overall GPA, final grade in English, TAQ scores, or FSSII total scores. However, on two items of the FSSII (1. failing a test and 2. not being a success) a significant difference was found between groups (p < .05). On the first item, the non-simultaneous group actually manifested greater decreases in anxiety than the preprogrammed systematic desensitization group (p < .025).

Each of the five items making up the modified form of the S-R Scale were analyzed separately. There were no significant differences among treatment groups on the items, "You are going to meet a new date," "You are alone in the woods at night," or "You are going to interview for a very important job." However, on items "You are getting up to give a speech before a large class" and "You are entering a final examination in an important course," significant differences existed between treatment groups (p < .05). On subsequent t-tests, scores for the non-simultaneous group were significantly better than scores for the relaxation group but not for the preprogrammed systematic desensitization group.

These results from Aponte and Aponte (1971), taken
together, indicate that the non-simultaneous procedures were at least as effective in modifying self-reported anxiety as the preprogrammed group systematic desensitization. In fact, while the latter approached superiority over the control groups on four variables, the former was significantly different from the controls on seven measures.

In an effort to understand the performance of the non-simultaneous groups, the authors noted that Ss in these groups consistently reported clearer visualizations of scenes and more anxiety than the preprogrammed systematic desensitization groups. What differences these findings may account for are unclear. Nevertheless, a few theories seem to offer plausible explanations for the reduced self-reported anxiety of the non-simultaneous groups. According to London's (1964) "cognitive discrimination theory," the critical function of both systematic desensitization and implosive therapy is to elicit vivid imagery. When vivid imagery occurs, Ss begin to gradually and progressively discriminate between the imagery and the real situation. Then Ss, theoretically, realize that regardless of the vividness of the imagery, the same aversive
consequences that may happen in real life situations will not occur. Thus, an increasingly calmer response occurs to the imagined scenes, increasing the probability of other responses occurring such as relaxation. While this theory may account for the improvement of Ss in the non-simultaneous groups, it is not clear from the data reported by Aponte and Aponte as to whether or not these Ss experienced an increasingly calmer response to aversive scenes presented during desensitization proper, at least in relation to the systematic desensitization group they did not.

A second explanation for the non-simultaneous group's improvement is the "inhibitory conditioning" theory of Guthrie (1952). One of the methods by which conditioning can occur is through toleration. Ss may have developed toleration for the aversive stimuli through gradual presentation of items. Theoretically, toleration would be produced by having aversive stimuli gradually introduced so that the toleration limit of the S is never exceeded. While this theory may be plausible there is certainly a lack of clarity concerning how toleration limits are defined or measured and whether or not Ss in the study by Aponte and Aponte were exposed to stimuli within their tolerance level.
While the mechanisms of therapeutic change in both the non-simultaneous and systematic desensitization treatments are left unclear, the study by Aponte and Aponte certainly questions the necessity of simultaneously pairing muscle relaxation and aversive scenes in treating test anxiety by desensitization. Still, the lack of data supporting changes in performance and the absence of behavioral or physiological measures of test anxiety do somewhat cloud interpretation in terms of the effectiveness of the non-simultaneous presentation of aversive scenes and relaxation. Also having only five treatment sessions may have been too short a time period for adequate assessment of procedures.

Up to this point, six studies evaluating the components of systematic desensitization have been reviewed. Four of these (Johnson and Sechrest (1968); Freeling and Shemberg (1970); Laxer et al. (1969); and Laxer and Walker (1970) have dealt primarily with the role of relaxation and one (Aponte and Aponte, 1971) has been concerned with the non-simultaneous presentation of aversive stimuli and relaxation. The results of these studies seem to indicate that while relaxation alone may contribute to the reduction of test anxiety for some Ss, treatment programs involving
both the presentation of aversive stimuli and relaxation are more consistently beneficial. Furthermore, it may not be necessary to present aversive stimuli simultaneously with relaxation. In the latter part of this section, further consideration will be given to the importance of aversive stimuli in the desensitization procedure, particularly for the treatment of test anxiety.

In assessing the importance of the order of presentation of aversive stimuli, four studies will be considered: Emery and Krumboltz (1967), Cohen (1969), Ihli and Garlington (1969), and Krapfl and Nawas (1970).

Emery and Krumboltz (1967) reported an investigation designed to evaluate the comparable effectiveness of standard versus individualized hierarchies. Forty-eight Stanford University freshmen, screened on an 18-item test-anxiety scale constructed for the investigation, were randomly assigned to one of three groups: (1) desensitization with an individual hierarchy, (2) desensitization with a standard hierarchy, or (3) no treatment. Groups met for a maximum of 16 sessions on a twice-weekly basis; and were conducted by graduate students in clinical and counseling psychology. No information explaining exact procedures
was provided. However, Ss in both treatment groups started with a standard 16-item spatial-temporal hierarchy based on information gathered in a pilot study. Ss in the standardized hierarchy condition followed the original hierarchy, while Ss in the individual hierarchy condition also used the same hierarchy but were instructed to order the items themselves.

Posttreatment assessment procedures consisted of a re-administration of the test-anxiety scale, and S self-ratings of anxiety on a 7-point scale before and during each final exam of the quarter. Also, exam grades for a common freshman course (history) were analyzed for changes from the quarter before to the quarter after treatment. Results of analyses indicated that the two treatment groups improved significantly more than the control group on self-ratings of anxiety before and during exams ($p < .01$) and the test-anxiety scale ($p < .01$). There were no significant differences between treatment groups on self-reported test anxiety scores and no significant differences between treatment and control groups on performance on the history exam. Actually, as noted by the authors, the performance measure was inappropriate for this sample of Ss who fell at the
90 percent ability level on national norms thus placing them in a range of talent wherein anxiety does not seem to adversely influence academic performance (see Spielberger and Katzenmeyer, 1959; Paul and Eriksen, 1964). Also, little academic improvement could be expected for these Ss since they were already functioning at such a high level.

While this study provides some support for the effectiveness of systematic desensitization, the possible confounding effects of therapist characteristics and unspecified procedures preclude the possibility of establishing specific relationships for systematic desensitization per se. Furthermore, and most important in terms of the present study, the study by Emery and Krumboltz does present some support regarding standard versus individualized hierarchies but these results should be interpreted cautiously due to the overlap of 60 percent in order, in addition to the common items between groups.

Another study providing some support for standard versus individualized hierarchies in the systematic desensitization of test anxiety is that of Ihli and Garlington (1969). In this study (previously reviewed), the authors found that both standard and individual hierarchy desensi-
tization groups improved significantly more than a control group on reductions in self-reported test anxiety. As already mentioned, the results of this study are limited by small n's and possible confounding effects. Together, the results of the latter two studies (Emery and Krumboltz, 1967; Ihli and Garlington, 1969) do suggest that a standard form of a composite hierarchy may be as effectively used in desensitization as individual forms of the same hierarchy.

In addition to studies designed to evaluate the efficacy of desensitization utilizing standard hierarchies, a few researchers have focused on the importance of the progressive presentation of aversive stimuli in desensitization proper.

Cohen (1969) studied the effect of progressive and non-progressive hierarchy conditions and group interaction in the desensitization of test anxiety with volunteer college students who had high scores on the Test Anxiety Scale or TAS (Sarason, 1952). Twenty-five students were randomly assigned to four groups; however six students dropped out before three sessions were completed and another six dropped out after half of the sessions were completed. Thus only thirteen students completed the entire course, with three
groups having three students each and one group consisting of four students.

Hierarchy conditions for groups were classified as "progressive" and "high anxious." The "progressive" hierarchy groups visualized 12 scenes beginning with the least aversive and ascending until the highest aversive scene was reached. The "high anxious" hierarchy groups started visualizing hierarchy item #9 and progressed to item #12. However, all Ss had the same number of visualizations (trials).

All groups met twice a week for a total of twelve one-hour sessions. Desensitization proper was started during the third session. Ss apparently visualized scenes at their own rate and moved to a higher item after having experienced no anxiety on two consecutive trials. Ss who successfully completed the hierarchy were told to repeat their hierarchy. During desensitization proper, five 30-second visualization trials were presented after each six-to-eight minute set of relaxation instructions. Also, each trial was separated by one minute of relaxation instructions.

Analyses of results indicated that experimental groups
had significantly greater reductions on test anxiety than the no-contact control Ss ($p < .05$). Also, analyses of variance indicated no significant main effects for the hierarchy variable and no significant differences among groups on grade point change. However, an analysis of variance performed on the number of trials required for each S to complete the hierarchy indicated that the progressive groups required significantly more trials than the "high anxious" hierarchy groups ($p < .001$). This latter finding suggests that desensitization may be more economical and as effective with fewer items in the hierarchy. However, since Ss were told to repeat their hierarchies, the effectiveness of desensitization in the high anxiety group may have been due to repetitions of the short hierarchy in which case the fact that high anxiety hierarchy Ss worked through their hierarchy faster than progressive hierarchy Ss may be inconsequential.

Krapfl and Nawas (1970) investigated the differential ordering of stimulus presentation in the systematic desensitization of snake phobia. They used five different treatment conditions including three desensitization and two control groups: (1) imagined stimuli presented in order
of increasing aversiveness, (2) stimuli presented in a decreasingly aversive order, (3) random order presentation, (4) pseudodesensitization; and (5) no-treatment control.

Results of analysis of variance on the change scores on the Behavioral Avoidance Test (Krapfl and Nawas, 1969), the Fear Thermometer (Lazovik and Lang, 1960), and the Fear Survey Schedule II (Greer, 1965) revealed significant differences \( p < .001 \) among the groups. More importantly, in terms of the order of presentation of hierarchy items, in individual comparisons of approach behavior, the traditional and reversed, but not the random order, groups showed more approach than the pseudodesensitization and no treatment control groups. The authors concluded that presentation of imaginal stimuli in an order of decreasing aversiveness appeared about as effective as presentation in an order of increasing aversiveness. These findings challenge the assumption that an ascending hierarchy, which is an integral part of Wolpe's reciprocal inhibition formulation, is a necessary condition for successful desensitization.

Four studies (Emery and Krumboltz, 1967; Cohen, 1969; Ihli and Garlington, 1969; and Krapfl and Nawas, 1970) have been reviewed which provide data on the importance of the
order of presentation of aversive stimuli in desensitization. In summary, taken together, these studies suggest that the presentation of hierarchy items does not have to be individually administered in a gradually ascending order of aversiveness in order for desensitization to be effective in the alleviation of test anxiety. Indeed it seems that a standard composite hierarchy suitable for group presentation may be developed by combining Ss rankings. Furthermore, starting with either the least aversive or the most aversive item and progressing in a systematic manner may prove to be equally effective in the desensitization of test anxiety. While the above studies challenge the assumption that items must be presented in a gradually ascending order of aversiveness, they do not challenge the assumption that maximum effectiveness in desensitization is obtained by utilizing hierarchy scenes depicting the feared object or behavior. The present study involves the investigation of the effectiveness of a symptom cues hierarchy versus a dynamic cues hierarchy in the desensitization of test anxiety.

As indicated in Chapter I, the idea for developing and evaluating a dynamic cues hierarchy to be used in this study
originated from Bandura (1969) and Prochaska (1971). However, the theorizing of Sarason et al. (1960) provides the basis for the development of specific aversive scenes or stimuli designed to represent underlying fears associated with test anxiety. Sarason et al. hypothesize that a child's inappropriately high test anxiety may represent some unexpressed fears developed out of parent-child interactions. In a sense, the unexpressable fear the child has when being negatively criticized by his parents generalizes to school examination situations. Some of the hypothesized aspects of the parent-child interaction leading to high test anxiety are as follows:

1. Parental criticism creates hostility in the child.

2. The child is unable to deal effectively with the hostility. Overt expression of hostility on the part of the child may result in punishment.

3. If the child expresses hostility in phantasy, such expression may likely conflict with the positive feelings the child has toward his parents. Thus the child may feel guilty for having such hostile feelings.

4. The hostility the child feels is difficult for him to deal with because his parents are very much in control and he is very dependent on them.
5. The child's feelings of guilt may be partially due to the way the parents handle the child's expressed hostility. And the guilt is reinforced by the child's strong positive feelings for his parents.

6. For the test anxious child, parental handling results in inordinately strong hostility and guilt.

7. Because the child feels a lot of hostility and guilt, he may likely develop a conscious derogatory attitude toward himself. Thus the child tends to degrade his own worth and direct aggression towards himself rather than others.

8. As the child continues to repress his hostility, there may be an increase in the strength of unconscious phantasies about the consequences of directing strong hostility towards parents. The child fears retaliation on the part of his parents. Not only does the child fear physical punishment, he also fears being in a state of abandonment and helplessness—a state in which his dependency needs will not be satisfied.

9. Therefore, not only does the child not express hostility but he becomes very dependent on his parents for approval, direction and support.

10. Thus the test anxious child may exert a lot of effort to conform to the expectations of others. However, conforming to the expectations of others is not a stable solution because the person is constantly being exposed to situations in which negative judgments may possibly be made about the adequacy of his behavior. Conceivably, anxiety develops whenever the person fears or is exposed to negative judgment.
In summary, Sarason et al. hypothesize that the "test anxious child...becomes overdependent on and over-conforming to parents as a way of coping with guilt, hostility, anticipated retaliation, and helplessness in the sense that he will be in a situation where his needs cannot be gratified (Sarason et al., 1960, 18)."

While the theorizing of Sarason et al. concerns the test anxious child, it is at least conceivable that college students having very high test anxiety may be overdependent and overconforming to their parents because of unresolved hostility and guilt as well as anticipated retaliation from their parents whenever hostility is expressed. If this is the case, and if test anxiety exists because of a student's anxiety in situations in which he is criticized or in which he expresses hostility, then desensitization directed towards alleviating this anxiety might be beneficial. More specifically, desensitization directed toward alleviating the anxiety in situations in which the person is criticized or in danger of being criticized by his parents and situations in which the person feels or expresses hostility toward his parents may lessen the anxiety the person feels in testing situations. Even if the above formulations
concerning dynamics are incorrect, it seems possible that anxiety could have generalized from parent-child interactions to examination situations. Possibly, focusing on anxieties associated with parent-child interactions may generalize to examination situations. The study by Prochaska provides some evidence that implosive therapy directed towards parent-child interactions involving extreme hostility does facilitate reductions in self-reported test anxiety and improvement in academic performance. Furthermore, at least one study (Paul and Shannon, 1966) provides data indicating that focusing on an interpersonal anxiety (public speaking) may contribute to improved academic performance. If the results of this present study indicate that focusing on parent-child interactions involving hostility lead to reductions in test anxiety, this will certainly not be interpretable as indicating that the above theorizing concerning dynamic aspects of test anxiety is correct. However, positive results might indicate that the treatment of test anxiety through desensitization is facilitated by focusing on dynamic as well as symptom aspects of test anxiety. Indeed, data supporting the position that phobic behavior could be more effectively treated through
desensitization by focusing on both symptom and dynamic
cues would be significant.

Comparisons of Systematic Desensitization and Other Treatments in the
Alleviation of Test Anxiety

While considerable controversy exists concerning the underlying psychological principles involved in desensitization, there is increasing support for the position that systematic desensitization is perhaps the most efficacious single treatment for test anxiety and that the potential of desensitization is most fully realized in conjunction with other treatment procedures, particularly study skills training. While the present study involves the use of desensitization as a single model treatment, it is important to review the literature concerning comparisons of desensitization with other treatments and the utilization of desensitization combined with other treatments so that the basis for the present study will be clearer.

Numerous researchers (Crighton and Jehu, 1969; Doctor, Aponte, Burry and Welch, 1970; Berrick, 1971; Allen, 1971; Graff, Maclean, and Loving, 1971; Montgomery, 1971; Taylor, 1971; Mitchell and Ng, 1972; and Osterhouse, 1972) have
compared desensitization to other treatments in the alleviation of anxiety; however, relatively few researchers have systematically studied the effectiveness of combined desensitization and study counseling in the alleviation of test anxiety (Doctor et al., 1970; Allen, 1971; McManus, 1971; and Mitchell and Ng, 1972).

Crighton and Jehu (1969) reported a study in which they compared desensitization to group psychotherapy using a sample of students from the University of Leicester, England. A total of 23 students, paired for severity of examination anxiety on the basis of clinical judgment, were randomly assigned to a systematic desensitization or a relaxation with non-directive psychotherapy group. No details of the treatment procedure are provided by the authors except that different therapists conducted each group. Also no control group was utilized in this study, although a control procedure was attempted for examination marks by matching experimental Ss with control Ss.

Pre and post measures were obtained for Ss on a number of criteria: (1) Zuckerman's (1960) Affect Adjective Check List, (2) a questionnaire about sleep disturbance, (3) use of psychotropic drugs, (4) examination marks, (5)
the Fear Survey Schedule (Wolpe and Lazarus, 1966), and (6) patients' self reports and therapists' clinical observations. Results indicated that significant pre-post improvement occurred for both the systematic desensitization and psychotherapy groups on the first three criterion measures. Results on the latter three measures were either non significant or uninterpretable. Additionally, there were no differences between the systematic desensitization and psychotherapy groups on any of the measures. Nevertheless, these results are questionable due to the possible effects of therapist specificity and subject expectancies as well as the use of non-equivalent controls. Furthermore, the lack of specificity of treatment procedures makes it impossible to understand real differences between treatment groups.

Taylor (1971) studied the effectiveness of desensitization compared to an automated presentation of material on study skills. Ss were 16 student volunteers having high scores on the Test Anxiety Questionnaire (TAQ) (Mandler and Sarason, 1952). Ss were randomly assigned to either desensitization or to the automated instruction group. In addition, eight students served as test-retest control Ss.
Desensitization group Ss met for a total of eight 40-minute sessions, two sessions per week. The first four sessions included rationale for treatment, training in relaxation, and the construction of individual 15-item anxiety hierarchies. During the next four sessions, desensitization group Ss were instructed in desensitization proper. The group moved as a unit through the hierarchies, but each S visualized scenes from his own individual hierarchy written on index cards. In contrast to the desensitization group, the automated instruction group met for eight sessions of only 20 minutes each. Ss merely listened to a series entitled "How to Study and Why" (McCullar, 1964). The TAQ was readministered to all Ss following treatment. Analyses indicated that the desensitization group Ss had significantly greater reductions \( p < .01 \) in self-reported test anxiety than automated instruction group Ss, who in turn had significantly greater reductions \( p < .01 \) than the no-treatment control. In a two-month follow-up of systematic desensitization group Ss, results continued to be stable. While this study provides data supporting the efficacy of systematic desensitization in the reduction of test anxiety, the strength of the data in this study is
weakened by the inequality of total treatment time for
groups, the nonequivalence of treatment and control groups,
the possibility of therapist specificity effects, and the
lack of additional measures of improvement.

Berrick (1970) studied the efficacy of three treatment
groups (Socratic, Instrumental, or Systematic Desensitiza-
tion) in the treatment of "exam fear." Results indicated
that all treatments were successful, to some degree, in
accomplishing a reduction of examination fear. While no
significant differences were found between treatment
groups, significant pre-to posttreatment changes for all
treatment groups in an improved direction were found on
three out of four self-report inventories, a performance
measure (classroom examination), and on a study attitude
scale. No significant differences were found on physiolog-
ical measures which proved to be difficult to interpret.
Surprisingly, the control groups which had no formal treat-
ment appeared to have improved as well as groups which had
undergone formal treatment. Berrick interpreted this
latter finding as an indication that "no-treatment" groups
may actually be "non-specific therapy" groups. Also
Berrick noted the need for additional research concerning
the influence of S characteristics, such as motivation, in the treatment of test anxiety.

Montgomery (1971) studied the effects of three pre-recorded behaviorally-oriented techniques—systematic desensitization, implosive therapy, and rational-emotive therapy—in the treatment of test anxiety. Ss were 40 volunteers exhibiting high debilitating anxiety and low facilitating anxiety on the Achievement Anxiety Test. All Ss were also given the Anxiety Differential, the Henmon-Nelson Test of Mental Ability, and the Fear Survey Schedule before and after treatment. Results of analyses indicated that the systematic desensitization group had greater anxiety reduction on the Anxiety Differential than the implosive therapy and control groups. Also, the systematic desensitization group had greater anxiety reduction on the Achievement Anxiety Test than the rational-emotive group. Thus, the study by Montgomery provides data suggesting that systematic desensitization is more effective in the reduction of self-reported test anxiety than either implosive or rational-emotive therapy.

Graff, Maclean, and Loving (1971) compared the effectiveness of reactive inhibition and reciprocal inhibi-
tion therapies with anxious college students. Ss were drawn from a population of approximately 1900 college freshmen residing in residence halls at Southern Illinois University. A total of 84 Ss having high scores on the Test Anxiety Scale (Sarason, 1958) and the IPAT (Cattell and Scheier, 1963) were randomly assigned to one of four groups with the constraints that groups were matched on sex and test anxiety scores. The reciprocal inhibition group met three times weekly for 45-60 minute sessions, with a total of eleven sessions. The treatment consisted of a modified form of treatment from Wolpe (1969) including (1) training in relaxation, (2) the use of a standardized 15-item hierarchy, and (3) simultaneous presentation of scenes with relaxation. In contrast, the reactive inhibition group met three times weekly for about 15-25 minute sessions. During the first session, after a brief explanation of the treatment, Ss were asked to read the paper "A Simple Home Remedy for Fears" (MacLean and Graff, 1970) which explained the mechanics of reactive inhibition and urged Ss to "experience the fear deliberately and as fully as possible." At the end of the first session, Ss were asked to describe their fears concerning school and to try the procedure
presented in the paper with one of their fears. Additional sessions were very similar, with Ss being asked to experience their fears as fully as possible. The other two groups in this study were a placebo and waiting list group.

Data were analyzed by a multiple linear regression model using pre and post treatment scores on the TAS and IPAT, and controlling for sex and ability. The results indicated that treatment effects were significant for both test anxiety (p<.0005) and manifest anxiety (p<.003). Both reactive inhibition and reciprocal inhibition groups were significantly more improved in test anxiety and manifest anxiety than either the placebo or control groups. Differences between reciprocal inhibition and reactive inhibition groups were not significant, although the latter had more improvement. No significant interactions were found between sex of students, ACT scores, and treatment. Additionally, results were stable at an eight-week follow-up. While results indicate that both reciprocal and reactive inhibition groups were beneficial, they were not equated on the extent to which Ss were free to determine their own fears concerning school. Also, the lack of performance measures restrict comparisons of these two approaches.
Osterhouse (1972) compared desensitization and study-skills training as treatment for two types of test-anxious students. Ss were drawn from introductory psychology classes. A total of 40 Ss scoring high on the Inventory of Test Anxiety (Osterhouse, 1969) were assigned to either desensitization or study-skills training. Two Ph.D. psychologists served as therapists, each having both a desensitization and study-skills group. All treatment groups met for one hour each week for six consecutive weeks.

Two criteria were used to judge the efficacy of treatment methods: self-reported anxiety and academic performance on the final examination in the introductory psychology class. Results indicated that desensitization group Ss were not significantly different than study-skills group Ss but were significantly more improved in self-reported anxiety than controls \( (p < .05) \). On academic performance, surprisingly, control Ss had significant improvement on final exam scores while neither desensitization nor study-skills Ss improved. Further analysis indicated that it was high-emotionality control Ss rather than high-worry control Ss who improved. However, the performance of the control Ss could be related to selection procedures. At any rate this study reiterates the need for further investi-
gation into the importance of S characteristics in the treatment of test anxiety.

While the above studies (Crighton and Jehu, 1969; Berrick, 1970; Graff et al., 1971; Montgomery, 1971; Taylor, 1971; and Osterhouse, 1972) taken together, indicate that systematic desensitization is at least as effective as other single model treatments for test anxiety, some additional studies suggest that systematic desensitization may be more beneficial in conjunction with study-skills training.

McManus (1971) evaluated the efficacy of a combined desensitization and counseling program for test-taking anxiety. Ss were student volunteers solicited through the school newspaper at Iowa State University. Nine Ss were assigned to the treatment group and nine to a wait-list control group. Treatment Ss attended seven treatment sessions containing the following procedures:

1. Hierarchy construction
2. Relaxation training
3. Desensitization proper
4. Discussion of both the use and success with the technique by group members, and the learning skills and attitudes with which to replace ineffective approaches
5. Graduated opportunities to practice on lesser quarterly exams with termination of the program during final exam week.

Pre and posttreatment GPA's of all Ss were compared. Results indicated that treatment Ss improved significantly more than control Ss in GPA (p < .001). However, no data on self-reported test anxiety were given and no control was provided for possible therapist effects.

In a more well controlled study, Allen (1971) studied the effectiveness of study counseling and desensitization in alleviating test anxiety in college students. Seventy-five volunteers were randomly assigned to one of two therapists, who provided training in (1) desensitization alone, (2) study counseling alone, (3) a combination of study counseling and desensitization, and (4) a placebo procedure. Ss were also assigned to two control groups. The experimental design in this study involved pre and posttreatment assessment of self-report, physiological, and academic performance variables. Results indicated that a combination of desensitization and study counseling was more effective in reducing physiologically measured anxiety and improving academic and examination performance than either technique alone. Also, desensitization and study counsel-
ing were not reliably different from each other, nor reliably more effective than the placebo procedure in improving academic performance.

In a study very similar to that of Allen (1971), Mitchell and Ng (1972) studied the effects of group counseling and behavior therapy on the academic achievement of test-anxious students. Ss who were selected for this study had high scores on test anxiety and low scores on study-skill competence. Thirty Ss were randomly assigned to five equal groups (N=6). In addition to a control group, there were four treatment groups: (1) desensitization, (2) counseling, (3) serial desensitization—counseling, and (4) combined desensitization. All groups received nine 50-minute sessions once a week. The same therapist conducted all four treatment groups. Desensitization procedures were based on those of Mitchell and Ingham (1970) and study counseling procedures were similar to those of Gilbreath (1968).

The effectiveness of treatment procedures was evaluated by changes in (1) test anxiety, (2) study habits, and (3) academic achievement. Measurements of treatment effects were conducted on five occasions (two pretreatment,
Session 3, posttreatment, and follow-up) and an analysis for group differences in trend was carried out on the mean scores for two components (test anxiety and study-habits) over the last four occasions. On the test anxiety factor, the serial desensitization, combined desensitization, and serial desensitization-counseling groups, while not different from one another, yielded a significantly (p < .05) greater slope component than the counseling only and no-treatment groups, which were not different from one another. On the study-habits factor, combined desensitization and serial desensitization-counseling groups, while not different from one another, yielded a significantly (p < .05) greater slope component than the other three groups which were not different from one another. These results indicate that serial or combined forms of desensitization and counseling produced significant improvements in both test anxiety and study habits; desensitization treatment alone produced improvement only in test anxiety; and counseling treatment only and no treatment produced no significant changes in either test anxiety or study habits. Additionally, post hoc contrasts indicated that the serial desensitization-counseling group and the combined desensitization
group while not different from one another, obtained significantly \((p < .05)\) greater improvement on academic performance and achievement than the groups receiving serial desensitization, counseling only, or no treatment.

The study by Mitchell and Ng is particularly relevant to the present study. Mitchell and Ng treated Ss whose scores on the Survey of Study Habits and Attitudes (SSHA) (Brown and Holtzman, 1955) indicated that these Ss were low in study-skill competence. Results indicated that neither systematic desensitization treatment alone or study-skills counseling alone facilitated improved study skills competence or academic performance. The authors concluded that: (1) a reduction in test anxiety is no guarantee of improved academic performance when the level of study-habit competence is ignored; and (2) attempts focused on the improvement of study skills competence and thus academic performance are of doubtful value if the poor study habits are imbedded and remain imbedded in a situation characterized by high test anxiety. The findings of Allen (1971), and Mitchell and Ng support the position of Gelder and Marks (1966) that single-model procedures are only partially effective when applied to relatively complex behavioral problems. Never-
theless, the role of poor study habits in the formation and
treatment of test anxiety is unclear. While it seems likely
that poor study habits may contribute to the formation of
test anxiety (Desiderato and Koskinen, 1969, found that high
debilitative anxiety Ss had poorer study habits than high
facilitative anxiety Ss), the assumption that all high test
anxious students have poor study habits would appear to be
unwarranted. Furthermore, while the systematic desensitiza-
tion of test anxiety may not facilitate academic improvement
for Ss of low study-skills competency (Mitchell and Ng,
1972), it may possibly facilitate both the reduction of self-
reported test anxiety and the improvement of academic per-
formance for Ss having suitable or moderately high study-
skills competency. In the present investigation, the
effect of desensitization treatment for Ss of high and low
study-skills competency will be examined.

**Summary**

In this chapter a considerable amount of literature was
reviewed. After a brief introduction concerning the proce-
dures involved in systematic desensitization, the literature
relating to the treatment of test anxiety by systematic
desensitization was examined. The review of this literature was divided into three main categories: (1) studies providing simple support for the efficacy of systematic desensitization in the treatment of test anxiety, (2) studies examining the parameters of desensitization in terms of the importance of component parts and the influence of variations in procedures, and (3) studies evaluating the efficacy of the desensitization of test anxiety in comparison to and in conjunction with other treatment strategies.

While numerous procedural confoundings were noted in many of the studies, combined results strongly suggest that desensitization is effective in reducing the level of self-reported test anxiety and, at times, in improving academic performance with college students. Furthermore, evidence is presented which indicates that a number of precautions suggested by Wolpe (1958) in regard to systematic desensitization procedures may not be necessary in the treatment of test anxiety by systematic desensitization. More specifically, data were presented which indicate that a variety of procedures involving either individual or group hierarchies presented in ascending or descending order may effectively reduce test anxiety. Also the possibility that test
anxiety may be treated by desensitization utilizing a dynamic cues hierarchy was explored. Furthermore, the efficacy of desensitization was noted in relation to such treatments as implosive therapy, rational-emotive therapy, reactive inhibition therapy, and study-skills counseling. Additionally, while the potential of combined desensitization and study counseling treatment was recognized, the need for further investigation concerning the effects of desensitization treatment with students of differing levels of study-skills competency was stressed.
CHAPTER III

METHODOLOGY

Design

A 2x4 factorial design, with two levels of study habits and four levels of treatment, was used in the investigation of the effectiveness of automated group systematic desensitization in the treatment of high test-anxious college students. Specifically, this study was conducted in an attempt to compare the effectiveness of symptom versus dynamic cues as hierarchical content in the systematic desensitization of high test-anxious college students. Also the importance of study habits in facilitating desensitization was examined.

The design included two treatment groups and two control groups, each having both high and low study habits Ss. The treatment groups were (1) symptom desensitization and (2) dynamic desensitization. The control groups were (1) pseudodesensitization and (2) assessment control. Originally a third treatment group (combined symptom and dynamic desensitization) was planned but dropped due to lack of Ss.
The dependent variables for this study were pre- and posttreatment measures on (1) Suinn Test Anxiety Behavioral Scale, or STABS (Suinn, 1969), (2) Taylor Manifest Anxiety Scale, or TMAS (Taylor, 1953), (3) examination scores from Psychology 100, and (4) Study Habits score on the Survey of Study Habits and Attitudes, or SSHA (Brown and Holtzman, 1955). Pretreatment measures were obtained approximately two weeks before treatment began. Posttreatment measures were obtained during the last session.

**Preliminary Testing**

Some preliminary testing was necessary before the primary objectives of this study could be accomplished. Of two sets of 24 items used to develop hierarchies in this study, the dynamic items (developed by E) were pretested to determine if sufficient variation of rated aversiveness existed so that a hierarchy of items gradually increasing in aversiveness could be formed. The second group of 24 items (symptom items) were adapted from Mitchell and Ingham (1971) and Emery and Krumboltz (1967) and were not pretested. In addition to the preliminary testing of hierarchy items, preliminary testing of tape-recorded treatment instructions was performed.
**Pretesting of Hierarchy Items**

The 24 items designed to represent dynamic aspects of test anxiety were rated on aversiveness by two samples of students. The first sample (82 undergraduates) rated items on a scale from 0 to 9, with 0 representing nonaversiveness and 9 representing extreme aversiveness. Because actual Ss in the study were to rate items from 1 to 5, a second sample of undergraduates (n=100) rated the items from 1 to 5, with 1 representing nonaversiveness and 5 representing extreme aversiveness.

All subjects in both samples were instructed to respond to each item in terms of the amount of anxiety they would probably experience in each situation. Table 1 shows the mean ratings and ranking of items.

Results indicated that items apparently elicited different amounts of anxiety among students. While the rankings of items were not identical for the two samples, many items were consistently rated as high or low by both samples. Also observation indicated that many individual items were rated within a wide range of aversiveness, suggesting variation in the anxiety level of students and individual differences in terms of reactions to specific items.
### TABLE 1
MEAN RATINGS AND RANKINGS OF DYNAMIC ITEMS ON AVERSIVENESS BY TWO SAMPLES

<table>
<thead>
<tr>
<th>Item</th>
<th>Sample 1 (n=86)</th>
<th>Sample 2 (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ratings (0-9)</td>
<td>Ranking</td>
</tr>
<tr>
<td>15.</td>
<td>You haven't sent a letter home for some time and your parents are coming to visit in two days</td>
<td>2.20</td>
</tr>
<tr>
<td>22.</td>
<td>Your parents are angry because you stayed out later than usual during the weekend</td>
<td>2.76</td>
</tr>
<tr>
<td>21.</td>
<td>You get into an argument about playing the stereo. Both you and your parents are angry</td>
<td>2.88</td>
</tr>
<tr>
<td>2.</td>
<td>Your mother is telling you that you have done a lousy job in helping her clean the house.</td>
<td>2.90</td>
</tr>
<tr>
<td>23.</td>
<td>You were supposed to stop and pick up some food at the store, you forgot, and your parents are angry</td>
<td>3.05</td>
</tr>
<tr>
<td>19.</td>
<td>You don't agree with the way your parents feel about religion so you tell them they are entitled to their beliefs but have no right to try to force them on you</td>
<td>3.10</td>
</tr>
<tr>
<td>4.</td>
<td>You have a date with a person whom your parents disapprove of. They are saying, &quot;How can you go out with someone like that?&quot;</td>
<td>3.52</td>
</tr>
<tr>
<td>Item</td>
<td>Sample 1 (n=86)</td>
<td>Sample 2 (n=100)</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>Mean ratings</td>
<td>Rank-ing</td>
</tr>
<tr>
<td></td>
<td>(0-9)</td>
<td></td>
</tr>
<tr>
<td>18. You disagree with your parents on racial issues and you angrily let them know it</td>
<td>3.54</td>
<td>8</td>
</tr>
<tr>
<td>13. You are telling your parents that you appreciate a lot of things about them but that you become angry when they criticize you</td>
<td>3.54</td>
<td>9</td>
</tr>
<tr>
<td>24. You were expected to have the car home by 4:30 because your parents had a meeting. You are caught in traffic and will be late</td>
<td>3.83</td>
<td>10</td>
</tr>
<tr>
<td>3. Relatives are visiting and your mother is describing how you just don't appreciate all the things she has done for you</td>
<td>3.93</td>
<td>11</td>
</tr>
<tr>
<td>5. You become angry when your parents keep complaining about your friends</td>
<td>3.95</td>
<td>12</td>
</tr>
<tr>
<td>20. Your parents are complaining that you never do anything well</td>
<td>4.10</td>
<td>13</td>
</tr>
</tbody>
</table>
### TABLE 1 (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Sample 1 (n=86)</th>
<th>Sample 2 (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ratings</td>
<td>Mean ratings</td>
</tr>
<tr>
<td></td>
<td>(0-9) Ranking</td>
<td>(1-5) Ranking</td>
</tr>
<tr>
<td>8. Your parents threaten to throw you out of the house if you raise your voice with them just once more</td>
<td>4.20 14</td>
<td>3.07 19</td>
</tr>
<tr>
<td>11. Your parents are saying that unless you can show more respect for us we won't continue to support you</td>
<td>4.24 15</td>
<td>2.84 11</td>
</tr>
<tr>
<td>9. You are thinking about trying to make it on your own because your parents have just told you that they will no longer provide any sort of financial assistance for you</td>
<td>4.28 16</td>
<td>3.22 21</td>
</tr>
<tr>
<td>7. You are telling your parents that you want to work at a summer camp and they say that unless you stay home for the summer they will not pay next quarter's tuition for you</td>
<td>4.31 17</td>
<td>3.21 20</td>
</tr>
<tr>
<td>16. You are driving down a narrow road. Your parents are with you and they are complaining about the way you drive</td>
<td>4.38 18</td>
<td>3.01 15</td>
</tr>
<tr>
<td>Item</td>
<td>Sample 1 (n=86)</td>
<td>Sample 2 (n=100)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Mean ratings (0-9)</td>
<td>Rank-</td>
</tr>
<tr>
<td>12. You have decided to tell your parents to stop complaining about all the things they don't like about you</td>
<td>4.47 19</td>
<td></td>
</tr>
<tr>
<td>6. You raise your voice and tell your parents to stop complaining about all the things they don't like about you</td>
<td>4.73 20</td>
<td></td>
</tr>
<tr>
<td>14. As you are telling your parents that you have decided to drop out of school they both angrily stare at you in disbelief</td>
<td>4.85 21</td>
<td></td>
</tr>
<tr>
<td>1. You have just put a scratch in your father's car as you were parking. Your father will be home in one hour</td>
<td>4.99 22</td>
<td></td>
</tr>
<tr>
<td>17. You have decided to get married to a person whom your parents strongly dislike. You know your parents will be very angry but you are going to tell them anyways.</td>
<td>5.39 23</td>
<td></td>
</tr>
<tr>
<td>10. After what seems like constant bickering from your parents, you become very angry and shout at them, &quot;Go to hell!&quot;</td>
<td>6.07 24</td>
<td></td>
</tr>
</tbody>
</table>

Note: Higher numbers represent greater amounts of anxiety.
Considering that student responses to these items were uniquely individual and that the possibility of developing dynamic items eliciting similar degrees of anxiety from all high test-anxious students was extremely remote, these 24 items were judged appropriate for the formation of a hierarchy to be used in systematic desensitization. Thus, during the second treatment session, these 24 items were presented in a random order to Ss receiving dynamic desensitization. Ss ranked these 24 items on 5-point scales, with 1 representing little aversiveness and 5 representing much aversiveness.

Pretesting of Tape-recorded Information

During Fall Quarter 1973, two groups of 15 undergraduate students listened to approximately two hours of tapes prepared for the study. The first group listened to the tape to be used for session one for all treatments and the tape to be used for session three of the symptom desensitization treatment. The second group listened to the tape to be used for session two for all treatments and part of the tape to be used for session three of the dynamic desensitization treatment.
After listening to 45 minutes of tape-recorded information, all Ss in both groups rated their experiences of relaxation, visualization, and anxiety on 7-point scales, with 1 representing very little and 7 representing very much of the particular variable. Table 2 presents the combined ratings of the two groups on these three variables.

**TABLE 2**

**MEAN RATINGS OF SELF-REPORTS ON RELAXATION, VISUALIZATION, AND ANXIETY AFTER ONE 45 MINUTE PRETESTING SESSION**

<table>
<thead>
<tr>
<th>Item</th>
<th>n</th>
<th>Mean rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. During today's session, I was able to maintain: very little relaxation — — — — — — — — relaxation</td>
<td>30</td>
<td>6.03</td>
</tr>
<tr>
<td>2. During today's session, I was able to maintain: very little success in visualizing — — — — — visualiza</td>
<td>30</td>
<td>5.39</td>
</tr>
<tr>
<td>3. During today's session, I experienced: little anxiety — — — — — — — anxiety</td>
<td>30</td>
<td>1.71</td>
</tr>
</tbody>
</table>

Note: Items represent 7-point scales, with 1 representing very little and 7 very much on each scale.
Results indicated that Ss experienced considerable relaxation and visualization and little anxiety. Results of Ss' ratings and behavioral indications of ability to follow instructions suggested that the prepared tapes were suitable for the treatment of groups having 15 members. Only minor adjustments were made in the tapes following the pretesting, primarily in volume and rate of speech.

Procedural Problems Encountered

As often occurs, some unanticipated difficulties appeared in this study and necessitated various methodological modifications. Major procedural problems stemmed from an insufficient subject population, inadequate facilities, and poor attendance.

The original design of this study included three experimental and two control groups, each consisting of an equal number (12) of Ss having high and low study habits. Planned experimental groups were (1) symptom desensitization, (2) dynamic desensitization, (3) combined symptom and dynamic desensitization. Control groups included (1) pseudodesensitization and (2) assessment control. Because too few Ss were available, the combined symptom and
dynamic desensitization treatment was deleted from the study. Also, an assessment control group was retained in the study but Ss in this category differed from Ss in the other groups in that assessment control Ss did not volunteer to participate in the entire study as did other Ss. Certainly the nature of the assessment control group severely restricted the potential usefulness of such a control procedure.

While the original design included equal sized groups balanced in terms of Ss' study habits level, scheduling difficulties necessitated the formation of seven groups (plus assessment control) of various sizes. Furthermore, attrition did occur, changing the composition of groups. Table 3 shows the composition of groups from pre- to post-treatment assessment.

Fourteen Ss did not show up at the beginning of the treatments and 16 more (including assessment control Ss) failed to attend all sessions or failed to provide information on all criteria. No systematic follow-up was undertaken on Ss who dropped out of the study. In general, dropouts reported not having sufficient time to continue treatment.
### TABLE 3

NUMBER OF SUBJECTS ATTENDING BY GROUPS FROM PRE- TO POSTTREATMENT ASSESSMENT

<table>
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<th>Treatments</th>
<th>Sessions</th>
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</table>

Note: H=High Study Habits; L=Low Study Habits

In addition to the deletion of the combined symptom and dynamic desensitization group from the study and the formation of unequal size groups, other planned procedures were modified. Because of Ss' expressed discomfort in being observed by E, scheduling difficulties, and a very small room, additional observers were not used to record Ss'
anxiety responses. Rather than having observers record Ss' indications of anxiety signaled by a raised forefinger, Ss made pencil marks on 3x5 cards when anxiety occurred.

A final methodological difficulty involved make-up sessions due to absenteeism. Of the 83 Ss included in the statistical analyses, 35 missed a total of 42 sessions. The breakdown was 11 Ss and 14 absences for the symptom desensitization groups, 14 Ss and 15 absences for the dynamic desensitization groups, and 10 Ss and 13 absences for the pseudodesensitization groups. Chi square analysis revealed nonsignificant differences in absences between the treatment groups ($X^2=.06, p > .50$). Also there were no significant differences between the groups in regard to the number of Ss missing sessions ($X^2=.52, p > .50$).

All sessions were made up individually or in small groups without E being present. Three Ss each completed one make-up session out of sequence. However, due to the nature of this study, automated desensitization with standardized hierarchies, and because these three Ss had post scores within one standard deviation of group mean scores, they were retained in the study.
Sample

During Fall quarter 1973, 424 female students, enrolled in Psychology 100, signed up to participate in the pretesting portion of this study. The study was described as one designed to help students reduce high test anxiety and only the participation of Ss experiencing nervousness concerning examinations was solicited.

During the pretesting hour, Ss responded to the STABS, the Study Habits portion of the SSHA, and the TMAS. Ss also completed an information sheet (Appendix B) designed to identify interested students. Of 139 students interested in further participation, 98 met the criterion for inclusion in this study by having scores at or above the 75th percentile on the STABS (raw score=142). This criterion was chosen after consideration of other research using a similar criterion (Aponte and Aponte, 1971) and because this cutoff point represented a reasonable compromise between obtaining a sufficiently large sample of Ss and still treating only highly test-anxious Ss.

Within two weeks of the pretesting, the 98 students meeting the criterion for the study were invited to participate further. Ss were informed that the remainder of the
study involved six sessions each approximately 45 minutes long and that, while meeting in a group, the focus of the study was directed toward individual participation while listening to tape-recorded information and instructions. Eighty-nine Ss agreed to participate in the remainder of the study. Using a median split, the 89 Ss were divided into high and low study habit groups (high=above 35, low=below 35) and randomly assigned, within the constraints of Ss and E's schedule, to the two desensitization and one pseudodesensitization treatments. Also 24 Ss chosen randomly from the remaining Ss meeting the criterion for inclusion in the study (but differing from the experimental groups in that they did not indicate interest in participating in the entire study) were assigned to an assessment control group. Assessment control Ss were merely told that additional people were needed to participate for another hour of experimental credit.

Treatments

Treatment procedures for the two desensitization and one pseudodesensitization groups were similar. Primary differences existed in the content of the hierarchies used
for each treatment. Instructions for all groups were pre-recorded and presented via a tape recorder. A number of studies (Aponte and Aponte, 1971; Donner and Guerney, 1968; and Krapfl and Nawas, 1970) have indicated that pre-programmed or standardized systematic desensitization procedures are as effective as individualized desensitization in alleviating anxiety.

Treatment consisted of six sessions, each lasting approximately 45 minutes. Sessions were held twice a week over a four-week period (no sessions were held during the third week due to a holiday). During session one Ss listened to a tape recording providing: (1) an introduction, including a rationale and explanation for treatment, (2) relaxation training and (3) visualization training. The rationale for treatment was similar to that described by Jones (1969) to Ss who were to receive desensitization treatment.

The introduction was presented as follows:

This is the first of six 45-minute sessions which we will spend together. The purpose of these sessions is to assist you in becoming less anxious about examinations. The goal is that you will gain more control over your anxiety.

All of the instructions for these sessions will be presented by tape recorder. One or two experi-
menters will be present during the sessions to perform some administrative tasks.

It is very important to listen to the recordings closely. The value of these sessions depends upon your listening closely to the instructions and performing each of the steps correctly.

Although we are meeting in a rather large group, the value of these sessions is not derived from being in a group. In fact, for most of the time that you are here you will be asked to relax with your eyes closed and attempt to imagine or visualize a number of situations. It is important that you concentrate on the procedures and that you remain silent so as not to disturb other participants.

Because different methods of helping students are being evaluated in this study, the experimenters may not be able to answer questions that you have about the study. Please hold your questions until after the sessions are over. At the end of the study all participants can obtain additional information.

Many students feel that they are unable to perform as well as possible on examinations because they are just too nervous. Because of their nervousness, students may not be able to concentrate well or they may experience such symptoms as headaches, nausea, or memory losses. The procedure to be used in this group is called systematic desensitization. Let me explain to you what is involved in systematic desensitization and how it works.

The first step in systematic desensitization is learning to relax. This step is very important because a person cannot be relaxed and tense at the same time. Relaxation and anxiety are incompatible responses. If you are relaxed, you cannot be anxious; if you are anxious, you cannot be relaxed. Since relaxation and anxiety cannot occur together, if I can help you to learn to relax yourself—and if you learn to do it by yourself in the future—then you should be able to gain some control over your anxiety. Relaxation is a skill that can
be improved with practice. At first, it will take about 25 minutes to go through the entire procedure properly. Eventually you will be able to relax yourself in 10-15 minutes or less. So learning to become very relaxed is the first step in systematic desensitization.

The next step in systematic desensitization is to learn to visualize situations with your eyes closed. Most people can do this without much practice, but through practice, visualizing situations becomes easier and more similar to the real situations. In order to help you learn to visualize situations more clearly you will be given some practice in visualization. When you clearly visualize or imagine a situation, your nervous system will react as if you were actually behaving in that way. Thus imagining situations while you are very relaxed will help you to be relaxed in the real situation.

The third step in systematic desensitization involves asking you to imagine certain situations while you are very relaxed. Because you are relaxed, any anxiety that you might normally experience while visualizing such scenes will be reduced. By gradually covering a variety of situations in this manner, the test anxiety a person experiences may be significantly reduced.

Relaxation training consisted of tensing and relaxing various muscle groups. During the first two sessions a 25-minute tape composed by E based on "a guide for training in muscle relaxation" from Osterhouse (1969) was utilized (Appendix A). Ss were instructed to close their eyes and tense and relax various muscle groups, including hands, arms, face, back, stomach, buttocks, legs, and feet progressing through 21 steps, each repeated twice with approximately
10 seconds of tensing and 10 seconds of relaxing. During the procedure Ss were asked to focus all of their attention on the muscle groups being relaxed, and Ss were continually instructed to allow themselves to relax and given suggestions of calmness and relaxation.

Also during the first session a 10-minute tape for training in visualization was played. This tape was also produced by E and consisted of descriptions of neutral scenes (Appendix A). The scenes described were: (1) sitting on the Oval, (2) walking through a supermarket, and (3) sitting in front of a fireplace.

At the end of session one, Ss were provided with a handout on muscle relaxation and encouraged to practice relaxation for 15 minutes a day (Appendix A). In addition a chart to record practice sessions was provided (Appendix A). However, Ss were entirely on their own in regard to practice and no feedback was obtained on how often Ss practiced.

During session two, Ss listened to the 25-minute relaxation tape again and also to a second 10-minute visualization tape describing scenes of (1) looking at a stream, (2) riding in a car, and (3) watching a commercial on television (Appendix A). At the end of session two, Ss in the
desensitization treatments rated items in their respective hierarchies. Pseudodesensitization Ss did not rate the items in their hierarchy.

Treatment for sessions three through six consisted of additional relaxation training and desensitization proper. The relaxation training was a shorter version of the 25-minute tape used in the first two sessions. Instead of the 21 steps, relaxation procedures involved approximately 10 steps and lasted about 15 minutes. Gross muscle groups were focused on because Ss should be able to relax more quickly as sessions progress. Desensitization proper was conducted in a manner similar to that used by Aponte and Aponte (1971). Beginning with number 1 (least aversive), each item was presented six times via a tape recorder. The item was presented twice for each of 5, 10, and 20 second time segments. Twenty seconds of relaxation followed each presentation and 45 seconds of relaxation followed the completion of each hierarchy item. The time required for the complete presentation of an item was about four minutes; thus, six items were presented during each session. To facilitate relaxation, E offered suggestions of heaviness, calmness, and relaxation.
The procedure for desensitization proper was designed to ensure very slow progression so that even the slowest S could progress without excessive anxiety being generated. Also, Ss were instructed to make small pencil marks on 3x5 index cards whenever they experienced anxiety during the presentation of hierarchy items. Ss' indications of anxiety were totaled at the end of sessions. In addition, at the end of sessions, Ss were asked to rate their relaxation, visualization, and anxiety experienced during the session on 7-point scales, with 1 representing little and 7 representing very much on each scale.

Although procedures were standardized and presented via tape recorder, E (also serving as therapist) was present. Donner and Guerney (1968) suggested that having a therapist present may improve the attention of Ss.

Treatment I. Group systematic desensitization with a symptom cues hierarchy (symptom desensitization).

The rationale for this treatment was the same as for traditional systematic desensitization. High test anxiety is assumed to be similar to other phobic reactions, such as claustrophobia and acrophobia, in that anxiety responses have been conditioned to certain situations, in the case
of test anxiety, situations associated with examinations. From a behavioral perspective, how the test anxiety originated in terms of specific causal events is not of primary importance. What is more important is that test anxiety is assumed to be a conditioned response which can be modified through systematic desensitization. Thus procedures in this group were designed to counteract anxiety responses by the presentation of symptom cues hierarchy items in a gradual ascending order of increasing aversiveness while Ss are in a deep state of relaxation.

At the end of session 2, Ss rated symptom items on a 5-point scale of aversiveness. The following order resulted from the ratings:

1. Hearing about someone else who has a test.
2. Studying, two weeks before a test.
3. Several days before a test and you are studying.
4. Hearing your instructor announce a test to be given in three weeks.
5. Studying, five days before a test.
6. Eating breakfast on the morning of a test day.
7. Seeing other students entering the test room.
8. Waking up on the morning of a test day.
9. Finding a seat inside the test room and sitting down.
10. Studying, two days before a test.
11. Walking to the test room.
12. Walking into the test room.
13. Talking with students outside the test room.
14. Studying, the day before a test.
15. Studying, the night before a test.
16. Finding that the test is longer than you expected.
17. Seeing others finish the test while you are still taking it.
18. Studying and wondering how you will remember information when the test comes.
19. Waiting for the test paper to be passed out.
20. Discovering some notes that you haven't completely studied.
21. Getting the test paper and looking it over.
22. Studying and coming across information that you do not understand.
23. Having 20 minutes worth of test material left to do with only 10 minutes left in the period.
24. Seeing a question on the test that you do not know the answer to.

Treatment II. Group systematic desensitization with a dynamic cues hierarchy (dynamic desensitization)

While behavioral formulations suggest that appropriate items for hierarchies in desensitization represent external behaviors or symptom cues, the possibility that phobic behavior might be extinguished when desensitization is directed toward hypothesized internal threats has not been tested (Bandura, 1969). Group II was designed to represent desensitization directed toward hypothesized internal threats associated with test anxiety as discussed by Sarason et al. (1960). They hypothesized that the high-test-anxious child has been negatively evaluated by his parents in "test-like" situations prior to school. The child was
angered and frustrated by his parents' criticism but he felt unable to express his hostility because he feared possible retaliation and rejection from his parents on whom he was very dependent.

While a number of phobias, such as snake phobia (Fenichel, 1945), claustrophobia (Cameron, 1963), and acrophobia (Cameron, 1963), have been assumed by some writers to represent internal threats, numerous studies (Bandura, Blanchard and Ritter, 1969; Lang, Lazovik and Reynolds, 1965; Paul, 1967) have indicated that successful neutralization of emotional responses to phobic stimuli, without considering possible internal threats, creates stable decreases in avoidance behavior. Such research suggests that the view that avoidance behavior is controlled by displaced and projected internal fears is of doubtful validity or, possibly, that neutralization of external symptom behaviors (representing projective stimuli) is a powerful means of extinguishing the arousal properties of unconscious internal events (Bandura, 1969). At any rate, the value of using a dynamic (hypothesized internal threat) cues hierarchy in desensitization is testable.
Furthermore, a recent study by Prochaska (1971) evaluating the efficacy of implosive therapy in the treatment of test anxiety suggested that test anxiety may consist of anxiety associated with both test taking and internal threats. Prochaska (1971) found that both symptom and dynamic cues groups improved significantly more on self-reports of test anxiety and academic performance than general anxiety cues, neutral cues, or no treatment control groups. Also, Prochaska stressed the need to begin to identify types of phobic behavior anxieties which may be treatable by focusing on both dynamic and symptom cues. Prochaska suggested that it is unwise to focus on one type of cues, due to theoretical orientation, without sufficient empirical support discounting the potential benefit of focusing on other types of cues.

During session two, Ss rated items (derived from situations which seemed to contain elements of underlying fears believed to be important in the formation of test anxiety according to Sarason et al. (1960) from 1 to 5 according to aversiveness, with 1 being nonaversive and 5 being very aversive. The following order resulted from the ratings:
1. You haven't sent a letter home for some time and your parents are coming to visit in 2 days.
2. You don't agree with the way your parents feel about religion so you tell them they are entitled to their beliefs but have no right to try to force them on you.
3. Your mother is telling you that you have done a lousy job in helping her clean the house.
4. You are telling your parents that you appreciate a lot of things about them but that you become angry when they criticize you.
5. You disagree with your parents on racial issues and you angrily let them know it.
6. You were supposed to stop and pick up some food at the store, you forgot, and your parents are angry.
7. Your parents are angry because you stayed out later than usual during the weekend.
8. You get into an argument about playing the stereo. Both you and your parents are angry.
9. You are driving down a narrow road. Your parents are with you and they are complaining about the way you drive.
10. Your parents threaten to throw you out of the house if you raise your voice with them just once more.
11. You have a date with a person whom your parents disapprove of. They are saying, "How can you go out with someone like that?"
12. Your parents are saying, "Unless you can show more respect for us we won't continue to support you."
13. You are telling your parents that you want to work at a summer camp and they say that unless you stay home for the summer they will not pay next quarter's tuition for you.
14. You were expected to have the car home by 4:30 because your parents had a meeting. You are caught in traffic and will be late.
15. Relatives are visiting and your mother is describing how you just don't appreciate all the things she has done for you.
16. Your parents are complaining that you never do anything well.
17. You are thinking about trying to make it on your own because your parents have just told you that they will no longer provide any sort of financial assistance for you.

18. You become angry when your parents keep complaining about your friends.

19. You have decided to tell your parents that it really makes you angry that they are trying to tell you how to live your life.

20. You have just put a scratch in your father's car as you were parking. Your father will be home in one hour.

21. As you are telling your parents that you have decided to drop out of school they both angrily stare at you in disbelief.

22. You raise your voice and tell your parents to stop complaining about all the things they don't like about you.

23. After what seems like constant bickering from your parents you become very angry and shout at them, "Go to hell!"

24. You have decided to get married to a person whom your parents strongly dislike. You know your parents will be very angry but you are going to tell them anyways.

Treatment III. Pseudodesensitization with a neutral cues hierarchy (pseudodesensitization)

Group III was designed to serve as a control group to ascertain the importance of having aversive items in the hierarchy utilized in desensitization. The procedures for this group were similar to those used by Davison (1968) in a control procedure called pseudodesensitization which involved the pairing of relaxation with an anxiety hierarchy.
consisting of items irrelevant to target behaviors. Krapfl and Nawas (1970) have also utilized such a pseudodesensitization group as a control for nonspecific factors such as expectancy, commitment, relationship, attention, and suggestion.

Hierarchy items for pseudodesensitization Ss were presented in the following order:

1. Looking at a waterfall.
2. Standing on a street corner watching an approaching bus.
3. Looking out a window and seeing puddles after a sudden rain.
4. Walking down the street and noticing some flowers.
5. Seeing a squirrel climbing a tree.
7. Seeing a dry, rocky stream bed.
8. Looking at a tree that is just beginning to form buds.
9. Looking at a mailbox and seeing the approaching mail truck.
10. Sitting at a beach with your feet in the water.
11. Throwing a stone into the river and seeing the splash.
12. Watching a duck swimming.
13. Looking at a rainbow.
14. Watching a sunset.
15. Looking at a mountain in the distance.
16. Looking into the sky and seeing some very white clouds.
17. Looking at a large church steeple.
18. Looking at the lights of a city from a distance.
20. Looking at a wall thermometer.
22. Looking at a large field of ripened corn.
23. Relaxing in a bathtub.
24. Watching two kittens playing in the grass.
Treatment IV. Assessment control group

Group IV was composed of Ss randomly chosen from the remaining pool of Ss after the desensitization and pseudo-desensitization groups were established. However assessment control Ss differed from Ss in other treatments in that assessment control Ss did not indicate an interest in participating in the entire study as did other experimental Ss. Assessment control Ss received pre- and posttreatment testing to control for the effects of being in a study and the possible effects of taking the measuring instruments.

Figure 1 presents a summary of treatment conditions.

<table>
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<tr>
<th>Study Habits</th>
<th>Treatments</th>
<th>Symptom desensitization</th>
<th>Dynamic desensitization</th>
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Figure 1. Summary Figure of Treatment Conditions
Suinn Test Anxiety Behavior Scale

The Suinn Test Anxiety Behavior Scale (STABS) (Suinn, 1969) was developed to provide a measure which would be valuable in the behavioral treatment of test anxiety. It was designed to (1) serve either as a diagnostic tool or as an aid in the development of anxiety hierarchies, (2) provide normative data, and (3) provide information on changes in scores occurring without treatment.

The STABS is a 50-item scale composed of behavioral situations which may cause considerable test anxiety in students. The author does not indicate how he arrived at the inclusion of these 50 items for the scale. However, a wide variety of situations and behaviors were included in the scale so that it would be applicable to a wide range of clients. Also, since clients rate each item on a 1 to 5 scale of the degree of the anxiety they experience in that situation, anxiety hierarchies can be easily constructed. In scoring, a value of 1 is assigned to "not at all anxious" and a value of 5 is assigned to "very much anxious." High scores reflect high levels of test-taking anxiety.
Two separate samples were utilized in the collection of normative data. The first sample consisted of 75 students from a large state university in Hawaii. The second sample consisted of 158 students from a state university in Colorado. Both samples were administered the STABS twice in order to provide reliability data. The first sample responded to the STABS the second time after a six-week period and the second sample after four weeks.

Test and retest mean scores were significantly different for the two samples. The Hawaiian sample initially had a mean score of 145.76 (S.D.=34.93) and later had a mean score of 135.42 (S.D.=32.67). The Colorado sample initially had a mean score of 122.00 (S.D.=30.46) and later had a mean score of 114.22 (S.D.=32.56). Differences between groups may be accounted for by differences between Oriental and Caucasian students. The following table was provided by Suinn to indicate the percentile ranking for various raw scores on the STABS for the Caucasian sample.

Suinn reported that test-retest reliability coefficients were .74 for sample 1 and .78 for sample 2. He indicated that these scores were comparable to the reliabilities for the Taylor Manifest Anxiety Scale (.80) and the Fear Survey
Schedule (.72), both of which are often used in clinical practice.

**TABLE 4**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Raw Score on STABS</th>
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</table>

*I = first examination of a client  
II = second or retesting of a client

Suinn attempted to substantiate the validity of the STABS by (1) comparing it to the Test Anxiety Scale (TAS) (Sarason, 1957) and (2) correlating STABS scores with academic performance. Comparison of the STABS and TAS indicated a significant association with r=.59 (p < .001) for students from Hawaii and r=.60 (p < .001) for students
from Colorado. Also, results indicated that STABS performance was significantly correlated with numbers of errors in examinations ($r = .24$, $p < .05$, sample 1) and final grade ($r = .26$, $p < .05$, sample 1; $r = -.28$, $p < .02$, sample 2) in an introductory psychology course.

**Taylor Manifest Anxiety Scale (TMAS)**

Taylor developed the TMAS in 1951 as an instrument to be used for experimental purposes only. The scale was published in 1953. Actually, while Taylor has interpreted the TMAS as a measure of general drive, items on the TMAS were originally selected on the basis of their ability to detect clinical anxiety.

The items of the TMAS were selected from the Minnesota Multiphasic Personality Inventory (MMPI). Clinicians choose items for the TMAS which fit Cameron's description of chronic anxiety reactions (Taylor, 1953). Initially 65 items were chosen. Later modifications reduced the scale to the 50 items having the highest correlation with the total anxiety score. In order to obtain optimal accuracy, Taylor added 175 buffer items (also from the MMPI, but judged non-indicative of anxiety) to the scale. Scores on
the TMAS are determined by counting the number of anxiety responses, which may be true or false, depending on the item. Scores can range from a low of 0 to a high of 50. For the benefit of subjects the TMAS is referred to as "Biographical Inventory."

Test-retest reliability of the scale over three weeks yielded a Pearson Product Moment Coefficient of .89. After five months the coefficient was .82 and after 9-17 months period .81 (Taylor, 1953).

The validity of the TMAS has been evaluated primarily by two methods. These methods are correlating TMAS scores with independent clinical judgments and with scores on other instruments purported to measure manifest anxiety. Some evidence exists supporting the validity of the TMAS. There is positive evidence for a relationship between clinical judgments of anxiety and TMAS scores and between scores on other anxiety instruments and TMAS scores.

A comparison of the scores of 1971 beginning psychology students and 103 neurotic and psychotic patients was made. The former group had a median score of approximately 14, with 20 percent of the group having scores above 21. The latter group had a median score of approximately 34,
which was equivalent to the 98.8th percentile of the student group. Taylor interpreted these findings as supporting the view that there is some relationship between the anxiety-scale and clinical observation of manifest anxiety (Taylor, 1953, p. 290).

Durkee, Buss, Wiener and Baer (1955) found a correlation of .60 between pooled ratings of overall anxiety manifestations (as defined in textbooks) and scores on the TMAS. Eriksen and Davids (1955) found a significant correlation in the expected direction between scores on the TMAS and clinical evaluation of various personality traits, theoretically associated with anxiety. Sampson and Bindra (1954) found a significant difference between the mean scores on the TMAS obtained by normals and by neurotics. Rosenbaum (1950) found that both TMAS scores and psychological ratings yielded similar results in the process of dividing subjects into groups of high and low anxiety. Kendall (1954) suggested that the TMAS may be effectively used to select extreme anxiety groups. He found a significant correlation between Manifest Anxiety Rating Scale (MARS) constructed according to Cameron's description of manifest anxiety, and used by ward nurses for rating the anxious behavior of
chronically ill T.B. patients, and the TMAS scores of the 13 percent top and bottom scores. Siegman (1956) has also contributed data on the construct validity of the TMAS. He found (1) a significant correlation between clinical evaluation and TMAS scores; (2) significantly higher TMAS scores for "anxiety reaction" patients than for all other categories of patients; and (3) significantly lower TMAS scores for "psychopathic" patients than for all other categories of patients.

Support for the construct validity of the TMAS has also been obtained by finding a significant positive relationship between its scores and scores on other instruments' purporting to measure anxiety. Holtzman, Calvin and Bitterman (1952) found a correlation of .86 between TMAS scores and scores on the Winne Scale of Neuroticism.

However, there has been some negative evidence reported about the construct validity of the TMAS. Sampson and Bindra (1954) found no significant differences on TMAS scores between anxiety patients and patients diagnosed as belonging to other clinical categories. Anxious patients tended to fall into the middle range of the distribution of scores (19-33), while scores obtained by other patients
fell at the two extremes. Extremely high scores on the TMAS seemed to be correlated with clinical judgments of depression rather than manifest anxiety. Sampson and Bindra concluded that the TMAS does not measure degrees of manifest anxiety and should only be used to separate individuals who are likely to be classified as anxious by clinical evaluation.

Bitterman and Holtzman (1952) found no relationship between anxiety measured by the TMAS and anxiety measured by the Roschach, and inferred from a clinical evaluation of behavior in a stress situation.

Considering the positive and negative data concerning the validity of the TMAS, the following conclusions seem warranted:

1. The TMAS seems to have some relationship to clinical diagnosis and sufficiently distinguishes between normal and patient groups to be clinically useful.

2. Conceivably, some of the inadequacies in the TMAS may be due to the lack of a consensual definition of anxiety. Thus, the lack of a more satisfactory relationship between TMAS scores
and clinical evaluations of anxiety may be due in part to inadequate and variable clinical evaluation.

3. While the TMAS has proved successful in separating subjects on the basis of extreme scores, it has not been particularly successful in establishing a continuum of degree of anxiety.

Overall, the advantages of the TMAS as an operational criterion for manifest anxiety seem to outweigh the disadvantages. While the TMAS is a self-report instrument and as such is subjected to a number of weaknesses, the reported research indicates that the TMAS does have some value as an instrument for measuring anxiety.

In the present study the TMAS was utilized to obtain pre and posttreatment measures of manifest (generalized) anxiety.

Survey of Study Habits and Attitudes (SSHA)

The development of the SSHA was started with the development of a 188-item preliminary questionnaire derived from the literature and a series of discussions with college students. After two revisions the 75-item SSHA was
published in 1953. Attempts at validation were made by comparison of SSHA scores to one-semester grade point averages. Using a sample of 3,560 freshmen, validity coefficients for the SSHA ranged from .27 to .66 for men, and from .26 to .65 for women. The average for men was .42 and for women .45. Correlations between SSHA scores and grade-point averages were significant and positive, while the correlations between the SSHA and the American Council on Education Psychological Examination (ACE) were consistently low.

Because the original form had separate scoring keys for males and females, did not utilize all items, and provided only one score, revisions were undertaken to provide a scale more useful for counseling. The developmental work on the new form (Form C) involved three stages. First, new items were developed to cover new attitudinal areas. Second, subscales were developed to aid in diagnosis and prognosis. Third, the usefulness of the derived subscales was evaluated.

Thus a 100-item SSHA questionnaire, having four subscales was developed. The subscales are Delay Avoidance, Work Methods, Education Acceptance, and Teacher Approval. Systematic evaluation of the use of the subscales in academic counseling indicated that counseled freshmen, when compared to uncounseled freshmen, generally earned better grades in
their initial semester in college. However, no control pro-
cedure for the effects of academic counseling without the
use of the SSHA subscales was provided. While using SSHA
subscales may facilitate academic counseling, this possibility
needs to be experimentally investigated.

Only the Delay Avoidance and Work Methods subscales,
making up the Study Habits score, were used in the present
study. Thus a total of 50 items were utilized to assess
students' study habits.

The lowest SSHA form C subscale reliability coefficient
(K-R8) is .87. The lowest four-week test-retest coefficient
is .88. The lowest fourteen-week test-retest coefficient
is .83.

Evidence for validity was presented in terms of low
correlation coefficients (mean .21 for Form C) between SSHA
and aptitude tests and higher correlations (mean .36 for
Form C) between SSHA and grades. Brown and Holtzman inter-
preted these findings as suggesting that the SSHA is related
to grades but not just a measure of ability.

**Hypotheses**

The following hypotheses were tested in the present
study:
1. Groups will differ on STABS scores following treatment.

1.1 Symptom desensitization Ss (S) will improve more on STABS scores than Dynamic desensitization Ss (D).
1.2 Dynamic desensitization Ss (D) will improve more on STABS scores than Pseudodesensitization Ss (P).
1.3 Pseudodesensitization Ss (P) will improve more on STABS scores than Assessment control Ss (A).
1.4 High Study Habit S Ss will improve more on STABS scores than Low Study Habits S Ss.

2. Groups will differ on TMAS scores following treatment.

2.1 D Ss will improve more on TMAS scores than S Ss.
2.2 S Ss will improve more on TMAS scores than P Ss.
3.3 P Ss will improve more on TMAS scores than A Ss.

3. Groups will differ on TEST scores following treatment.

3.1 S Ss will improve more on TEST scores than D Ss.
3.2 D Ss will improve more on TEST scores than P Ss.
3.3 P Ss will improve more on TEST scores than A Ss.
3.4 High Study Habit S Ss will improve more on TEST scores than Low Study Habit S Ss.

Analysis

Data collected in this study was analyzed primarily through multivariate analyses of variance. Also correlated t-tests to determine the significance of within cell pre-post changes were utilized. In addition, all possible comparisons of pairs of means were performed following significant F's for main effects and interactions.
CHAPTER IV

RESULTS AND DISCUSSION

This study was carried out in an attempt to investigate the importance of hierarchical content in the systematic desensitization of high test anxious college students. Of primary concern was the investigation of differences between treatment groups in changes on self-reports of test anxiety. Also of concern were changes in study habit scores, general anxiety scores, and examination scores. In addition, attempts were made to investigate the importance of study habits in regard to changes on various criteria. Finally, treatment groups were compared on some additional measures not included in the hypotheses formulated for this study. Results of scores on these measures (relaxation, visualization, anxiety, and expectancy) are included in Appendix C.

Results

This section is subdivided into four smaller sections each of which presents the results for one of the four variables. Each subsection follows a similar format in pre-
senting the results. Initially pre- and posttreatment mean scores and standard deviations are presented. Subsections also contain the results of univariate F tests for Study Habit (S) effects, Treatment (T) effects, and Study Habit X Treatment (ST) effects from a Multivariate Analysis of Variance (MANOVA) program.

In subsections where F-tests for pretest scores are significant ($p < .10$), additional MANOVA procedures were utilized with pretest scores as covariates. Also, where appropriate, post hoc tests of differences between means are presented.

**Effects of Experimental Treatments on STABS Scores**

Table 5 presents the pre and posttreatment mean STABS scores and standard deviations for the experimental and control groups. Also shown are the mean change scores from pre to posttreatment.

Table 6 presents the results of univariate F tests for pre and posttreatment scores on STABS. Results indicate that the ST interaction effect was significant ($p < .10$) for pretreatment scores on STABS. Also there was a significant ($p < .05$) main effect for T on posttreatment scores on STABS. No other F tests were significant.
<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>HS</td>
<td>169.600</td>
<td>21.104</td>
<td>139.700</td>
</tr>
<tr>
<td>HD</td>
<td>178.900</td>
<td>23.830</td>
<td>134.100</td>
</tr>
<tr>
<td>HP</td>
<td>184.273</td>
<td>24.707</td>
<td>125.545</td>
</tr>
<tr>
<td>HA</td>
<td>170.818</td>
<td>10.352</td>
<td>136.545</td>
</tr>
<tr>
<td>LS</td>
<td>180.200</td>
<td>23.175</td>
<td>128.300</td>
</tr>
<tr>
<td>LD</td>
<td>179.923</td>
<td>19.543</td>
<td>147.769</td>
</tr>
<tr>
<td>LP</td>
<td>163.667</td>
<td>17.762</td>
<td>125.333</td>
</tr>
</tbody>
</table>

Note: Asterisks denote the significance of within cell pre- to posttreatment change scores as determined by correlated t-tests.

* p < .05
** p < .01
*** p < .001

H=High Study Habits; L=Low Study Habits; S=symptom desensitization; D=dynamic desensitization; P=pseudo-desensitization; A=assessment control.
TABLE 6

SUMMARY OF UNIVARIATE F TESTS FOR STUDY HABITS, TREATMENT, AND STUDY HABITS X TREATMENT EFFECTS ON PRE AND POSTTREATMENT SCORES ON STABS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Pre</th>
<th></th>
<th>Post</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MS</td>
<td>F</td>
<td>MS</td>
<td>F</td>
</tr>
<tr>
<td>Study Habits</td>
<td>1</td>
<td>8.98</td>
<td>0.02</td>
<td>1933.84</td>
<td>1.99</td>
</tr>
<tr>
<td>Treatments</td>
<td>3</td>
<td>105.51</td>
<td>0.25</td>
<td>2670.46</td>
<td>2.75*</td>
</tr>
<tr>
<td>Study Habits X Treatment</td>
<td>3</td>
<td>1056.47</td>
<td>2.59**</td>
<td>2056.58</td>
<td>2.11</td>
</tr>
<tr>
<td>Error</td>
<td>75</td>
<td>408.27</td>
<td></td>
<td>970.37</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05

** p < .10

Since there were significant differences between treatments on posttreatment STABS scores, tests on differences between all pairs of treatment means were performed using the Tukey (a) procedure adjusted for unequal sample sizes (Winer, 1962, 102). Table 7 shows the results of the Tukey (a) test. The only significant difference occurred between the pseudodesensitization and assessment control groups. Figure 2 presents a schematic representation of the treatment means.
### TABLE 7
TUKEY (a) COMPARISONS ON POSTTEST TREATMENT MEAN SCORES ON STABS

<table>
<thead>
<tr>
<th>Group</th>
<th>Symptom desensitization</th>
<th>Dynamic desensitization</th>
<th>Assessment control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudo desensitization</td>
<td>8.55</td>
<td>16.38</td>
<td>27.20*</td>
</tr>
<tr>
<td>Symptom desensitization</td>
<td>-</td>
<td>7.83</td>
<td>18.65</td>
</tr>
<tr>
<td>Dynamic desensitization</td>
<td>-</td>
<td>-</td>
<td>10.82</td>
</tr>
</tbody>
</table>

*\( p < .05 \)

Because there were significant \( (p < .10) \) ST interaction effects on pretreatment STABS scores, additional MANOVA procedures were performed with pretest scores as a covariate and posttest scores as a variate. Results of ST interaction effects with pretest scores as a covariate are shown in Table 8. The F test was significant \( (p < .10) \) and tests on differences between all pairs of adjusted means were performed using F tests designed for post hoc comparisons (Winer, 1962, 592-600). Results indicate that there were no significant differences between adjusted cell means on post-
Figure 2. Mean Pretest and Posttest Treatment Scores on the STABS
test STABS scores. Table 9 shows the differences between adjusted cell means on posttest STABS scores.

TABLE 8

SUMMARY OF MANOVA WITH PRETEST SCORES AS COVARIATE FOR STUDY HABITS X TREATMENT EFFECTS ON STABS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Habits X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>3</td>
<td>2261.35</td>
<td>2.29*</td>
</tr>
<tr>
<td>Error</td>
<td>74</td>
<td>988.25</td>
<td></td>
</tr>
</tbody>
</table>

*P < .10

Effects of Experimental Treatments on TMAS Scores

Table 10 presents the pre and posttreatment mean TMAS scores and standard deviations for the experimental and control groups. Also shown are the mean change scores from pre to posttreatment.
### Table 9

**Differences Between Adjusted Posttest Group Mean Scores on STABS**

<table>
<thead>
<tr>
<th>Group</th>
<th>HD</th>
<th>LS</th>
<th>LP</th>
<th>HA</th>
<th>HS</th>
<th>LD</th>
<th>IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP</td>
<td>1.80</td>
<td>5.45</td>
<td>12.40</td>
<td>19.89</td>
<td>23.85</td>
<td>25.10</td>
<td>49.02</td>
</tr>
<tr>
<td>HD</td>
<td>-</td>
<td>3.65</td>
<td>11.60</td>
<td>18.09</td>
<td>22.05</td>
<td>23.30</td>
<td>47.22</td>
</tr>
<tr>
<td>LS</td>
<td>-</td>
<td>-</td>
<td>7.95</td>
<td>14.44</td>
<td>18.40</td>
<td>19.65</td>
<td>43.57</td>
</tr>
<tr>
<td>LP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.49</td>
<td>10.45</td>
<td>11.70</td>
<td>35.62</td>
</tr>
<tr>
<td>HA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.96</td>
<td>5.21</td>
<td>29.13</td>
</tr>
<tr>
<td>HS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.25</td>
<td>25.17</td>
</tr>
<tr>
<td>LD</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>23.92</td>
</tr>
</tbody>
</table>

**Note:** To obtain $F_{.95}(1,74) = 3.98$ a difference between groups of 68.29 would have to exist.

H=High Study Habits; L=Low Study Habits; P=Pseudo desensitization; D=Dynamic desensitization; S=Symptom desensitization; A=Assessment control.

Table 11 presents the results of univariate F-tests for pre and posttreatment scores on TMAS. Results indicate that the S effect was significant ($p < .05$) for pretreatment scores on TMAS. No other F's were significant.
TABLE 10
MEANS, STANDARD DEVIATIONS, AND PRE-POST CHANGE SCORES FOR EXPERIMENTAL AND CONTROL GROUPS ON TMAS

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>HS</td>
<td>29.20</td>
<td>6.71</td>
<td>23.80</td>
</tr>
<tr>
<td>HD</td>
<td>26.80</td>
<td>9.54</td>
<td>18.70</td>
</tr>
<tr>
<td>HP</td>
<td>26.18</td>
<td>10.55</td>
<td>19.00</td>
</tr>
<tr>
<td>HA</td>
<td>22.45</td>
<td>6.52</td>
<td>17.36</td>
</tr>
<tr>
<td>LS</td>
<td>26.70</td>
<td>6.63</td>
<td>19.90</td>
</tr>
<tr>
<td>LD</td>
<td>33.31</td>
<td>6.51</td>
<td>22.15</td>
</tr>
<tr>
<td>LP</td>
<td>30.44</td>
<td>7.75</td>
<td>22.00</td>
</tr>
<tr>
<td>LA</td>
<td>27.56</td>
<td>10.97</td>
<td>28.89</td>
</tr>
</tbody>
</table>

Note: Asterisks denote the significance of within cell pre- to posttreatment change scores as determined by correlated t-tests.

*p < .05
**p < .01
***p < .001

H=High study habits; L=Low study habits; S=Symptom desensitization; D=Dynamic desensitization; P=Pseudo-desensitization; A=Assessment control
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Pre MS</th>
<th>Pre F</th>
<th>Post MS</th>
<th>Post F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Habits</td>
<td>1</td>
<td>289.18</td>
<td>4.24*</td>
<td>240.67</td>
<td>2.59</td>
</tr>
<tr>
<td>Treatment</td>
<td>3</td>
<td>101.91</td>
<td>1.50</td>
<td>25.32</td>
<td>0.27</td>
</tr>
<tr>
<td>Study Habits X Treatment</td>
<td>3</td>
<td>82.21</td>
<td>1.21</td>
<td>197.95</td>
<td>2.13</td>
</tr>
<tr>
<td>Error</td>
<td>75</td>
<td>68.14</td>
<td></td>
<td>93.03</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05

Because there were significant S effects on pretreatment TMAS scores, additional MANOVA procedures were performed with pretest scores as a covariate. Results are shown in Table 12. The F-test was nonsignificant, indicating that there was no significant difference in changes on TMAS scores between High and Low Study Habit Ss.
TABLE 12

SUMMARY OF MANOVA WITH PRETEST SCORES AS COVARIATE FOR STUDY HABITS EFFECTS ON TMAS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study habits</td>
<td>1</td>
<td>10.01</td>
<td>0.20</td>
</tr>
<tr>
<td>Error</td>
<td>74</td>
<td>49.35</td>
<td></td>
</tr>
</tbody>
</table>

Effects of Experimental Treatments on TEST Scores

Table 13 presents the pre and posttreatment mean TEST scores and standard deviations for the experimental and control groups. Also shown are the mean change scores from pre to posttreatment.

Table 14 gives the results of univariate F-tests for pre and posttreatment TEST scores. Results indicate that there was a significant S effect for both pre and posttreatment mean TEST scores. No other F's were significant.

Because there were significant (p < .05) S effects on pretest test scores, additional MANOVA procedures were performed with pretest scores as covariate. Results are shown in Table 15. The F was significant (p < .10) indicating that High and Low Study Habit Ss differed in their
### TABLE 13

MEANS, STANDARD DEVIATIONS, AND PRE-POST CHANGE
SCORES FOR EXPERIMENTAL AND CONTROL
GROUPS ON TEST<sup>a</sup>

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>HS</td>
<td>84.20</td>
<td>13.65</td>
<td>90.40</td>
</tr>
<tr>
<td>HD</td>
<td>87.40</td>
<td>19.51</td>
<td>89.10</td>
</tr>
<tr>
<td>HP</td>
<td>91.82</td>
<td>13.16</td>
<td>86.91</td>
</tr>
<tr>
<td>HA</td>
<td>88.36</td>
<td>13.26</td>
<td>89.36</td>
</tr>
<tr>
<td>LS</td>
<td>75.60</td>
<td>18.03</td>
<td>75.00</td>
</tr>
<tr>
<td>LD</td>
<td>85.69</td>
<td>15.21</td>
<td>85.54</td>
</tr>
<tr>
<td>LP</td>
<td>75.33</td>
<td>10.63</td>
<td>78.22</td>
</tr>
<tr>
<td>LA</td>
<td>87.33</td>
<td>14.80</td>
<td>77.44</td>
</tr>
</tbody>
</table>

<sup>a</sup>Pretest scores are adjusted to be comparable to post-test scores.

Note: Asterisks denote the significance of within cell pre- to posttreatment change scores as determined by correlated t-tests.

*<sup>*</sup> *p* < .05
**<sup>**p</sup> < .01
***<sup>***p</sup> < .001

H=High study habits; L=Low study habits; S=Symptom desensitization; D=Dynamic desensitization; P=Pseudo desensitization; A=Assessment control
### TABLE 14

**SUMMARY OF UNIVARIATE F TESTS FOR STUDY HABITS, TREATMENT, AND STUDY HABITS X TREATMENT EFFECTS ON PRE AND POSTTREATMENT SCORES ON TEST**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Pre</th>
<th></th>
<th></th>
<th>Post</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MS</td>
<td>F</td>
<td></td>
<td>MS</td>
<td>F</td>
</tr>
<tr>
<td>Study habits</td>
<td>1</td>
<td>939.81</td>
<td>4.16*</td>
<td></td>
<td>1801.86</td>
<td>7.32**</td>
</tr>
<tr>
<td>Treatment</td>
<td>3</td>
<td>247.21</td>
<td>1.09</td>
<td></td>
<td>130.97</td>
<td>0.53</td>
</tr>
<tr>
<td>Study Habits X Treatment</td>
<td>3</td>
<td>263.94</td>
<td>1.17</td>
<td></td>
<td>134.95</td>
<td>0.55</td>
</tr>
<tr>
<td>Error</td>
<td>75</td>
<td>225.97</td>
<td></td>
<td></td>
<td>246.06</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05

** p < .01

### TABLE 15

**SUMMARY OF MANOVA WITH PRETEST SCORES AS COVARIATE FOR STUDY HABITS EFFECTS ON TEST**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study habits</td>
<td>1</td>
<td>328.00</td>
<td>2.96*</td>
</tr>
<tr>
<td>Error</td>
<td>74</td>
<td>110.85</td>
<td></td>
</tr>
</tbody>
</table>

* p < .10
improvement on TEST scores. Inspection of the means indicates that High Study Habit Ss remained higher on test scores than Low Study Habit Ss.

**Effects of Experimental Treatments on SSHA Scores**

Table 16 presents the pre and posttreatment mean SSHA scores and standard deviations for the experimental and control groups. Also shown are the mean change scores from pre to posttreatment.

Table 17 gives the results of univariate F-TESTS for pre and posttreatment scores on SSHA. Results show that the S effect was significant for both pre and posttreatment scores on SSHA (as would be expected due to the assignment of Ss to high and low study habit groups on the basis of SSHA scores).

Additional MANOVA procedures were performed with pre TEST scores as a covariate. Results (Table 18) indicate that there were no significant S effects on SSHA scores.
TABLE 16
MEANS, STANDARD DEVIATIONS, AND PRE-POST CHANGE SCORES FOR EXPERIMENTAL AND CONTROL GROUPS ON SSHA

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>HS</td>
<td>43.60</td>
<td>6.17</td>
<td>49.10</td>
</tr>
<tr>
<td>HD</td>
<td>44.50</td>
<td>7.09</td>
<td>49.50</td>
</tr>
<tr>
<td>HP</td>
<td>44.55</td>
<td>9.68</td>
<td>45.09</td>
</tr>
<tr>
<td>HA</td>
<td>44.64</td>
<td>8.12</td>
<td>50.91</td>
</tr>
<tr>
<td>LS</td>
<td>24.90</td>
<td>6.06</td>
<td>33.70</td>
</tr>
<tr>
<td>LD</td>
<td>21.77</td>
<td>6.59</td>
<td>33.15</td>
</tr>
<tr>
<td>LP</td>
<td>22.44</td>
<td>7.20</td>
<td>30.11</td>
</tr>
<tr>
<td>LA</td>
<td>26.33</td>
<td>5.07</td>
<td>24.67</td>
</tr>
</tbody>
</table>

Note: Asterisks denote the significance of within cell pre-to posttreatment change scores as determined by correlated t-tests.

* p < .05
** p < .01
*** p < .001

H=High study habits; L=Low study habits; S=Symptom desensitization; D=Dynamic desensitization; P=Pseudo-desensitization; A=Assessment control
### Table 17

**Summary of Univariate F Tests for Study Habits, Treatment, and Study Habits X Treatment Effects on Pre and Posttreatment Scores on SSHA**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Pre</th>
<th></th>
<th>Post</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MS</td>
<td>F</td>
<td>MS</td>
<td>F</td>
</tr>
<tr>
<td>Study habits</td>
<td>1</td>
<td>8847.34</td>
<td>171.83*</td>
<td>6620.02</td>
<td>40.21*</td>
</tr>
<tr>
<td>Treatment</td>
<td>3</td>
<td>21.91</td>
<td>0.43</td>
<td>91.15</td>
<td>0.55</td>
</tr>
<tr>
<td>Study Habits X Treatment</td>
<td>3</td>
<td>26.96</td>
<td>0.52</td>
<td>143.37</td>
<td>0.87</td>
</tr>
<tr>
<td>Error</td>
<td>75</td>
<td>51.49</td>
<td></td>
<td>164.64</td>
<td></td>
</tr>
</tbody>
</table>

* * p < .001

### Table 18

**Summary of MANOVA with Pretest Scores as Covariate for Study Habits Effects on SSHA**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study habits</td>
<td>1</td>
<td>8.92</td>
<td>0.07</td>
</tr>
<tr>
<td>Error</td>
<td>74</td>
<td>122.45</td>
<td></td>
</tr>
</tbody>
</table>

* *
Discussion

The discussion will be divided into two main sections, one dealing with the effects of treatment on changes in the four dependent variables and the other considering the influence of level of study habits on changes in the dependent variables. Each section will include a discussion of hypotheses as well as comments pertinent to more global results.

Treatment Effects

The following hypotheses were developed in regard to the effects of treatment on changes in the dependent variables:

1. Groups will differ on STABS scores following treatment. In Hypotheses 1.1-1.3 the sequence S<D<P<A was predicted.

2. Groups will differ on TMAS scores following treatment. In Hypotheses 2.1-2.3 the sequence D<S<P<A was predicted.

3. Groups will differ on TEST scores following treatment. In hypotheses 3.1-3.3 the sequence S>D>P>A was predicted.

Only the F test for treatment effects on posttreatment scores on STABS was significant. However, post hoc comparisons of mean scores to test hypotheses 1.1 through 1.3 revealed support for only hypothesis 1.3. Thus while the
pseudodesensitization treatment group showed more improvement than the assessment control group, there were no other significant differences among treatment groups on post-treatment STABS scores.

A surprising aspect of the results of this study is that the lack of differences between treatments was not generally due to the lack of improvement of Ss in the desensitization treatment groups but rather to the apparent improvement of many Ss in all treatment groups, including the assessment control. The tendency for all Ss to show improvement was greater on the STABS and TMAS (both self-report measures) than on the TEST scores. While such results may mean that improvements on the self-report instruments were largely due to the effects of being in an experiment (perhaps demand characteristics of the experiment encouraging Ss to indicate improvement) and thus uncorroborated by more objective data (TEST scores), such a conclusion is mitigated by at least two possibilities. First, while in general Ss showed little improvement on TEST scores, it is conceivable that Ss in this study had considerable improvement in regard to the average Psychology 100 student (unfortunately no data for possible
confirmation of this possibility was available). A second, and perhaps more convincing, argument is that the relationship of test anxiety to academic performance is unclear. Numerous studies (reviewed by Allen, 1972) have revealed conflicting data regarding a direct positive relationship between reduced test anxiety and academic improvement. Concluding that reduced test anxiety must produce improved academic performance appears at present unfounded. Thus, while the effects of being in an experiment may have contributed to the apparent improvement of many Ss, the possible discrepancy between results on self-report measures and those on TEST scores does not necessitate such a conclusion.

Such global improvement as evidenced in the present study might be due to having many first quarter freshmen Ss. The findings of the present study partially corroborate those reported by Garlington and Cotler (1968) concerning the desensitization treatment of first semester freshmen for test anxiety. They found nonsignificant differences in GPA improvement between desensitized and nontreated female freshmen. Garlington and Cotler suggest that first semester freshmen, not having experience with college exams,
may interpret a variety of nonspecific stressors in their new environment as associated with examination anxiety. Then, after some adaptation to the new environment, the potency of these multiple nonspecific stressors may be reduced, resulting in decreased self-reported test anxiety and improved academic performance.

While the comments of Garlington and Cotler were made in regard to test anxiety, similar reasoning may also be applicable to changes in general anxiety (as measured by the TMAS here) experienced by students during their first quarter. Further investigation of the reduction of general anxiety by desensitization may help to clarify this position.

Desensitization has been regarded as optimum in cases where specific stimuli elicit anxiety and not as beneficial in situations where anxiety has generalized to a large number of different stimuli (Wolpe, 1958). Research on the effects of desensitization on the general anxiety of college students, measured by the IPAT (Cattell and Scheier, 1963), various Fear Survey Schedules, and the TMAS is conflicting. Studies by Mitchell and Ingham (1970), Mitchell (1971), Crighton and Jehu (1968), and McMillan and Osterhouse (1972)
suggest that there is little change in the general anxiety of Ss following desensitization treatment and that general anxiety may be a rather stable personality characteristic, which may serve a mediating role in the improvement of academic performance from desensitization treatment. However, studies reported by Graff et al. (1971) and Laxer et al. (1969) suggest that desensitization is effective in reducing the general anxiety of secondary school students and college freshmen. The fact that these latter two studies used younger Ss than those used in the former mentioned studies may partially account for the conflicting findings in the literature. Laxer et al. (1969) found that Ss (9-12 grades) in relaxation groups had greater decreases on the TMAS than Ss in control groups, while no significant differences existed between their desensitization with relaxation groups or the desensitization and control groups.

Considering the tendency for all groups in the present study except one to decrease significantly from pre to post-treatment on TMAS and the concomitant lack of differences between groups, the suggestions supplied by Garlington and Cotler (1968) concerning the consequences of using first semester freshmen in studies involving desensitization seem
appropriate here. Thus, Ss may have experienced decreased
general anxiety due more to an acculturation to the
university environment than to specific and nonspecific
treatment effects.

While the reasoning of Garlington and Cotler concerning
the perceptions and reactions of first quarter freshmen
provide a possible explanation for the improvement of Ss
from all treatment groups, the argument fails to explain why
support was obtained for hypothesis 1.4, indicating
significantly greater decrement in TMAS scores for Ss in the
pseudodesensitization group than in the assessment control.
While improvement on STABS scores for pseudodesensitization
Ss was not significantly greater than improvement for Ss in
either of the desensitization groups, it seems noteworthy
that improvement was actually greater for the pseudodesen­
sitization Ss than for the Ss in the desensitization groups.
Perhaps some therapeutic quality was present in the pseudo-
desensitization group which was not present in the assess­
ment control group and which may not have been present in
the two desensitization treatments. Another possibility
is that desensitization treatment could have been harmful.
While this result is puzzling, some possible explanations do exist.

Some researchers (Laxer and Walker, 1970; and Laxer et al., 1969) have suggested that relaxation effects might be beneficial due to Ss inadvertently or intentionally pairing "aversive scenes" with relaxation during treatment. This explanation seems possible but less applicable to the present study than to the studies by Laxer due to the prescribed format in which Ss were instructed to imagine neutral scenes. Nevertheless, scenes were repeated five times and Ss may have visualized scenes (some aversive) other than those prescribed. Furthermore, if pseudodesensitization Ss imagined aversive scenes they could have imagined scenes of their own choosing and imagined them at their own rate. Additional attention to what Ss are actually imagining during desensitization might prove to be a fruitful area for future research.

An additional possibility in attempting to explain the superior improvement of pseudodesensitization Ss on STABS is that they learned to relax more effectively than the desensitization groups and experienced some in vivo desensitization by employing their ability to relax in everyday
situations. Conceivably desensitization Ss may not have learned to relax as well as pseudodesensitization Ss since the former had only two sessions for relaxation training before the presentation of aversive scenes began. Thus desensitization Ss may not have been relaxed enough to benefit fully from in-session treatments or to experience significant self-induced in vivo desensitization (results shown in Appendix C suggest that some pseudodesensitization Ss may have experienced greater relaxation and less anxiety than desensitization Ss).

Another possibility is that the non-specific effects of treatment (including therapist suggestions and patient expectancies) shown to be important by Lott (1973), Rosen (1973), and Tori and Worell (1973) were more powerful in the pseudodesensitization group than in the other groups.

While none of the hypotheses concerning treatment effects on changes in TEST scores were supported, it is interesting that High Study Habit Ss receiving symptom desensitization treatment had some pre- to posttreatment improvement on TEST scores. While this apparent improvement may have been due to a regression toward the mean, it may also have been due to the possibility that symptom desensi-
tization treatment facilitates academic improvement on the part of Ss having good study habits. This latter possibility will be discussed in the next section.

In summary, the results of this study indicated that none of the treatment conditions was consistently superior to any of the other treatments in producing positive changes on the dependent variables. The only significant difference between treatment groups was found between the pseudodesensitization and assessment control groups on the STABS, with the pseudodesensitization treatment proving to be more effective. Along with possible explanations for the superior improvement of pseudodesensitization Ss on STABS, comments were directed towards explaining apparent global improvements (regardless of treatment condition) on STABS and TMAS. Two possible influences discussed were the demand characteristics of being in a study and a tendency for first quarter freshmen to experience reductions in anxiety due to adaptation to their new environment.

**Effects of Level of Study Habits**

The following hypotheses were developed in regard to the effects of Study Habits and Study Habits X Treatment
on changes in the dependent variables.

1.4 Of Ss receiving symptom desensitization treatment, those having good study habits will improve more on STABS scores than those having poor study habits.

3.4 Of Ss receiving symptom desensitization treatment, those having good study habits will improve more on TEST scores than those having poor study habits.

Neither of these two hypotheses was supported by the results of this study. While changes were in the hypothesized direction on TEST scores (Ss with good study habits had higher scores than Ss with poor study habits), they were not in the hypothesized direction on STABS scores (Ss with poor study habits improved more than Ss with good study habits).

Realizing that comparisons between High Study Habit and Low Study Habit Ss receiving symptom desensitization did not reveal any significant differences, it seems important to consider possible meanings of the direction of the results and the lack of significant hypothesized differences.

The fact that Low Study Habit Ss receiving symptom desensitization (LS) improved more on STABS than High Study Habit Ss receiving symptom desensitization (HS) suggests
that the assumptions underlying this hypothesis may not be true. Thus, the HS group Ss may not have less anxiety due to poor study habits than LS group Ss and desensitization only may not be a better treatment for those having good study habits than those having poor study habits. The interpretation of these results is further moderated by the technique employed in this study to determine Ss having high and low study habits (taking the upper 50 percent of the sample as high and the lower 50 percent of the sample as low). Taking the upper 27½ percent and lower 27½ percent would have provided better discrimination among Ss on study habits (Anastasi, 1968). Also being a self-report measure whose items can be easily answered to give a good impression, the SSHA may not discriminate well between those actually having good study habits and those actually having poor study habits. Still, assuming that the groups were different on self-reported study habits, Ss in both groups could have experienced decreases in test anxiety even though the LS group might be viewed as "relaxed incompetents," in that they became relaxed but still lacked good study habits (results of the present study indicated that the LS group did not have a significant improvement in
mean SSHA score from pre to posttreatment).

Furthermore, there does not seem to be an apparent reason why the LS group should show greater decreases on the STABS than the HS group. Possibly, LS group Ss might be more inclined to look for easy answers or magical solutions to their academic problems and thus rely more completely on desensitization.

While the test of hypothesis 3.4, predicting that HS Ss would improve more on TEST scores than LS Ss, was not significant, changes were in the hypothesized direction. In light of the fact that there was a significant overall effect on posttreatment TEST scores due to level of study habits (High Study Habit Ss were initially higher on TEST scores and remained higher than Low Study Habit Ss), the higher TEST scores of HS Ss as compared to LS Ss was probably due more to subject characteristics (Study Habits) than to treatment effects. However, there may have been some differential responses to treatment. Thus, possibly both HS Ss and LS Ss benefited from desensitization treatment. However, perhaps reducing some of the anxiety of Ss who have good study habits allows these Ss to capitalize on their skills and become even more skillful. The Ss with
poor study habits might show less improvement after desensitization because they do not have the actual skills and thus, in effect, are hampered more by lack of skill than by anxiety.

The above reasoning can perhaps be seen more clearly by considering test anxiety as related to the direction of one's attention (Wine, 1971). Wine has proposed that the low test anxious person focuses well on task relevant variables while the high test anxious person is "internally focused on self-evaluative, self-deprecatory thinking, and perception of his autonomic responses." Thus, if desensitization helps one become less preoccupied with internal cues, then students with good study habits may function better than students with poor study habits. The latter group may be less prepared due to their poor study habits.

Since the only main effect due to Study Habit level was on the improvement of TEST scores, the present study corroborates reports by other researchers (Brown and Holtzman, 1966; Desiderato and Koskinen, 1969) indicating that good study habits are positively related to academic performance. However, this corroboration of existing research is weakened by the existence of a low positive correlation (.15, p<.10)
between posttreatment scores on SSHA and TEST in the present study. Since a slightly higher correlation (.36, p.<.01) existed between pretreatment scores on SSHA and TEST, perhaps there were some unsubstantiated treatment effects influencing the academic performance of some Ss.

In addition to the positive relationship between study habits and academic performance, there may also be a significant inverse relationship between level of study habits and anxiety (Desiderato and Koskinen, 1969). The results of the present study lend some support to such a possibility. Posttreatment measures revealed significant negative correlations between SSHA and TMAS scores (-.43, p.<.01) and between SSHA and STABS (-.34, p.<.01).

Because there were very few significant F tests in the statistical analyses and because there seemed to be a general pre- to posttreatment change on the dependent variables, an additional investigation of possible differences in changes among groups was carried out. For the purposes of analysis, groups were formed on the basis of specific (high on STABS and low on TMAS) and generalized (high on STABS and high on TMAS) anxiety. However, the resulting MANOVA program (Appendix C) revealed no significant effects
due to treatment or type of anxiety.

One final explanation for the lack of more significant main effects due to treatment and level of study habits may be that Ss in the present study classified as High Study Habit Ss were not absolutely high on study habits (mean pretreatment score for High Study Habit Ss was about 44 out of a possible 100). Using Ss having a more clearly demonstrated high level of study habits may have resulted in more predicted results. Also an increasing amount of literature (Allen, 1972) suggests that single model treatments may be less effective than combined treatments. Thus, offering desensitization combined with training in study skills (assuming virtually all first quarter freshmen can profit from such training) may provide an optimally effective treatment modality for reducing test anxiety and improving academic performance.

In summary, neither of the two hypotheses concerning the effects of level of study habits on pre- to post-treatment changes on the dependent variables was supported. The discussion centered around possible explanations and implications of the directionality of changes. Also considered were the possible relationships of study habits and
academic performance and study habits and anxiety.

Suggestions for Further Research

Further research is needed to understand the equivocal results of the present study. One of the most important areas for further investigation may be the area of S characteristics. It seems important to discern more clearly the influence that characteristics such as motivation, level of study habits, internal/external orientation, type of anxiety, and intelligence might have in regard to desensitization treatment. It would be interesting to replicate the present study using Ss who were all upperclassmen committed (in writing) to attending all sessions and fulfilling homework requirements involving relaxation practice.

In addition to further investigating the importance of S characteristics in desensitization treatment, continued efforts toward understanding the importance of the components of desensitization seem warranted. The importance of various components of desensitization may be different for different Ss. Also, some components of desensitization may be more beneficial in terms of increasing expectancy
effects than in terms of facilitating counterconditioning or reciprocal inhibition effects.

Finally, careful attention to S characteristics, components of desensitization, and related treatments may produce some additional beneficial approaches, individually tailored and both flexible and efficient.
CHAPTER V

SUMMARY, CONCLUSIONS, AND LIMITATIONS

Summary

The present study was completed in an attempt to investigate the influence of various content-differing hierarchies in the systematic desensitization of test anxiety. Also the importance of study habits in facilitating improvement following desensitization was examined. Improvements were ascertained by pre and posttreatment scores on STABS, TMAS, SSHA, and Psychology 100 examinations.

Considerable attention in the literature has been devoted to studying the overall effects and various aspects of systematic desensitization. Results from the literature suggest that for some students desensitization, especially when combined with other treatments, may facilitate decreased self-reported test anxiety and improved academic performance. However, little empirical research has been reported concerning the value of using hierarchy items representing hypothesized underlying (dynamic) fears in the
reduction of anxiety associated with examination performance. Also, the appropriateness of using desensitization as a single model treatment with students of different levels of study habits has not been investigated.

Thus there seemed to be a need to further investigate the importance of various content-differing hierarchies in the systematic desensitization of high test-anxious college students of differing self-reported study habits. This research was designed to provide additional information concerning the optimal usage of desensitization.

A total of 83 female students from Psychology 100 satisfactorily completed all of the participatory requirements of this study. Twenty students (10 HSH and 10 LSH) received symptom desensitization, 23 students (10 HSH and 13 LSH) received dynamic desensitization, 20 students (11 HSH and 9 LSH) received pseudodesensitization, and 20 students (11 HSH and 9 LSH) served as a no treatment control. Treatment group Ss met in groups for six sessions over a four-week period. Control group Ss met for pre and post-treatment sessions. All Ss responded pre and posttreatment (experimental Ss during the sixth session) to the STABS, TMAS, and the study habits section of the SSHA.
The data collected was analyzed by multivariate analysis of variance. Also within-cell paired t-tests were performed to test the significance of pre-post changes.

Conclusions

Only a few tentative conclusions seem warranted from the analyses performed. One is that there may be a tendency for first quarter freshmen females to report significant decreases in test anxiety during their first quarter. While desensitization treatment and level of study habits may be important as mediating factors, the results of this study do not lend much support to such a position. However, results of this study do suggest that pseudodesensitization may be more effective in facilitating decreases in self-reported test anxiety than no treatment.

Another conclusion of this study is that there may be a tendency for first quarter freshmen females to report significant decreases in general anxiety during their first quarter. While the differences between desensitization and pseudodesensitization treatments seem negligible, level of study habits may be an important factor here. Students
having good study habits may need no treatment to show decreases on TMAS while students having poor study habits may need either specific or nonspecific treatment to show decreases on TMAS.

An additional conclusion is that none of the treatment approaches produced consistently better results than any of the others or the control procedure. It seems that the particular contributions of the various approaches in this study were not as influential as were aspects common to all approaches. The effects of treatment may have been overshadowed by other circumstances (perhaps adaptation to the new environment) common to many of the Ss. Another possible influence may have been a felt need on the part of Ss to fulfill experimental credit or to "please" the experimenter.

Limitations

A number of limitations exist in the present study. An important, possibly crucial, limitation is that sessions were held in rooms not having comfortable chairs or recliners. Having better facilities may have aided students in learning to relax as well as facilitated more enjoyment
and benefit from the sessions.

Another important limitation is that many first quarter freshmen were involved in the study. Whether or not similar results would be obtained with another college population is unclear. Also Ss for this study indicated an interest in participating but may have felt considerable press to fulfill an experimental credit requirement due to a smaller than usual number of experiments being run. A more or differently motivated group of Ss might respond differently to treatment.

An additional limitation of this study was imposed by the instruments chosen for the study. Except for academic performance, all criteria were of the self-report variety. Utilizing additional more objective measures such as heart beat, palmar sweating, and observed test-taking behavior might have revealed information contributing to different conclusions.
APPENDICES
APPENDIX A

VISUALIZATION TRAINING

RELAXATION INSTRUCTIONS

RELAXATION PRACTICE SHEET
VISUALIZATION TRAINING

Scene 1

Imagine as vividly as possible that you are sitting on the oval on a beautiful day. Take a few moments to look at the numerous trees around you. Some are very close and some are rather far away. The trees are beginning to form buds and to blossom. Some of the trees are gently swaying in the soft breeze of the day. Now, notice the grass, it is very, very green. The warm sunlight seems to make the grass an even richer green. As you sit there enjoying the beauty of the earth, you suddenly become aware of the nice warmth of the sun. It is amazingly pleasant and relaxing to sit for a few moments enjoying just the right amount of sunlight. As you continue to enjoy the warmth of the sun, you begin to look at the very blue sky. It is as though you had not noticed the almost perfect blueness of the sky. And far away you see a tiny white cloud that seems to gently float across the sky. As you see the small white cloud slowly moving across the sky, the blueness of the sky seems to grow more intense. You lower your gaze and you see many people walk-
ing across the oval. You see how the sidewalks seem to criss-cross in all directions and occasionally a bicycle rider comes into view. Gradually, the crowds of moving people diminish in size and you refocus your attention on the beauty of nature. Again, you see how green the grass is beginning to look and you find yourself becoming very relaxed as you continue to observe it's greenness. You hear a soft swishing sound near you as two people walk through the grass near by. You see that the guy is tall and darkly tanned. He is wearing a light blue shirt, dark trousers and sandals. The girl seems to be walking rather fast in order to keep up with the guy. She has long red hair and a lot of freckles. She is wearing jeans and a greenish colored blouse. As they come closer, you notice that they are both smiling. Then the girl begins to mention something about the day before and they gradually move past you and their voices fade away. You watch them walking for a few more moments noticing particularly the long red hair of the girl. Her hair is blowing slightly in the breeze and she occasionally pushes her hair back into place with her left hand. As the two people fade out of sight, you again focus your attention on how comfortable and relaxed you feel.
Imagine that you have just entered a large supermarket. You are only going to get a few items so you do not take a grocery cart but you notice the carts as you walk into the store. There are two long rows of carts all pushed closely together. They are all bright silver in appearance. They are located just opposite of all the check-out counters. As you continue walking you notice that all the check-out counters have a very large quantity of paper sacks piled at the ends of the counter. There seem to be enough paper sacks to serve customers for a week. They are stacked so high. As you proceed to the back of the store, you notice a number of different kinds of fresh fruit. You see the bright red apples and the sections of oranges, as well as grapefruit, lettuce, cucumbers, squash, carrots, tomatoes, and cabbage. Then you see the sign which says, "Bananas, 2 lbs. for 29¢." And you see the nice yellow bananas in a large slanted container. You continue walking to the dairy section of the store, passing all the selections of cheeses arranged on cold, shiny white shelves. You locate the eggs and you choose a one-dozen carton of grade A large eggs. You gently lift the container from the shelf and slowly raise the top to inspect the eggs. They all seem to be OK. So you close
the top of the egg container and begin walking toward the cartons of milk only a few feet away. With little difficulty you find a half gallon of homogenized milk and gently carrying the milk and eggs, you proceed to the check-out counter, dodging a cart full of groceries as you walk. You pass a section of soft drinks as you near the check-out counter. The check-out line is short and only one person, a large lady in a dark blue dress, is in front of you. The wheels of her cart squeek as she pushes her cart toward the exit. Your attention turns to the cashier as she punches the cash register vigorously and your bill totals to one dollar and twenty-four cents. After giving the cashier two dollars, you receive your change and walk toward the exist of the supermarket.

Scene III

Now imagine that you are sitting in a very cosy little cabin in front of a wonderful fireplace. You are sitting in a very comfortable chair just the right distance from a warm, relaxing fire. As you look at the fire you see the flames consuming the large dry pine logs. The flames seem to have a rhythm all their own as they cast shadows on the
back of the fireplace. You can hear the crackling sound of the wood burning and see very fine streams of smoke rise slowly toward the chimney. The fireplace is very sturdy and quite large. It is also very old and the appearance is that of one which has had much use. Above the fireplace is a solidly built mantle on which is a small box. It looks like an old music box with some skillful, intricate designs. As you sit there enjoying the warmth and relaxation you notice that one section of the log in the fireplace has turned to a bright red glow. You watch as the flames grow again and a newly added log bursts into flames. You watch for a few more moments and then close your eyes to enjoy the relaxation even more.

Scene IV

Imagine as vividly as you can that you are on the bank of a stream looking out over the water. There are numerous things which catch your attention. You see the small waves of water breaking over a large rock near the bank. A few small branches and a rather large log come floating down the stream. You move closer to the water and notice that the stream is rather shallow near where you are standing.
The water is very, very clear and you can see the bottom of the stream. The depth of the stream seems to be about 1½ feet near the edge. Gradually the stream deepens to several feet out near the middle. Looking down into the water you see that numerous rocks cover the bottom. In spaces not covered by the rocks, you see a firm-looking dark brown bottom. A school of tiny minnows swims near the bank and their shiny silver skins glisten in the sunlight. A few feet further out a larger yellowish brown fish is swimming. Out near the middle where the water seems deeper and darker, a series of bubbles rise to the surface. Then a small fish jumps out of the water creating a small splash. As you are looking at the stream you notice a tree to the right not far from you that hangs over the stream. In fact some of its branches are so close to the water that the two seem to merge. The sun is also to your right and you notice that a shadow of the tree is cast upon the stream. On the far side of the stream, two people are paddling a canoe. The canoe is a particularly long one and it seems to sit very high in the water. The canoe is moving rather rapidly and small waves of water flow from the impact of the canoe. Before long the canoe is almost out of sight. You stand
looking at the calmness of the stream. Then lifting a small stone you toss it into the water, watching it splash and trying to follow it as it sinks to the bottom of the stream.

Scene V

Imagine as vividly as you can that you are riding in a car. You are at a stop light and you can see the red light very clearly. Now the light turns green. You continue down the street which takes you through a pleasant section of town. On your right cars are parked along the street. You notice particularly a very large dark blue car that looks as though it is either brand new or has just been waxed. The surface of the car really shines in the sunlight. As you proceed down the street you notice how dark the pavement is and how the white lines designating lanes really stand out. For a few moments you count the white lines as you pass them, 1, 2, 3, 4, 5, 6, 7.... As you go a little faster it becomes harder to count the lines because they appear so quickly. Now you notice a large white building on your right. As you get closer you notice a sign which reads "Madison Courthouse." You are stopped at a red light and you are able to get a better look at the building. It seems
to be about three stories high but it is difficult to distin­
quish how many floors there are in the building because
the outside structure has large columns and few windows.
The top of the building is the shape of a large dome. You
try to locate some sort of chimney but there doesn't seem
to be any. As you continue to look at the building a tall
man in a dark suit comes out the door. He is smiling and
carrying a brief case. Now the street light changes to
green and you continue riding down the street.

Scene VI

Imagine as vividly as you can that you are sitting in
a very comfortable chair watching television. The tele­
vision provides pictures in black and white only. The
screen is probably a 21-inch one. As you look at the tele­
vision you see that a commercial is on. There is a small
boy playing in a yard with a couple of his friends. They are
playing catch with what appears to be an extra large basket­
ball. The yard in which they are playing is quite muddy.
Occasionally, one of the boys will slide as he attempts to
stop in the mud. Apparently, all of them have fallen in
the mud also, for their clothes have numerous signs of
ground-in dirt. Just now, in fact, one of the boys slips and falls into the mud. As he is slowly getting up, his mother is heard calling him to come home and to clean up before supper. The scene switches and you see the mother holding up the child's filthy dungarees. On her right clearly in view is a large box of detergent. You notice the large letters spelling out the name, T..I..D..E. The mother is smiling. She is an attractive woman with rather long straight hair, dressed in a blouse and slacks. You hear her say that she used to worry about whether or not she would ever be able to get Johnny's clothes clean the way he plays so rough. And holding the jeans a little higher, she says that she used to really worry about stains like these until she discovered "Tide" and the marvelous way that it cleans. Again the scene switches and you see the jeans being placed into the washing machine. Moments later the jeans are being removed from the machine and being held so that you can see that they indeed have become very clean. As the commercial ends, you decide that you have watched enough television for now. You walk to the television and turn it off. You watch as the screen turns to a blank dull gray and then you leave the room.
General Instructions: The following exercises will help you learn to relax more completely so that you can achieve the maximum benefit from the procedures which are to follow. After you feel the tension associated with each movement, hold each position **five** seconds. Become aware of the feelings of tension. Then completely relax, allowing the affected muscles to become absolutely limp. Note the feelings of **pleasantness** associated with the relaxation. Note the absence of tension. Do each of the following exercises **twice**!

1. Clench left fist - note tension in hand and forearm - relax.
2. Clench right fist - note tension in hand and forearm - relax.
3. Bend left hand upward at wrist, point fingers at ceiling - note tension in back of hand and forearm - relax.
4. Bend right hand upward at wrist, point fingers at ceiling - note tension in back of hand and forearm - relax.
5. Touch shoulders with fingers, raise arms - note tension in biceps and upper arms - relax.
6. Shrug shoulders, raise as high as possible, note tension in shoulders - relax.
7. Wrinkle forehead - note tension about eyes and forehead - relax.
8. Close eyes tightly - study tension - relax with eyes lightly closed.
11. Press head backward - note tension in neck and upper back - relax.
13. Arch your back, move away from back of chair, push arms backward - note tension in back and shoulders - relax.
14. Take a deep breath and hold it - note tension in chest and back - relax.
15. Take two deep breathes of air, hold, and then exhale - note your breathing becoming slower and more relaxed - relax.

16. Suck in stomach, try to make it reach your spine - note feelings of tension in the stomach - relax, noting your breathing becoming more regular.

17. Tense buttocks by pushing them hard into the chair - note tension in buttock area - relax.

19. Tense thigh muscles, straighten legs, lift off ground - note tension in thighs, place feet on floor, relax.

20. Point toes upward toward face - note tension in foot and calves of legs - relax.

21. Curl toes downward as if burying them in the sand - note tension in arches of the feet - relax.
RELAXATION PRACTICE

Name ________________________________

Directions: Record below the amount of time spent in practicing muscle relaxation. Use the entry below as an example.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Number of Exercises Engaged in</th>
<th>Time Spent</th>
</tr>
</thead>
</table>

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APPENDIX B

INFORMATION SHEET

EXPECTANCY QUESTIONNAIRE

STABS

TMAS
INFORMATION SHEET

Name ___________________________  Instructor __________________

Telephone number _____________  Best times to be reached:

Weekends _______________

Weekdays _______________

Some students will be selected to participate in group sessions designed to help reduce test anxiety.

These sessions will be held in the evenings. Groups will meet twice a week for 45 minutes each session for 3 weeks. One final session will be held after the 3-week period.

Although this will require about 5½ hours of time, only 3 additional hours of experimental credit can be given.

Students who are selected will be contacted by telephone. Also a list, arranged alphabetically, will be posted on the second floor of Arps.

IF YOU ARE INTERESTED IN PARTICIPATING, IF SELECTED, PLEASE MARK THIS BOX.

IF YOU CAN PARTICIPATE DURING THE FOLLOWING TIMES, PLEASE MARK THE BOXES.

Mon. & Wed. 6:00-6:45
  "  "  7:00-7:45
  "  "  8:00-8:45
  "  "  9:00-9:45

Tues. & Thur 6:00-6:45
  "  "  7:00-7:45
  "  "  8:00-8:45
  "  "  9:00-9:45
EXPECTANCY QUESTIONNAIRE

Name ___________________ Date ___________ Time ___________

1. So far I feel that these sessions (have, have not) helped to reduce some of my anxiety.

2. Circle the situations in which you feel that your anxiety has been reduced.
   a. test situations
   b. interpersonal situations
   c. speaking in class
   d. studying
   e. other situations __________________________

3. At the end of this study, I expect that these sessions (will, will not) have helped me to reduce some of my anxiety.

4. I expect that at the end of this study these sessions will have helped me to reduce anxiety in the following areas:
   a. test situations
   b. interpersonal situations
   c. speaking in class
   d. studying
   e. other situations __________________________

Scores were derived from responses to item 4.

Possible scores were from 0-5. However, scores of 0 were adjusted to 1 so that the computer would not reject any scores as would be the case with zeroes.
SUINN TEST ANXIETY BEHAVIOR SCALE (STABS)

The items in the questionnaire refer to experiences that may cause fear or apprehension. For each item, place a number in the margin to describe how much you are frightened by it nowadays.

Choices are:  1  2  3  4  5
Not  A  A  Much  Very much
at all  little  Fair amount

1. Going into a regularly scheduled class period in which the professor asks the students to participate.

2. Re-reading the answers I gave on the test before turning it in.

3. Sitting down to study before a regularly scheduled class.

4. Turning my completed test paper in.

5. Hearing the announcement of a coming test.

6. Having a test returned.

7. Reading the first question on a final exam.

8. Studying for a class in which I am scared of the professor.

9. Being in class waiting for my corrected test to be returned.

10. Seeing a test question and not being sure of the answer.

11. Studying for a test the night before.

12. Waiting to enter the room where a test is to be given.
13. Waiting for a test to be handed out.

14. Being called on to answer a question in class by a professor who scares me.

15. Waiting for the day my corrected test will be returned.

16. Discussing with the instructor an answer I believed to be right but which was marked wrong.

17. Seeing my standing on the exam relative to other people's standing.

18. Waiting to see my letter grade on the test.

19. Studying for a quiz.

20. Studying for a midterm.


22. Discussing my approaching test with friends a few weeks before the test is due.

23. After the test, listening to the answers which my friends selected.

24. Looking at the clock to see how much time remains during an exam.

25. Seeing the number of questions that need to be answered in the test.

26. On an essay exam, seeing a question I cannot answer.

27. On a multiple choice test, seeing a question I cannot answer.

28. Being asked by someone if I am ready for a forthcoming exam.

29. Being the first one to finish an exam and turn it in.
30. Being asked by a friend concerning my standing in a class.
31. Being asked by a friend concerning results of a test on which I did poorly.
32. Discovering I need an A or B on the next exam in order to pass the course.
33. Discovering I need an A or B on the final exam to maintain the grade point average necessary to remain in school.
34. Thinking about "warning slips" from the Dean's office.
35. Reading a "warning slip" from the Dean's office.
36. Remembering my past reactions while preparing for another test.
37. Seeking out the teaching assistant or instructor for advice or help.
38. Being told to see the instructor concerning some aspect of my class work.
39. Asking for a make-up exam after missing the scheduled exam.
40. Discovering the course content with the fellow students just before entering the classroom the day of the exam.
41. Being the last one to finish an exam and turn it in.
42. Reviewing study materials the night before an exam.
43. On the first day of the course, hearing the instructor announce the dates of the midterm and final examination.
44. Having the instructor ask a question of the class which deals with the course material, and then look in my direction.
45. Making an appointment to see the instructor regarding some course problem.

46. Thinking about a coming exam 3 weeks before its scheduled date.

47. Thinking about a coming exam 1 week before its scheduled date.

48. Thinking about a coming exam the weekend before its scheduled date.

49. Thinking about a coming exam the night before its scheduled date.

50. Thinking about a coming exam the hour before its scheduled time.
TAYLOR MANIFEST ANXIETY SCALE (TMAS)

Please respond to the following items in terms of whether they are true or false for you. It is important that you respond to each sentence.

1. I do not tire quickly.
2. I am often sick to my stomach.
3. I am about as nervous as other people.
4. I have very few headaches.
5. I work under a great deal of strain.
6. I cannot keep my mind on one thing.
7. I worry over money and business.
8. I frequently notice my hand shakes when I try to do something.
9. I blush as often as others.
10. I have diarrhea once a month or more.
11. I worry quite a bit over possible troubles.
12. I practically never blush.
13. I am often afraid that I am going to blush.
14. I have nightmares every few nights.
15. My hands and feet are usually warm enough.
16. I sweat very easily even on cool days.
17. When embarrassed, I often break out in a sweat which is very annoying.
18. I do not often notice my heart pounding and I am seldom short of breath.

19. I feel hungry almost all the time.

20. Often my bowels don't move for several days at a time.

21. I have a great deal of stomach trouble.

22. At times I lose sleep over worry.

23. My sleep is restless and disturbed.

24. I often dream about things I don't like to tell other people.

25. I am easily embarrassed.

26. My feelings are hurt easier than most people.

27. I often find myself worrying about something.

28. I wish I could be as happy as others.

29. I am usually calm and not easily upset.

30. I cry easily.

31. I feel anxious about something or someone almost all of the time.

32. I am happy most of the time.

33. It makes me nervous to have to wait.

34. At times I am so restless that I cannot sit in a chair for very long.

35. Sometimes I become so excited that I find it hard to get to sleep.

36. I have often felt that I faced so many difficulties I could not overcome them.
37. At times I have been worried beyond reason about something that did not matter.

38. I do not have as many fears as my friends.

39. I have been afraid of things or people that I know could not hurt me.

40. I certainly feel useless at times.

41. I find it hard to keep my mind on a task or job.

42. I am more self-conscious than most people.

43. I am the kind of person who takes things hard.

44. I am a very nervous person.

45. Life is often a strain for me.

46. At times I think I am no good at all.

47. I am not at all confident of myself.

48. At times I feel that I am going to crack up.

49. I don't like to face a difficulty or make an important decision.

50. I am very confident of myself.
APPENDIX C

MANOVA RESULTS OF GENERALIZED VERSUS SPECIFIC ANXIETY

MEANS AND STANDARD DEVIATIONS OF MEASURES OF RELAXATION, VISUALIZATION, ANXIETY, AND EXPECTANCY

MANOVA RESULTS OF MEASURES OF RELAXATION VISUALIZATION, ANXIETY AND EXPECTANCY

CORRELATION MATRIX OF DEPENDENT VARIABLES
### Summary of Univariate F Tests for Anxiety-Type, Treatment, and Anxiety-Type X Treatment Effects on Pre and Posttreatment Scores on STABS, Test, and SSHA

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MEANS AND STANDARD DEVIATIONS FOR EXPERIMENTAL GROUPS ON RELAXATION, VISUALIZATION, ANXIETY, AND EXPECTANCY MEASURES

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<td>4.41</td>
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</table>

Scores for the first three measures represent sums of ratings over six sessions. Scores for Anx. 2 are total number of pencil marks from session 3-6 (in cases where no marks were made a score of 1 was given so that the computer would not eliminate Ss). A similar procedure was followed for the expectancy score, derived from part 4 of the expectancy questionnaire, with a value of one given for each sub-part checked.
SUMMARY OF UNIVARIATE F TESTS FOR S, T, AND ST EFFECTS ON RELAXATION, VISUALIZATION, ANXIETY, AND EXPECTANCY

| Source | df | Relaxation | | | Visuali- | | | | | | | zation | | | | | | |
|--------|----|------------|---|----|-----------|---|----|------------|---|----|-----------|---|----|------------|---|----|-----------|
|        |    | MS | F |    | MS | F |    | MS | F |    | MS | F |    | MS | F |    | MS | F |
| S      | 1  | 2.56 | .11 | | 2.38 | .05 | | | | | | | | | | | | | |
| T      | 2  | 41.33 | 1.79 | | 79.92 | 1.66 | | | | | | | | | | | | | |
| ST     | 2  | 118.06 | 5.11* | | 18.43 | .38 | | | | | | | | | | | | | |
| Error  | 57 | 23.00 | | | 47.60 | | | | | | | | | | | | | |

| Anxiety I | | Anxiety II | | |
| MS | F | MS | F |
| S | 15.65 | .64 | 34.39 | .16 |
| T | 159.89 | 6.49 | 1228.68 | 5.87* |
| ST | 74.13 | 3.01** | 87.09 | .42 |
| Error | 24.84 | | 214.94 | |

| Expectancy | | |
| S | 2.97 | 1.92 |
| T | .39 | .25 |
| ST | .90 | .58 |
| Error | 1.55 | |

*p < .01

**p < .10
### Correlation Matrix of Pre- and Posttreatment Measures on 4 Dependent Variables

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* *p < .05

** *p < .01
REFERENCES


Eriksen, C. W., and Davids, A. The meaning and clinical validity of the Taylor anxiety scale and the hysteria-psychasthenia scale from the MMPI. *Journal of Abnormal and Social Psychology*, 1955, 50, 135-137.


Katahn, Martin; Strenger, Stuart; and Cherry, Nancy. Group counseling and behavior therapy with test-anxious college students. Journal of Consulting Psychology, 1966, 30, 544-549.


