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A COMPARISON OF DESENSITIZATION AND STUDY-SKILLS TRAINING

FOR THE TREATMENT OF TWO KINDS OF TEST-ANXIOUS STUDENTS

DISSERTATION

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

By

Robert Alan Osterhouse, B.A., M.A.

* * * * *

The Ohio State University
1969

Approved by

[Signature]
Adviser
Department of Psychology
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VITA

January 23, 1932 • • • Born - Kane, Pennsylvania

1964 • • • • • • B.A., Whitworth College, Spokane, Washington

1965-1966 • • • Research Assistant to Dr. Frank Fletcher, The Ohio State University, Columbus, Ohio

1966 • • • • • • Psychology Trainee, U.S. Veterans Administration Hospital, Chillicothe, Ohio

1966-1969 • • • Teaching Associate, Department of Psychology, The Ohio State University, Columbus, Ohio

1967 • • • • • • Psychology Trainee, U.S. Veterans Administration Hospital, Chillicothe, Ohio

1968 • • • • • • M.A., The Ohio State University, Columbus, Ohio

1969 • • • • • • National Science Foundation Summer Fellowship, The Ohio State University, Columbus, Ohio

FIELDS OF STUDY

Major Field: Counseling Psychology
Professors Samuel H. Osipow (Advisor), Frank M. Fletcher, Harold B. Pepinsky, Francis P. Robinson, Lyle D. Schmidt, Maude A. Stewart, and W. Bruce Walsh

Minor Field: Social Psychology
Professors Timothy C. Brock, Anthony G. Greenwald, and Thomas W. Ostrom
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CHAPTER I

THE PROBLEM

Among the most frequently mentioned concerns of college students is distress about one's academic performance (Spielberger, 1966). Since success or failure within the academic environment depends, to a large extent, upon examination performance, it is not surprising that students frequently report feelings of anxiety associated with test-taking situations. Self-descriptive reports by those who describe themselves as test-anxious range from mild feelings of tension or discomfort during examinations to severe nausea, headaches, and increased heart beat rate. A common belief expressed by those who report test-anxiety is that their level of examination performance is not commensurate with their preparation or with their intellectual aptitude (Spielberger, 1966). Investigations which have reported significant negative correlations between test-anxiety scale scores and performance on classroom examinations (e.g., Alpert and Haber, 1960; Paul and Erikson, 1964; Walsh, Engbretson, and O'Brien, 1968) indicate that this belief has some validity. The reduction of test-anxiety would thus appear to be a worthwhile therapeutic goal.
Concern about test-anxiety is not new. The reduction of anxiety has been an implicit or explicit goal of every psychotherapeutic approach (Paul, 1966). What is new is the recent concern with measuring the effectiveness of various treatment methods designed to alleviate or reduce test-anxiety. This recent focus upon the public examination of the efficacy of treatment methods may be attributed, to a large degree, to the research efforts of investigators interested in assessing the effects of behavior modification techniques. The majority of reported investigations have examined the effectiveness of systematic desensitization (Wolpe, 1954; 1958) for reducing test-anxiety. Systematic desensitization of test-anxiety has been reported as effective for reducing the client's self-report of examination-anxiety (Emery and Krumboltz, 1967; Garlington and Cottler, 1968; Kondas, 1967; Suinn, 1968), for increasing academic performance (Donner and Guerney, 1969; Johnson and Sechrest, 1968), or for both (Cohen, 1969; Katahn, Strenger, and Cherry, 1966).

These investigations have demonstrated the potential of systematic desensitization for the reduction of test-anxiety. They therefore represent a long step forward from the previously untested assumptions that various kinds of procedures were effective in treating test-anxious clients. It appears, however, that the point has now been reached where future investigations in this area will be more productive if they are designed to answer a different question than that to which previous investigators have addressed themselves. The majority of earlier studies have evidently been designed to determine whether or not systematic desensitization is more effective
than is no treatment. There has been a growing awareness (e.g., Blocher, 1967; Paul, 1967) that research into the benefits deriving from therapeutic treatment methods will be most effective when it is designed to answer the question, "what specific treatment method administered to what kind of clients by which counselors will lead to what observable outcome?" The answer to this type of question will obviously be complex and will eventually depend upon the results accumulated from a large number of investigations. It may be possible, however, to identify some of the needed developments that permit investigation of this question with respect to the treatment of test-anxious clients.

First, there is a need for investigations which compare the relative effectiveness of dissimilar treatment methods for the reduction of test-anxiety among the same population. Although some studies have compared different treatment methods, the primary concern has been to discover the effective components only within systematic desensitization (Johnson and Sechrest, 1968). For example, Emery and Krumboltz (1967) compared the effectiveness of treatments with individual anxiety hierarchies for each client as opposed to a standard anxiety hierarchy for all clients, while Donner and Guerney (1969) contrasted desensitization procedures using either a therapist or tape-recorded instructions. These studies do not show whether desensitization is more or less effective than other possible treatment methods which have been reported to be helpful for the reduction of test-anxiety such as hypnosis and drug treatment (Goldburgh, 1968).
There is also a need to begin to specify those client characteristics which might be theoretically related to the reduction of test-anxiety within one treatment method rather than another. There is substantial evidence that the overall effectiveness of counseling or psychotherapy may be obscured by the fact that some clients improve as the result of exposure to a particular treatment while others get worse (e.g., Cartwright and Vogel, 1960; Truax, 1963; Volsky, Magoon, Norman, and Hoyt, 1965). While some of this variance in treatment outcome is apparently related to therapist differences (Truax, 1963), client differences which exist prior to treatment are also important. Sufficient evidence of this fact exists so that Sprinthall (1967, p. 43) was led to conclude that, "...on logical and empirical grounds it may be inescapable that we must focus our research on differences within groups of counselees prior to the onset of counseling."

Finally, there appears to be a need for the development of additional behavioral outcome measures designed to reflect the reduction of test-anxiety. The two most frequently employed measures for assessing treatment effectiveness have been changes which take place on self-report instruments of test-anxiety after treatment and changes in academic performance after treatment. The possibility for distortion arising from the use of the same self-report instrument before and after treatment have often been noted (e.g., Campbell and Stanley, 1966; Paul, 1966; Zax and Klien, 1960). While changes in academic performance after treatment appear to be a relatively clear-cut measure of test-anxiety reduction, the use of this measure to evaluate the effectiveness of various treatment procedures rests upon
the basic assumption that the academic performance of highly test-
'anxious students will improve if their anxiety is reduced. At
present, however, the relationship which does exist between anxiety
reduction and improved academic performance is unclear. In spite of
the problems associated with the use of these two outcome criteria,
there has been little attempt made to develop additional outcome
measures to evaluate the effectiveness of treatment methods designed
to reduce test-anxiety. Since highly test-anxious students report
that their high levels of anxiety arousal occur during classroom
examinations, there is a need for outcome measures specifically
designed to reflect the overt behavior of test-anxious students while
they are engaged in the actual process of taking an examination.

Objectives

In accordance with the above considerations, the investigation
to be reported here was designed to accomplish three objectives:

(1) To examine the relative effectiveness of two dissimilar
treatment methods for the reduction of anxiety associated with examina-
tion performance.

(2) To begin to examine client characteristics which may be
theoretically associated with the degree of improvement within each
of the two treatment methods.

(3) To develop a behavioral outcome measure which can be
obtained during the client's actual examination performance and to
examine the relationship between this measure and other outcome
measures frequently employed to evaluate test-anxiety reduction.
CHAPTER II
BACKGROUND

Any scientific investigation is largely the product of knowledge accumulated from the past. The investigation on the reduction of test-anxiety to be reported here had its roots in two different areas of psychological research. The first line of research examined the general relationship between anxiety and behavior in a wide variety of settings. It has asked, "In what ways do persons behave differently who report varying levels of anxiety?" The second area of investigation has grown out of the therapeutic emphasis within clinical and counseling psychology and has asked, "What is the most effective means for helping persons reduce their anxiety?"

This chapter reviews the developments within these two interest areas most pertinent to this investigation. In addition, the rationale underlying training in more effective study-skills as a possible treatment for the reduction of test-anxiety will be explored, as will a recent series of studies which may offer some clues to those client characteristics which could be expected to be related to differential treatment effectiveness. Finally, the need for new behavioral measures of test-anxiety reduction will be discussed, and one such measure will be proposed for use in the present study.
Anxiety and Academic Performance

Considering the importance of the concept of anxiety in theories of personality, it is somewhat surprising that objective measures of anxiety have been developed only rather recently. The Manifest Anxiety Scale (MAS) (Taylor, 1951; 1953; 1956) was the first widely-used scale for the measurement of anxiety. This instrument was not originally intended to serve as a measure of general anxiety as a personality variable, but rather was developed to identify individuals who differ in emotional responsiveness, and hence drive level (D), within the framework of Hull-Spence behavior theory (Spence and Spence, 1966).

Sarason (1960) has noted that the absence of other objective, easily administered measures of individual differences in anxiety resulted in the quick use of the MAS by numerous investigators interested in the relationship of anxiety to such variables as intellectual performance, reaction to stress, and ability to learn. In fact, the proliferation of studies using the MAS as a measure of general anxiety led Jenkins and Lykken (1957) to charge that the rationale for the use of the MAS had been lacking in many research projects.

In addition to stimulating research, the development of the MAS also encouraged other researchers to construct measures of anxiety which were more suited to their specific needs (for a review of this development, see Sarason, 1960). A number of self-report scales were developed to reflect feelings of anxiety during periods of intellectual performance (Alpert and Haber, 1960; Mandler and Sarason, 1952; Sarason, 1958). As the evidence accumulated (Alpert and Haber, 1960;
Sarason, 1960), it became fairly clear that scores on these specific test-anxiety scales were negatively and significantly correlated with measures of intellectual performance, such as aptitude tests, classroom tests, and college grades. At the same time, little consistent relationship was demonstrated between intellectual measures and measures of general anxiety such as the MAS.

The nature of the relationship between examination anxiety and academic performance is less clear. The strength of the negative correlations between test-anxiety and academic performance has varied according to the specific scale of test-anxiety used, the sex of the sample, and the class standing of the students being measured. One reason for these inconsistent results may lie in the homogeneity or heterogeneity of academic ability represented by the group which is observed. Among those few studies which did find a relationship between general anxiety and academic performance, Spielberger and Katzenmeyer (1959) and Spielberger (1962) found that male college upperclassmen with high MAS scores earned lower grades and had a higher drop-out rate than did students with comparable academic ability and low MAS scores. This relationship was evident, however, only for students within the broad middle range of academic ability (Spielberger, 1962). MAS scores were not related to grades or drop-out rate for students among the top 20% or bottom 20% in terms of college entrance test scores.

Paul and Erickson (1964) administered two equivalent forms of a midterm examination to 100 female students under anxious (regular classroom) and nonanxious (experimental) conditions. When
all subjects were included in the analysis, there was no significant relationship observed between test-anxiety scores and performance on the two examinations. However, when those students whose college entrance test scores placed them within the top or bottom 15% of the sample were eliminated from the analyses, a significant interaction effect between anxiety and performance was obtained. Highly anxious students performed better on the test under nonanxious conditions than they did on the regular classroom examination. Students low in test-anxiety performed better on the classroom examination.

These three investigations, taken together, lend support to the conclusion that the relationship between test-anxiety and intellectual performance will be most clear among students of moderate academic ability.

Why should students who score high on test-anxiety scales perform more poorly than students who score low on the same scale? Paul and Erickson (1964) have reviewed three possible alternative explanations, drawn from earlier investigations. The first is that students use the test-anxiety scale as a vehicle for rationalization or justification of poor performance. A second possible explanation is that anxiety does not really affect performance on an intellectual test but that the negative relationship is contributed by low-ability subjects who are realistically anxious about their performance in such a situation. A third possible explanation, one which Paul and Erickson feel is most in accord with their data, is the "Interference" theory of Child, (1954) and Mandler and Sarason (1952). Interference theory holds that subjects who score high on scales of test-anxiety,
"...suffer impaired performance under regular examination or testing conditions due to the heightened physiological activity and self-deprecating ruminations which constitute interfering and distracting influences during the testing situation" (Paul and Erickson, 1964, p. 489).

There is research which indicates that high-anxiety subjects perform more poorly than low-anxiety subjects when the experimental task is complex or requires new and novel responses. Most current theorists (see Spielberger, 1966, pp. 365-367) agree that this is due to competing response tendencies (interfering or irrelevant in nature) on the part of high-anxiety subjects. There is some disagreement, however, whether these competing response tendencies are primarily due to task-produced or to anxiety-produced interfering responses.

If these interfering responses among test-anxious students are primarily the result of anxiety aroused during examinations, then, the reduction of test-anxiety should be accompanied by an increase in academic performance. As will be shown in the following section, however, the relationship between anxiety reduction and academic performance is far from clear.

The Reduction of Test-Anxiety

Much of the early research in which test-anxiety scales were employed was designed to discover the manner in which low and high scoring subjects differed in their performance in a wide variety of experimental settings. Frequently this research involved measurement within a situation designed to arouse anxiety (e.g., informing subjects that their performance on a very difficult task was a basic indicator
of their intelligence). In a review of the research related to the use of anxiety scales, Sarason (1960) expressed the hope that future research would be as concerned with the reduction of anxiety as previous research had been with the artificial arousal of anxiety.

The first systematic program designed to improve the academic performance of students with high levels of reported anxiety was that of Spielberger and associates (Spielberger and Weitz, 1964; Spielberger, Weitz, and Denny, 1962). During two consecutive academic years, freshmen males identified as highly anxious by their responses to the Taylor Manifest Anxiety Scale (Taylor, 1951) and the Welsh (1956) Anxiety Scale were invited by letter to participate in an "Academic Orientation Project." Volunteers were assigned either to treatment through group counseling or to control groups. Students who regularly attended these group sessions obtained higher grades than did students who attended the groups only irregularly or control students.

A number of more recent studies have had two elements in common: (1) A specific concern with the reduction of test-anxiety, and (2) The use of systematic desensitization techniques. Since desensitization has played such an important role in the therapeutic effort to reduce test-anxiety, it is important to note the theoretical rationale underlying the use of this treatment method. Joseph Wolpe (1954, 1958) has been consistent in his attempt to apply learning theory principles to psychotherapeutic treatment. Rejecting therapeutic approaches oriented toward helping the patient to discover and understand the reasons why he behaved or felt as he did, Wolpe has
insisted that all habits or neurotic patterns are learned and that they are susceptible to unlearning. Desensitization techniques are based on Wolpe's reciprocal inhibition principle, which states that, "If a response inhibitory of anxiety can be made to occur in the presence of an anxiety-evoking stimuli, it will weaken the bond between these stimuli and the anxiety" (Wolpe, 1958).

Most of the investigations into the reduction of test-anxiety have employed the general plan for desensitization set forth by Wolpe. The subjects are deeply relaxed and then required to imagine anxiety-evoking stimuli which are presented in hierarchical order, from least to most anxiety-provoking. As soon as the subject can imagine himself in a previously threatening situation without disturbing his level of deep relaxation, he moves on to the next anxiety-provoking stimulus on the hierarchy.

Katahn, Strenger, and Cherry (1966) were among the first to investigate the effects of desensitization upon test-anxiety. From a population of forty-three students, identified as highly test-anxious by their responses to the Test Anxiety Scale (Sarason, 1958), fourteen students volunteered for treatment and were exposed to a combination program of desensitization, study-skills training, group discussion, and outside reading. Compared with students who volunteered but were not given treatment and with non-volunteer controls, the treated group showed a significant increase in grade-point-average and a marginally significant reduction in reported anxiety during a final examination. The increases in academic performance were substantial when compared to previous programs designed to influence academic achievement (Chestnut, 1965; Spielberger and Weitz, 1964),
but the use of so many techniques within the treatment groups makes it difficult to determine which specific technique was primarily responsible for these increases.

Snider and Oetting (1966) reported the clinical results of a study testing the effectiveness of autogenetic training for the reduction of test-anxiety. In this method, the subject is given training in voluntary muscle relaxation and told to apply the relaxation procedures in those situations where he feels tense or anxious. The authors report that treatment subjects went from a C+ to a B+ average on examinations and that subjects showed marked and rapid reduction of tension. Unfortunately, the lack of a control group, the lack of objective measures of test-anxiety, and the inclusion only of very highly-motivated students within the treatment group renders these results almost meaningless, particularly in the light of research reported by Kondas (1967) and Johnson and Secrest (1968).

Kondas (1967) compared the effects of desensitization and autogenetic training in reducing examination examination-anxiety among thirteen Czechoslovakian university students. Using selected items from the Fear Survey Schedule (Lang and Lazovich, 1953) as a measure of pre- and post-treatment anxiety, Kondas reported that students treated by desensitization showed a significantly greater reduction of examination-anxiety after treatment than did subjects trained in relaxation procedures or a group of control students.
Somewhat similar results were found by Johnson and Sechrest (1968). Highly test-anxious students, identified on the basis of their scores on the Alpert-Haber (1960) Achievement Anxiety Test, were invited to participate in treatment designed to help them reduce their anxiety or assigned randomly to a no-contact control group. Those subjects who responded were given individual treatment, either through desensitization or relaxation training. The desensitization subjects attained significantly higher grades on a final examination than did control or relaxation subjects. A readministration of the Alpert-Haber anxiety scale after treatment yielded no significant differences among the three comparison groups.

These two studies would appear to indicate that relaxation training followed by the presentation of anxiety-provoking stimuli in hierarchical fashion is more effective in reducing test-anxiety than is relaxation training alone. It is interesting to note, though, that the superiority of desensitization subjects in the study of Kondas (1967) was evident in the reduction of self-reported anxiety with no measurement of examination performance, while Johnson and Sechrest (1968) found superior academic performance for desensitization subjects but no differences among the groups in reported anxiety after treatment. Other studies, to be reviewed below, have also shown that improvement in one of these two most-commonly employed measures of test-anxiety reduction is not necessarily reflected by improvement within the other measure.
A number of investigators have reported a decrease in self-report of anxiety following treatment either without an accompanying increase in academic performance or without measurement of this variable. For example, Suinn (1968) compared the effectiveness of a combination of group and individual desensitization therapy for reducing test-anxiety with a no-contact control group. Although desensitization subjects reported significantly less anxiety following treatment than the control subjects, no mention was made of the academic performance of subjects. In addition, a strong subject self-selection factor was evident in securing treatment and control subjects so that the decrease in anxiety cannot be attributed in a straightforward manner to the effects of treatment. Treatment subjects were volunteers for a test-anxiety reduction program drawn from an introductory psychology class and only those subjects who completed the whole program were measured. Control subjects were nonvolunteers from the same class. There thus appears to be a possible confounding between motivation to seek help for one's feelings of anxiety and the specific effects of the treatment program.

In spite of the flaws in this study, our confidence in the results is increased by similar results from two more-adequately designed investigations. Emery and Krumboltz (1967) found group desensitization in which all subjects used the same anxiety-hierarchy and group desensitization in which each subject constructed his own hierarchy more effective for reducing self-reported test-anxiety than was no treatment at all. Final examination grades were slightly, but not significantly, higher for both desensitization groups than
for the control group. Carlington and Cotler (1968) also report that subjects treated by desensitization report less test-anxiety following treatment than do no-contact control subjects, but they differ from Emery and Krumboltz (1967) in their discovery that control subjects had slightly higher grades on a final examination and a slightly higher grade-point-average following treatment than did the treatment subjects, although none of the differences were reliable.

It is, therefore, fairly clear that reduction in self-reported anxiety following treatment by desensitization is not necessarily associated with an increase in academic performance. Further, Donner and Guerney (1969) give support to Johnson and Sechrest's (1968) finding that increases in academic performance following treatment by desensitization may be independent of decreases in reported test-anxiety. Donner and Guerney (1969) compared the effectiveness of desensitization groups using a live therapist and desensitization groups using a completely tape-recorded program for reducing test-anxiety. Subjects in both treatment groups achieved a significantly higher grade-point-average following treatment than did subjects in a waiting-list control group. Although two anxiety-scales and an adjective check list were administered to all subjects both immediately after treatment was concluded and after a final examination, only one of these measures significantly favored the treatment subjects and that occurred for only one of the two administrations.
In contrast to the investigations reported above, Cohen (1969) has recently reported results which purportedly show that desensitization is effective for increasing academic performance and in reducing self-reports of test-anxiety. Again, however, the results are uncertain due to the confounding of motivational factors and treatment effects. One hundred thirty-seven students were initially identified as highly test-anxious by falling within the top 30% of the scores on the Test Anxiety Scale (Sarason, 1958) which was administered to all students in a large introductory psychology course. Ten subjects were randomly selected to serve as no-contact controls before letters of invitation to participate in a treatment program were sent to the remaining 127 students. Those 23 subjects who responded to the letter were assigned to treatment groups. Six of these subjects were dropped from treatment after three sessions for failure to attend the sessions, while other treatment subjects were dropped half-way through the program for the same reason. Therefore, the final comparison was actually between thirteen highly motivated treatment subjects and ten control subjects. If the same percentages had been obtained for control subjects as were shown by those students invited to participate in treatment, only one of the control subjects would have completed the treatment program if given the opportunity to do so.

Cohen (1969) does report the correlation between changes in pre- and post-treatment scores on the Test-Anxiety Scale and changes in grade-point-average following treatment, something none of the other investigators have done. The reported correlation was
positive, which, without further elaboration by the author, would appear to indicate that treatment subjects who showed the greatest reduction in test-anxiety scores following treatment would also show the least improvement in academic performance. This assumption is given further support by an analysis of the change scores reported for the four desensitization groups. There is a perfect inverse relationship between group means on the two measures under consideration; the group showing the greatest reduction of reported anxiety showed the least improvement on academic performance and vice versa.

In view of the investigations into the reduction of test-anxiety reviewed here, three conclusions seem warranted. First, systematic desensitization has been the most widely investigated and most successful of any treatment method for the reduction of test-anxiety. Second, the relationship between reduction in self-report of test-anxiety and academic performance following treatment is far from clear at the present time. Finally, although it is not as self-evident as the first two conclusions, there is a need for investigations which explore the relative effectiveness of other potential treatment methods for the reduction of test-anxiety. The rationale for one such possible treatment method - training students in more effective study habits - will be explored in the following section.

Training in Effective Study-Skills - A Potential Treatment Method for the Reduction of Test-Anxiety

Training in effective study techniques has been widely offered by colleges and universities as a means of improving the academic performance of underachieving students and students with
marginal academic potential. Entwistle (1958) has noted that 90% of the institutions of higher education in the United States offer some program to help students learn how to study more efficiently. These programs range from full-credit academic courses to voluntary groups for improvement in reading methods sponsored by a counseling center or a concerned professor. The potential usefulness of study-skills training for the reduction of test-anxiety, however, has not yet been explored.

The theoretical rationale for suggesting that training students in more productive study methods may be effective in helping them to reduce their test-anxiety is fairly straightforward. The previously noted negative correlations between test-anxiety scale scores and academic performance may be the result of the debilitating effects of high levels of anxiety upon complex performance. On the other hand, high examination-anxiety may also be related to the prior experiences of the student within previous testing situations. Students who perform poorly on examinations relative to other students may come to experience even greater levels of tension or apprehension during future examinations. If, however, the student can be trained to be more efficient in preparing for examinations so that he feels more prepared and more confident of his ability to perform adequately relative to other students, he may then experience reduced levels of anxiety.

There is some empirical evidence which suggests that highly test-anxious students have poorer study techniques than do less
anxious students. Sassenrath (1967) reported small but significant negative correlations between scores on the Test Anxiety Questionnaire (Mandler and Sarason, 1952) and two measures of study skills, on which higher scores represented more efficient study techniques. Desiderato and Koskinen (1969) have shown that students who score high on the Debilitating Scale of the Alpert-Haber (1960) Achievement Anxiety Test obtain significantly lower scores on the Brown-Holtzman (1956) Survey of Study Habits and Attitudes than do students high on the Facilitating Scale of the Alpert-Haber AAT.

Finally, some justification for the use of study-skills training in reducing anxiety exists in the clinical descriptions of programs to reduce anxiety reported by Spielberger (1966) and Katahn, Strenger, and Cherry (1966). Spielberger suggests that while his counselors were prepared to deal with personal and emotional difficulties, "The topics of greatest concern in our counseling groups included: methods of study, individual academic difficulties, relations with professors in class and on the campus, dormitory life, vocational goals, etc. The students wanted to know how to study, how to prepare for examinations, ..., how to budget their time, and how to get work done in dormitories..." (1966, p. 394).

Katahn, Strenger, and Cherry (1966) have interpreted the results of their study as signifying the usefulness of desensitization in treating test-anxious students. The students, however, felt slightly different. The authors state that, "While the relaxation procedures and the desensitization procedures seemed important to the students, they invariably felt that the most important aspects
of the program were just being able to talk about their problems with other students, finding out that these were others having similar experiences, and learning how to organize their study habits."

They also report that, ".....from the student's standpoints, changes in their approaches to studying and in their attitudes toward education were more responsible for their increased academic effectiveness than were the desensitization procedures." (Katahn, Strenger, and Charry, 1966, p. 548)

The research investigation to be reported here, then, will compare the relative effectiveness of desensitization procedures and training students in more effective study techniques for the reduction of high levels of reported test-anxiety.

Client Characteristics - Autonomic Stress vs. Cognitive Concern

Our knowledge about the effectiveness of various psychotherapeutic approaches is advanced when the kinds of subjects who might be expected to profit most from exposure to the different treatment methods can be specified. For example, Gilbreath (1968) has reported that leader-structured group counseling was more effective for increasing the academic performance of dependent underachievers than it was for independent underachievers, while group-structured counseling was more effective for independent than for dependent underachievers. Although the obtained differences dissipate over time, a knowledge about client characteristics appears to be helpful in selecting the appropriate kind of group counseling methods for underachieving students. The value of knowledge about
client characteristics was also demonstrated by McKeachie (1951, 1958) who reported data which show that some normally achieving students, characterized as emotionally insecure and dependent, functioned most effectively in a highly structured learning situation, although the majority of students performed most adequately in a less structured situation.

There has been no attempt, however, to specify the characteristics of test-anxious students which might be related to differential treatment effectiveness.

One recent series of investigations appears to hold some promise for identifying those students who might be expected to profit most from exposure to treatment either by desensitization or by training in more effective study-skills. Liebert and Morris (1967) noted that previous factor-analytic examinations of responses to the Test Anxiety Questionnaire (Mandler and Sarason, 1952) had yielded two classes of factors. The first was a cognitive component which the authors labeled "worry" (W) and conceptually identified as any cognitive expression of concern about one's own test performance. A second component appeared to measure autonomic or physiological reactions which tended to occur under the stress of the examination itself (e.g., a rapid heart beat, an upset stomach). The authors tentatively identified this second class of factors as "emotionality" (E).

Liebert and Morris (1967) developed a ten-item scale to measure these two components of test-anxiety. They first independently classified items on the Test Anxiety Questionnaire as
reflecting either cognitive concern or autonomic stress, and then drew five E and five W items from the two subpools thus created. They administered this instrument, along with an item designed to reflect examination performance expectancy, to 54 undergraduate students just prior to a classroom examination. As predicted, the authors found a significant inverse relationship between W scores and performance expectancy. The greater the expectation of performing well on the examination, the lower the W score tended to be. No relationship was observed between E scores and performance expectancy.

Spiegler, Morris, and Liebert (1968) conducted two additional studies into the properties of the E and W components of test-anxiety. It was reported that for 71 undergraduate students the E scores on the ten-item scale decreased significantly immediately after an important final examination (compared to scores immediately before the test), while no such decrease was observed for W scores. The investigators concluded that the E factor dissipates rapidly after the stress of the examination is over, while the major determinants of cognitive concern (W) were presumably left relatively unchanged until the individual received a grade for his examination performance.

In a second study, 21 first year graduate students completed the ten-item scale five days prior to, immediately before, and immediately after the first examination in an important "pro-seminar" course. Whereas the E scores changed systematically over time (7.76, 9.67, and 7.90, respectively), the W scores remained
fairly stable. Further analyses suggested to the authors that, "...W is related to how one expects to do on the examination, irrespective of the presence or absence of the test situation, whereas E is due to the stress of the examination situation, regardless of one's concern about failure or success on the test (p. 455).

Doctor and Altman (1969) replicated the results from the earlier studies. They administered the ten-item research instrument and the performance expectancy item to 159 undergraduate students just prior to and immediately after a final examination. The results confirmed the previous findings that E scores decreased significantly following the examination and that W scores were more highly correlated with expectancy of a successful performance on the examination than were E scores. The investigators reported, however, that there was a significant decrease in W scores after the examination for students with high initial W scores but not for students with low initial W scores. Although the results might be parsimoniously interpreted as a regression effect, the authors suggest instead that students with high W scores prior to the examination suffer an increment in their anxiety due to the perceived aversion of the test-taking situation. Doctor and Altman (1969) also present data which suggests that W scores may have been more directly related to scores on the final examination than were E scores.

The emphasis within this series of studies has been on the "emotionality" and "worry" components of test-anxiety as measured only within the same individual. However, since these two components have been shown to be present in test-anxiety scales, it
does not appear too difficult to justify the assumption that some individuals achieve high scores on a self-report instrument of test-anxiety primarily as the result of their responses to items measuring the E component, while others are designated as highly test-anxious primarily because of their responses to W items. There is also some reason to hypothesize that subjects designated as highly test-anxious as the result of their responses to items assessing the E component of test anxiety would profit most from treatment by desensitization, and that subjects whose high test-anxiety is primarily the result of their responses to W items would profit most as the result of treatment designed to help them achieve more effective study techniques.

Wolpe (1954, 1958) has been consistent in describing anxiety as an integral part of the neuroses which he feels are best suited for treatment by systematic desensitization. Anxiety, as Wolfe defines it, is evidenced predominantly through autonomic or physiological response patterns. For example, "By anxiety is meant the autonomic response pattern or patterns that are characteristically part of the organism's response to noxious stimulation" (Wolpe, 1958, p. 34), and again, "The response elements that typically constitute an anxiety response are largely those associated with a widespread discharge of the autonomic nervous system, and predominantly of its sympathetic division" (Wolpe, 1958, p. 35). Systematic desensitization would thus appear to be the most appropriate treatment for those test-anxious subjects who report unusual levels of autonomic arousal during the stress of the testing situation.
On the other hand, training in more effective study-skills is primarily cognitive in nature. The attempt to help students replace awkward and ineffective reading and study techniques with more organized methods is essentially a reeducative approach. As such, it would appear to be a particularly helpful treatment method for those students whose high test-anxiety is predominantly due to their unusual cognitive concern about how well they will perform on an examination.

This hypothesizing receives some support from Doctor and Altman (1969). They suggest that, "The W - E distinction has important implications for planning treatment of test-anxiety problems. In particular, different treatment approaches might be best suited for manifestations of H(igh) W and of H(igh) E. HW Ss might profit more from a treatment program that attempts to change cognitive attitudinal responses such as counseling methods aimed at improving study habit techniques and building greater self-confidence. On the other hand, HE problems might be more responsive to direct anxiety-reduction methods such as systematic desensitization."

(p. 567-568)

As one means, then, of attempting to make more explicit predictions about the relative effectiveness of various treatment methods for the reduction of test anxiety, the following hypothesis will be examined in this investigation: Students whose high test-anxiety scores are due primarily to their responses to E items (measuring autonomic response to stress) will profit most from treatment by desensitization techniques, while students whose high
test-anxiety scores result from their response to W items (measuring cognitive concern about level of examination performance) will profit most from training in the use of more efficient study techniques.

Observation of Test-Anxious Behavior

The lack of agreement between improvement in academic performance and reduction in self-reported anxiety, discussed earlier, would appear to suggest that these two outcome measures may be independent of one another. If knowledge about the effective reduction of test-anxiety is to continue to advance, it also appears likely that additional outcome measures, which may be useful for assessing the effects of treatment procedures, should be developed.

It is somewhat surprising that so little an attempt has been made to devise outcome measures which reflect the subject's anxiety while he actually takes an examination. Only Johnson and Sechrest (1968) have attempted to use new measures in order to assess examination-anxiety. They measured the number of nonessential discrete marks (i.e., letters, punctuation marks, and symbols made in the test margin and the extent to which subjects produced messy and disorganized papers during an examination. Although both measures distinguished between a group of high test-anxious and a group of low test-anxious subjects, they were not sensitive enough to reflect differences between treated and nontreated subjects.

None of the investigations into the reduction of test-anxiety has ever employed the observation of a student during an examination. The ways in which highly test-anxious students behave differently from students with low levels of anxiety during that period in which they report the greatest stress is really unknown.
Sarason (1966) has also questioned this lack of studies directed toward the observation of overt behavioral characteristics associated with high scores on anxiety scales. He concludes that there is a definite need to measure, "...facial expressions, postural and muscular qualities, voice change, and other characteristics which could reflect the experience of anxiety." (p. 68)

It has been widely assumed (e.g., Sarason, 1966, pp. 64-68) that high levels of anxiety are reflected in nervous mannerisms or other observable behavior, while the absence of anxiety is more likely to be associated with quiescent behavior. One possible measure of test-anxiety, then, may be the number of physical movements made by the student during the stress of the examination period. The current investigation attempts to determine what specific kinds of physical movements are most frequently engaged in by highly test-anxious students, and then attempts to develop a scale for the observation and recording of these physical movements. The basic assumption underlying the use of this kind of behavioral index is that a reduction of anxiety is associated with a reduction in the number of physical movements made during an actual examination. The relationship between this measure and improvement in academic performance and reduction in self-report of anxiety will also be examined.

Scope of This Investigation

This investigation will compare the relative effectiveness of two different treatment methods - desensitization and training in more efficient study techniques - for the reduction of test-anxiety. Because the potential of study-skills training for anxiety reduction
has not yet been explored, and since Katahn, Strenger, and Cherry (1966) used both treatment methods to obtain reduced anxiety and increased academic performance, there is no reason at this point to predict that one method will be superior to the other. It is predicted, however, that desensitization will be more effective than training in study-skills for reducing the anxiety of students whose high test-anxiety scores are primarily the result of items assessing autonomic arousal during examinations. It is also predicted that training in efficient study techniques will be more helpful than desensitization in reducing the test-anxiety of students who report unusual levels of cognitive concern about their examination performance relative to other students.

In addition, an attempt will be made to measure the physical movements of subjects during the actual examination period. The potential use of this measure in reflecting the reduction of test-anxiety will be explored.
Overview

Sixty subjects, designated as highly test-anxious on the basis of their responses to an Inventory of Test Anxiety, were obtained from a population of 724 students enrolled in the Introductory Psychology class at The Ohio State University. Thirty of these subjects were designated as "High E" subjects, since their high test-anxiety scores were primarily the result of responses to items on the Inventory of Test Anxiety previously selected to measure an "Emotionality" component of test-anxiety. The other thirty subjects were designated as "High W" subjects because their high scores were primarily due to their responses to items selected to measure a "Generalized Worry" component. Both High E and High W subjects were randomly assigned to one of two treatment methods designed to reduce test-anxiety (desensitization and study-skills training) or to a no-contact control group. Pre-treatment measures of academic performance and physical activity were obtained for all subjects at the first mid-term examination in their Introductory Psychology class. After a six-week treatment period, post-treatment measures of academic performance and physical activity were obtained during the final examination in the same class. In addition, the Inventory
of Test Anxiety, slightly modified, was readministered to all subjects immediately after that examination.

The Inventory of Test Anxiety

The Inventory of Test Anxiety was specifically developed for this investigation in order to distinguish those students who report unusual feelings of stress during examinations from those students who report unusual cognitive concern about their level of examination performance in relationship to other students. A copy of the research instrument used by Liebert and Morris (1967) and Spiegler, Morris, and Liebert (1968) was obtained from the authors. This instrument, it will be recalled, is based upon a selected subset of items drawn from the Test-Anxiety Questionnaire of Mandler and Sarason (1952) and shown by earlier factor analytic studies to be related to the two components of test-anxiety under consideration here. In addition to the ten items from this research instrument, other items felt to reflect feelings of stress during examinations or cognitive concern about examination performance were drawn from the Alpert-Haber Anxiety Test (Alpert and Haber, 1960), from the Test-Anxiety Scale (Sarason, 1958) which is a shortened, sixteen-item, true-false revision of the earlier Test-Anxiety Questionnaire, or were composed by the investigator. A pool of twenty-one potential items was thus assembled.

Each item was reworded so that it referred only to classroom examinations, the major topic of concern for this investigation. Four psychology graduate students were then given a written description of the emotionality (E) and generalized worry (W) components
of test-anxiety (Appendix I) and asked to rate each of the twenty-one items (Appendix II) as being representative of one of the two components. The four judges agreed perfectly for twenty of the items. The item on which there was disagreement was eliminated. Further instructions to the judges had asked them to indicate the numbers of those items about which it was most difficult to reach a decision. Those items mentioned by more than one judge were also eliminated. The remaining items were comprised of eight $E$ items and nine $W$ items. One $W$ item was randomly selected for elimination.

The Inventory of Test Anxiety, then, is composed of eight $E$ items whose purpose is to measure autonomic or physiological reactions to the stress of examination performance and eight $W$ items planned to reflect cognitive concern about one's level of academic performance. Respondents are instructed to respond to each of the sixteen items on the following five-point scale (Liebert and Morris, 1967):

1. The statement does not describe my feelings, condition, etc.
2. The feeling, condition, etc., is barely noticeable.
3. The feeling, condition, etc., is moderately intense.
4. The feeling, condition, etc., is strong.
5. The feeling, condition, etc., is very strong.

Subjects

Identification of High $E$ and High $W$ Students.

The Inventory of Test Anxiety (Appendix III) was administered by the individual class instructors in each of the fourteen small
sections (40-60 students) of Introductory Psychology to 724
students during the first class session. The following instructions
were included on a cover page:

This questionnaire is part of a research
project investigating, among other things, the
relationship which exists between a person's
reactions to taking tests and his actual per­
formance upon tests. On the following page
are sixteen items relating to your reactions
to tests, along with directions for respond­
ing to the items. After completing the in­
formation called for on this page, please
turn to the following page. Your responses
to the individual items will be confidential.
They will not be made available to faculty
members or administrative personnel of the
university.

Additional information about the student was solicited on the cover
page, including the student's class standing, length of residence
at The Ohio State University, and approximate previous grade-point-
average at OSU.

A total test-anxiety score was computed for each student,
based upon the sum of the responses to all sixteen items of the
Inventory of Test Anxiety. These test-anxiety scores ranged from
16 to 66, with a mean score of 34.7. Since the population of
interest for this investigation was highly test-anxious students,
only those students whose total test-anxiety scores fell in the top
quartile of the entire population were considered as possible
candidates for treatment.

For those 194 students with total scores of 41 or higher
on the Inventory of Test Anxiety, separate E and W scores were
obtained by summing the responses to the eight E and eight W items
within the inventory. Both the raw E scores and the raw W scores for the 196 students were transformed into a "T" distribution (Ferguson, 1959, pp. 220-223), having the properties of a mean of 50 and a standard deviation of 10. The T score for W responses was subtracted from the T score for E responses, thus providing some indication (within the highly test-anxious population) of whether the individual student's high test-anxiety score was primarily the result of his responses to the E items or to the W items. For example, a student whose total test-anxiety score was 49, based on an E score of 28 and a W score of 21, would have a T(E) score of 64 and a T(W) score of 39. The resulting difference between the T scores (E-25) would indicate that his high test-anxiety score is more the result of his responses to E items than of his responses to W items.

Each of the 194 highly test-anxious students could thus be categorized as either a High E or a High W student, and could also be assigned a numerical approximation of the relative strength of his E or W score. Ninety-one students were classified as High E students with scores ranging from 1-46, while 93 students were classified as High W students with a range of scores from 1-48. Ten students had identical T scores for both the E and W items.

Reliability of The Inventory of Test Anxiety.

In order to obtain some estimate of the reliability of The Inventory of Test Anxiety, split-half scores on the odd and even items were taken from all of the 724 responses to this instrument gathered at the initial class session of Introductory Psychology. The procedures suggested by Jackson and Ferguson (1941, cited by
Ferguson, 1959, pp. 282-283) were used to determine a split-half reliability coefficient which was corrected for test length with the Spearman-Brown Prophecy formula. The resulting split-half reliability coefficient of .92 indicates that the great majority of variance in scores associated with the Inventory of Test Anxiety represents true variance within the population to whom it was administered. This reliability coefficient compares favorably with the split-half reliability coefficient of .91 reported for the Test Anxiety Questionnaire (Mandler and Sarason, 1952), one of the most commonly used scales for the measurement of test-anxiety.

Selection of Treatment and Control Subjects.

Students were selected for treatment on the basis of the extremity of their E or W scores. The invitation to participate in treatment sessions was extended first to those students with the most extreme scores and was continued until twenty High E and twenty High W students agreed to participate in treatment sessions designed to help them reduce their test-anxiety.

During the second week of the academic quarter, the investigator made telephone contact with 53 students and offered them the opportunity to participate in six weekly one-hour sessions for the reduction of test-anxiety as a means of fulfilling their four hours of research participation required of all Introductory Psychology students. If the student agreed to participate, the investigator emphasized the importance and the necessity for attendance at all of the sessions. The student was asked to indicate a first and second preference among the evenings on which the groups were to
meet, and was asked if he had ever taken the Study-Skills course (Psychology 120) at OSU.

After any two consecutive High E or High W students agreed to participate, the next highest E or W student was arbitrarily assigned to the no-contact control group. This procedure was followed until the forty treatment subjects were obtained and twenty control subjects had been identified.

Thirteen students refused the invitation to participate in the treatment sessions. Four were unwilling to participate, while the remaining students were unable to participate because of work schedules, evening classes, academic dismissal from the university, transfer out of Introductory Psychology, or obligations which would prohibit attendance at all of the sessions.

The no-contact control subjects were contacted by the investigator and asked if they would be willing to save one hour of their research participation until after the final examination. The explanation was offered that the investigator was interested in student reaction to the final examination in the Introductory Psychology class. There was no indication that this request was related in any way to the measurement of test-anxiety. All twenty of the control subjects agreed to participate.

Assignment of Subjects to Treatment Groups.

Two Ph.D. psychologists were employed to serve as group leaders. Four treatment groups were formed by having each of the therapists handle one desensitization group and one group for training in more effective study-skills. This design allowed for
the separate examination of therapist and treatment differences, and avoids the confounding of the two found when different therapists handle only one kind of treatment method - one of the major criticisms directed against some therapy outcome research (Mattis, 1968).

Treatment subjects were randomly assigned to the different treatment methods. Starting with the most extreme $E$ or $W$ score and proceeding to the least extreme score, subjects were alternately assigned to the two treatment methods. One deviation from randomness was necessitated when one subject who had previously taken the study-skills course at Ohio State University was initially assigned to that same treatment method.

After assignment to treatment method, subjects were assigned to therapists on the basis of their preference for the evenings on which the groups would meet. Since there was no reason to suspect that there would be any systematic differences associated with a preference for meeting on one evening as opposed to another, assignment to therapists was also considered to be random. These assignment procedures resulted in four treatment groups, each with five High $E$ and five High $W$ subjects.

Treatment Methods

All treatment groups met one hour each week for six consecutive weeks, beginning the 4th week of the academic quarter and continuing until the 9th week, approximately two weeks before the final examination period. Both treatment methods were "programmed" in that the investigator planned in detail the activities and areas
of discussion prior to the individual sessions and allotted specific
time limits to the various activities.

Desensitization.

Appendix IV contains the instructions to the therapists for
each of the sessions. In general, an attempt was made to go through
each of the five steps previously identified by Garlington and Cotler
(1968), Lang and Lazovick (1963), and Rachman (1965) as important in
desensitization procedures: (1) Instructions to Subjects, (2) Relaxa-
tion training, (3) Visualization training, (4) Hierarchy construction,
and (5) Desensitization proper.

The initial two sessions were devoted to instructions to the
subjects, relaxation training, and the construction of the group
anxiety-hierarchy. A three-minute tape (Appendix V), slightly
modified from that reported by Garlington and Cotler (1968) was
developed to explain and introduce desensitization principles to
the subjects. During the first session, the subjects were exposed
to a thirty-minute tape designed to help students learn how to relax
more completely. This relaxation tape, prepared by Dr. Gerald
Davison at the Palo Alto V.A. Hospital in 1965, is presently avail-
able either from Dr. Davison at the State University of New York
at Stoney Brook or from the Psychological and Counseling Center at
Vanderbilt University. The tape presents relaxation instructions
for twenty-one different muscle groups.

At the conclusion of the first session, the therapists
provided each subject with a copy of A Guide for Training in Muscle
Relaxation (Appendix VI) and Report of Practice in Muscle Relaxation
(Appendix VII), both prepared by the investigator. The subjects were instructed to spend some time each day practicing the relaxation practices described in *A Guide for Training in Muscle Relaxation* and to record the amount of time actually spent in practice on the Report of Practice in Muscle Relaxation.

During the second session, after presentation of the relaxation tape, each subject completed the Test-Anxiety Hierarchy (Appendix VIII). This hierarchy, developed by the investigator from descriptions of anxiety-hierarchies in previous investigations of test-anxiety reduction, describes 18 situations which would be expected to elicit varying degrees of anxiety among the subjects. Nine of the items refer to mid-term examinations and nine refer to final examinations. Both sets of items range in time from the day before examinations (e.g., studying or going to sleep the night before an important examination) to the actual examination period (e.g., sitting in class before an examination is distributed, receiving the examination, finding that you are rushed for time during an examination, etc.). Subjects were instructed to rank these 18 descriptions from least to most anxiety-provoking. The group anxiety-hierarchy was constructed by averaging the responses of subjects within each desensitization group. At the end of the second session, the subjects were again provided copies of the practice guide and the form for recording the time spent in relaxation practice.

The third and fourth sessions were almost identical. After the relaxation tape was presented, practice was provided for train-
ing in visualization of neutral scenes as a preparation for the visualization of the hierarchy items. A ten-minute tape (Appendix IX) was prepared which described three neutral scenes (relaxing at a beach, sitting in a friend's back yard, shopping at a supermarket) and subjects were requested to continue to relax while they imagined themselves in the different situations.

At the conclusion of the visualization training, the anxiety-hierarchy items were presented in sequence, beginning with the least anxiety-provoking scene. Prior to presenting the first item, the therapists informed subjects that they should signal by raising a hand if they experienced any feelings of discomfort or tension as they visualized themselves in the hierarchy scenes. It was also explained that individual help was available if any subject should experience anxiety so severe that he could not continue on to a new item with the rest of the group. A standard 5-6 sentence description was prepared for each hierarchy scene (Appendix X), and these descriptions were read slowly by the therapist. Each new scene was repeated up to three times, depending on whether or not any subjects continued to indicate the presence of anxiety. Between each presentation the therapist spent a few moments in urging the subjects to relax even more deeply, if possible.

The final two sessions were devoted almost exclusively to working on the hierarchy items. The therapist spent the first ten minutes inducing relaxation and the final fifty minutes in desensitization proper. The therapist repeated each of the scenes previously covered in earlier sessions once and then proceeded to new
hierarchy items. As a final step, during the last session, the therapist presented one time each of the 18 items from the least to most anxiety-provoking. Each hierarchy scene was thus described at least four times during the treatment period, while some of the less anxiety-provoking scenes were repeated up to seven times.

**Study-Skills Training.**

Appendix XI contains the instructions to the therapist for the six sessions designed to help students reduce their test-anxiety through training in more effective study-skills. In general, an attempt was made to have the subjects actually try out new methods of organizing for study and new study techniques. Since there was more group discussion and more opportunity for differences in therapist style to emerge than in the desensitization treatment, all sessions were tape recorded for possible future analysis.

The first two sessions were built around a consideration of efficient use of time and effective study conditions within the campus environment. The first session included a discussion of the heavy demands placed upon the time of college students and the manner in which the subjects were currently attempting to balance course-related and personal obligations. Each subject was asked to keep a one-week record of the way in which he actually spent his time and was asked to become aware of the interruptions which occurred when he did attempt to study.

The first half of the second session was spent in a discussion of what the subjects had observed about their use of time and the interruptions which they had experienced during the previous
week. A basic attempt was made to get subjects to suggest specific behavioral steps which might be taken to reduce the number of study interruptions and to meet more adequately the course-related demands upon their available time. The second half of this session was used to construct a proposed time schedule for the following week. The schedule was described as a vehicle for helping the student to accomplish what he wanted to get done rather than something which had to be followed at all costs.

During the third session, the subjects were introduced to the SQ3R study method (Robinson, 1961), a method designed to help students: (1) select what they are expected to know, (2) comprehend these ideas more rapidly, (3) fix these ideas in the student's memory, and (4) review for examinations efficiently. Each subject was provided with a copy of Effective Study (Robinson, 1961) and given the opportunity to read about, discuss, and raise questions about the SQ3R study method. The last portion of the session was spent in constructing a more effective proposed time schedule, based upon the experiences of the previous week.

The fourth session was primarily devoted to practice in the use of the SQ3R study method. Copies of Steps in the Survey SQ3R Method of Study (Appendix XII) were provided for each subject as a means of summarizing the previous week's discussion, and subjects were encouraged to share their experiences in attempting to use the new method the previous week. Half of the session was allotted to using the SQ3R method over A Test of Reading Ability: Canadian History (Robinson and Hall, 1940) in order to practice the method
on representative material and to get some feedback about their ability to use it.

During the fifth session, subjects practiced the use of the SQ3R over a chapter from their Introductory Psychology textbook. They also practiced predicting examination questions which might be likely to be asked over that kind of material.

The final session was spent in a consideration of methods for keeping calm during examinations and methods for the systematic attack on the kinds of objective and essay questions students typically encounter in their examinations. In addition to the use of appropriate sections from Effective Study (Robinson, 1961), a mimeographed passout on Examination Skills (Appendix XIII) from the Ohio State University Counseling Center was distributed to each subject. The two sources served as the basis for the discussion period.

Throughout all of the sessions, the basic focus was on helping the subjects to examine their present modes of behavior and to try out new and more productive ways of meeting the academic demands of their current environment. There was also a continued emphasis upon the fact that more effective academic preparation could result in fewer feelings of tension and apprehension prior to and during examinations.

Therapists

In addition to the fact that both are female, the two therapists in this investigation were similar in some important respects. Both had received their Ph.D.'s in Counseling Psychology
at The Ohio State University within the past three years, both had
previous experience as either an instructor or a course supervisor
with the study-skills course at OSU, and neither had any previous
experience with desensitization techniques. The most obvious dif­
ference, other than normal personality differences, resides in their
employment. Therapist A has worked at a public health clinic and
at a Veteran's Administration outpatient clinic since her gradu­
ation three years ago. Therapist B received her degree a year
earlier and has been working at the Ohio State University Counsel­
ing Center in the area of academic adjustment.

During the treatment period, it was necessary for Therapist
A to miss one session of each of her two groups and for Therapist
B to be absent from one session of one of her groups. Fortunately,
a third female therapist who was similar to the regular therapists
was available to serve as a substitute for these sessions. She had
also received her Ph.D. in Counseling Psychology at OSU within the
three-year period, had taught the study-skills course, and had no
previous experience with desensitization.

The investigator met with the regular therapists three times
prior to the beginning of the treatment period. The first meeting
was individual, at which time the purpose of the study was explained
and desensitization techniques were discussed at length. During
the second meeting the therapists listened to the relaxation tape
and became more familiar with relaxation procedures. The final
meeting was used to present more specific plans for the individual
treatment sessions and to answer any questions the therapists had
thought of in the intervening period. After the treatment period had started, the investigator met with each therapist both prior to and immediately after each treatment session.

Dependent Measures

Three criteria were used to judge the efficacy of the treatment methods: (1) changes in self-reported examination anxiety after treatment, (2) changes in academic performance after treatment, and (3) changes in the level of physical activity during examinations after treatment.

Changes in Self-Reports of Test-Anxiety.

At the end of the last treatment session, the investigator met briefly with treatment subjects to sign their research participation cards. At that time he secured the voluntary agreement of all subjects to record their reactions to the final examination in Introductory Psychology immediately after they had completed it. At the beginning of the final examination, the individual instructors of Introductory Psychology gave postcards to any treatment or control subject in their class. These postcards reminded the subject of their appointment and the room number where they would meet the investigator.

When one of the subjects appeared, after completing the final examination, he was handed a copy of *The Inventory of Test Anxiety*, slightly modified, and asked to record his reactions to the examination as accurately and honestly as possible. He was
led to one of three empty offices nearby and asked to return the inventory when it had been completed.

The sixteen items of the modified Inventory of Test Anxiety (Appendix XIV) were identical to those in the original instrument, but they were reworded to refer specifically to the Introductory Psychology final examination. For example, the first item on The Inventory of Test Anxiety originally read, "I feel panicky while taking course examinations." That same item on the modified form of that instrument read, "I felt panicky while taking my Psychology 100 final examination." The directions to the subject also reflected this slight shift in emphasis. Rather than asking subjects to indicate how they usually felt during course examinations (original), subjects were instructed to, "...indicate how you actually did feel while you were taking your Psychology 100 final examination." The five-point scale for responding to the items was identical in both administrations.

These modifications of The Inventory of Test Anxiety were made to take account of Johnson and Sechrest's (1968) observation that the use of identical anxiety-scales before and after treatment may obscure legitimate treatment effects. Most anxiety scales are comprised of items which are designed to describe the manner in which an individual habitually reacts to testing situations. If this kind of item is used after treatment, however, the subject may be reporting how he ordinarily reacts, even though he may have experienced and been aware of less anxiety on tests taken after treatment. Johnson and Sechrest conclude that, "It would seem at
this point that a self-report measure of this type would be most meaningful if it applied to a specific examination and if it were administered directly after such an examination." (p. 285)

Changes in Academic Performance

In order to measure any changes in academic performance which might have resulted from treatment effects, examination scores for the first mid-term and final examination were secured for each subject. The first mid-term examination was administered during the same week in which the treatment groups first met and the final examination occurred after the completion of treatment.

Changes in Level of Physical Activity During Examinations.

Near the end of the academic quarter immediately preceding the quarter in which this investigation was conducted, the Test-Anxiety Scale (Sarason, 1958) was administered in eleven psychology classes. The three students within each class who obtained the highest test-anxiety scores were identified and later observed by their instructors or by psychology graduate students while they took their final examinations. The observer was asked to record every physical movement of these highly test-anxious subjects during ten random 30-second intervals within the final examination period. Every observer was provided with an instruction sheet (Appendix XV) and an individual observation sheet (Appendix XVI) for each of the students to be observed.

The thirty-three observation sheets were then examined in order to determine which physical movements were most characteristic of students with high test-anxiety scores. The fifteen physical
movements which were most frequently recorded by the observers became the basis for the measurement of physical activity in this investigation. These movements fell into five major categories, each having from two to four specific movements associated with them: (1) Movements of the head, (2) Movements of the non-writing hand, (3) Movements of the writing hand, (4) Movements of the feet and legs, and (5) Gross body movements.

Seven upper-class undergraduates were selected to serve as observers from a population of eighteen students who originally volunteered for this research project as a means of earning academic credit. Prior to the first Introductory Psychology mid-term examination, these observers were given three hours of training in looking for and recording those physical movements previously identified as characteristic of highly test-anxious subjects. A fifteen-minute video-tape was prepared for training purposes in which an individual was pictured repeatedly engaging in different combinations of the physical movements under consideration. The training proceeded systematically from brief intervals in which only one kind of movement was observed to a full twenty-second interval during which all of the fifteen movements were to be measured.

In addition to their training in observation of physical movements, the observers were also trained to be unobtrusive in their classroom behavior. None of the treatment or control subjects was aware that their test-taking behavior was to be observed. The observers played the role of classroom proctors and wandered
throughout the classroom during the examination period. When they reached a favorable position from which to observe one of their assigned subjects, the observers obtained a twenty-second sample of physical activity. The number and kind of movements were recorded a few moments later in an area where the writing activity of the observers could not be noticed by the class members.

Each observer was responsible for from two-four subjects in any one class period, and they secured nine random twenty-second samples (three minutes) of physical activity for each subject. Measures of physical activity were secured at the first mid-term and final examination and recorded on the Physical Activity Observation Sheet (Appendix XVII), provided to observers for each subject they were to measure. The observer had no knowledge about the treatment or control status of any of the students they observed. One observer served as an actual proctor in each of the classes during the second mid-term, even though no measures of physical movement were obtained, in order to provide continuity to the classroom procedures during examination periods.

Reliability of Observers' Ratings.

At a final training session, just prior to the first mid-term examination, the seven observers measured the number of physical movements during nine twenty-second intervals of the video-taped training film. The investigator provided a starting signal for each observation period but no ending signal, so that each observer had to judge the twenty-second interval for himself. Approximately 60-75 seconds after the completion of each observation interval,
the observers recorded the number and kind of physical movements they had noted during the twenty-second interval.

The number of physical movements recorded during these nine periods for the seven judges ranged from twenty-three to twenty-seven. The variance of 2.33 and standard deviation of 1.53 for these total physical movement scores indicates that there was substantial agreement among the observers. One estimate of the reliability of the observers' ratings was made possible by treating each of the individual fifteen physical movements as a separate category. The fifteen movements were rank-ordered for each observer, from most to least frequently observed during the total nine observation periods. The Coefficient of Concordance (W) with tied ranks (Ferguson, 1959, pp. 186-189) was used to obtain an inter-observer reliability estimate of .72. It should be noted that this is a much more stringent test of agreement among the observers than is required where the only unit of measurement is the number of physical movements. The agreement of the observers, both as to the number of physical movements and the kind of movements, was considered to be acceptable for this preliminary investigation into the potential usefulness of physical activity as a measure of anxiety reduction.

Design

Four treatment groups for the reduction of test-anxiety, each with five High E and five High W subjects, were formed by having each of two therapists handle a desensitization group and a study-skills training group. The main and interaction treatment effects
due to therapist, treatment method, and type of subject were examined in a 2 x 2 x 2 factorial design, pictured below:

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1</td>
<td></td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>N=5</td>
<td></td>
<td>N=5</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>N=5</td>
<td></td>
<td>N=5</td>
<td></td>
</tr>
</tbody>
</table>

A1 = Therapist A  
A2 = Therapist B  
B1 = Desensitization  
B2 = Study-Skills Training  
C1 = High W Subjects  
C2 = High E Subjects

In addition to the treatment subjects, shown above, ten High E and ten High W subjects were randomly assigned to a no-contact control group.

Hypotheses

The following eleven hypotheses were tested in this investigation.

1.1 High E subjects treated for high test-anxiety by desensitization will report a greater reduction of test-anxiety after treatment, as evidenced by lower scores on the modified Inventory of Test Anxiety, than will High E subjects treated by training in more effective study-skills.

1.2 High W subjects treated by Study-Skills training will report
a greater reduction of test-anxiety after treatment than will High W subjects treated by desensitization.

1.3 Subjects treated for high test-anxiety, both by desensitization and by Study-Skills training, will report a greater reduction of test-anxiety than will no-contact control subjects.

2.1 High E subjects treated for high test-anxiety by desensitization will show a greater increase in academic performance after treatment, as evidenced by higher scores on the final examination, than will High E subjects treated by training in more effective study-skills.

2.2 High W subjects treated by Study-Skills training will show a greater increase in academic performance after treatment than will High W subjects treated by desensitization.

2.3 Subjects treated for high test-anxiety, both by desensitization and by Study-Skills training, will show a greater increase in academic performance than will no-contact control subjects.

3.1 High E subjects treated by desensitization will show a greater reduction in physical activity during examinations, as evidenced by fewer physical movements during the final examination, than will High E subjects treated by training in more effective study-skills.

3.2 High W subjects treated by Study-Skills training will show a greater reduction of physical activity during examinations than will High W subjects treated by desensitization.
3.3 Subjects treated for high test-anxiety, both by desensitization and by Study-Skills training, will show a greater reduction of physical activity during examinations than will no-contact control subjects.

4.1 For those subjects treated for high test-anxiety, both by desensitization and Study-Skills training, changes in the level of physical activity after treatment will be positively and significantly correlated with changes in self-reported test-anxiety after treatment.

4.2 For treatment subjects, changes in the level of physical activity after treatment will be negatively and significantly correlated with changes in academic performance after treatment.
CHAPTER IV

RESULTS

Subject Loss

Before treatment began, it had been decided that a subject would be eliminated from the data analysis if he missed more than one treatment session. In spite of reminder postcards sent weekly to all treatment subjects, six subjects were thus deleted from the treatment program. It had originally been planned to use, as a comparison group, any subjects who were eliminated, but two of these subjects subsequently dropped the Introductory Psychology class and another failed to complete the final examination.

Of the remaining thirty-four subjects who completed the treatment program, twelve missed one session and twenty-two attended all six sessions. There were no significant differences in subject loss or attendance rate associated with therapist, treatment condition, or type of subject.

One observer became ill just prior to the first mid-term examination and was unable to observe three subjects in one class to which he had been assigned. The number of physical movements for the remaining thirty-one treatment subjects was measured at both the first mid-term examination and the final examination in their Introductory Psychology class.
Data Analysis

Campbell and Stanley (1966, p. 23) have noted that the most widely used method for testing differences between a treatment and a control group has been to compute for each group pretreatment-posttreatment gain scores and then to compute a $t$ between experimental and control groups on these gain scores. These authors go on to suggest, however, that the most appropriate method for assessing the effects of a treatment group relative to a control group is to use the analysis of covariance with the pretreatment scores as a covariate. Their suggestion was employed in this investigation.

To test the predictions concerning an interaction between treatment method and type of subject, a factorial analysis of covariance was computed for treatment subjects alone, using pretreatment scores as a covariate. This allows for the examination of differences among treatment subjects which are associated with therapists, treatment methods, and type of subject.

To test the predictions that both treatment methods would lead to a greater reduction in test-anxiety than would assignment to a control group, a one-way analysis of covariance using pretreatment scores as a covariate was computed for all subjects treated by desensitization, all subjects treated by training in more efficient study techniques, and all control subjects. Similar one-way analyses of covariance were conducted for both High $E$ and High $W$ subjects within these three groups.

To test the final prediction that changes in physical activity would be correlated with the other measures of test-anxiety reduction,
product-moment correlations were computed between the pretreatment-posttreatment change scores in reported test-anxiety, academic performance, and physical activity.

Test of the Hypotheses

Changes in Self-Reported Test-Anxiety.

Hypotheses 1.1 and 1.2 had predicted an interaction effect between treatment method and type of subject such that High E subjects would report less anxiety following treatment by desensitization than following treatment by study-skills training and High W subjects would report less anxiety after treatment by study-skills training than after treatment by desensitization.

Table 1 shows the mean posttreatment scores on The Inventory of Test Anxiety for treatment subjects, adjusted to control for pretreatment differences among the groups. Table 2 shows the summary of the factorial analysis of covariance, with final Inventory of Test Anxiety scores as the dependent measure and initial scores on that instrument as the covariate.
TABLE 1

MEAN POST-TREATMENT SCORES on "THE INVENTORY OF TEST ANXIETY" FOR TREATMENT SUBJECTS IN RELATIONSHIP TO THERAPIST, TREATMENT CONDITION, AND TYPE OF SUBJECT

<table>
<thead>
<tr>
<th>Type of Systematic Desensitization</th>
<th>Therapist A</th>
<th>Therapist B</th>
<th>Therapist A</th>
<th>Therapist B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study-Skills Training</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
</tr>
<tr>
<td>High W</td>
<td>38.0 (^b) 11.1</td>
<td>40.5 8.9</td>
<td>37.6 4.7</td>
<td>35.1 4.7</td>
</tr>
<tr>
<td>Subjects (N=5)</td>
<td>(N=5)</td>
<td>(N=4)</td>
<td>(N=3)</td>
<td></td>
</tr>
<tr>
<td>High E</td>
<td>33.5 9.9</td>
<td>36.5 13.9</td>
<td>37.5 5.5</td>
<td>49.3 4.1</td>
</tr>
<tr>
<td>Subjects (N=4)</td>
<td>(N=4)</td>
<td>(N=4)</td>
<td>(N=5)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) All post-treatment means are adjusted by covariance to control for pre-treatment differences.

\(^b\) The higher the score, the greater the intensity of reported anxiety during the final examination.
### TABLE 2

**SUMMARY OF ANALYSIS OF COVARIANCE OF POST-TREATMENT SCORES ON THE "INVENTORY OF TEST ANXIETY" FOR TREATMENT SUBJECTS**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapist (A)</td>
<td>1</td>
<td>60.8</td>
<td></td>
</tr>
<tr>
<td>Treatment Method (B)</td>
<td>1</td>
<td>113.4</td>
<td>1.31</td>
</tr>
<tr>
<td>Type of Subject (C)</td>
<td>1</td>
<td>15.2</td>
<td></td>
</tr>
<tr>
<td>A x B</td>
<td>1</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>A x C</td>
<td>1</td>
<td>259.8</td>
<td>2.99</td>
</tr>
<tr>
<td>B x C</td>
<td>1</td>
<td>102.9</td>
<td>1.18</td>
</tr>
<tr>
<td>A x B x C</td>
<td>1</td>
<td>92.3</td>
<td>1.06</td>
</tr>
<tr>
<td>Error</td>
<td>25</td>
<td>86.8</td>
<td></td>
</tr>
</tbody>
</table>

An examination of the B x C interaction in Table 2 shows that hypotheses 1.1 and 1.2 received no support. The only main or interaction effect approaching significance is the interaction between therapist and type of subject (p < .10). An examination of Table 1 shows that for those subjects treated by Therapist A, High E subjects reported slightly less test-anxiety during the final examination than did High W subjects. For those subjects treated by Therapist B, High W subjects reported somewhat less anxiety than did High E subjects.

Hypothesis 1.3 had predicted that subjects treated by study-skills training and subjects treated by desensitization would report less anxiety following treatment than would control subjects. The one-way analysis of covariance for these three groups yielded an F of 2.84 (df = 2,50, p < .10). Although there is thus no support for the overall hypothesis that both treatments would be more effective in reducing reported test-anxiety than would assignment to a no-contact control group, the marginal significance of the F
allows for a comparison of the individual means. Table 3 reports the adjusted post-treatment means for the three groups. An examination of that table shows that the greatest difference in reported

**TABLE 3**

ADJUSTED POST-TREATMENT MEAN SCORES ON "THE INVENTORY OF TEST ANXIETY" FOR DESENSITIZATION, STUDY-SKILLS TRAINING, AND CONTROL SUBJECTS

<table>
<thead>
<tr>
<th></th>
<th>Study-Skills Training Group (N=17)</th>
<th>Desensitization Group (N=17)</th>
<th>Control Group (N=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted Mean</td>
<td>36.3b</td>
<td>40.9</td>
<td>43.9b</td>
</tr>
</tbody>
</table>

^a Means adjusted by covariance to control for pre-treatment differences.

^b Means significantly different from one another at p < .05.

test-anxiety reduction occurred between desensitization and control subjects. In order to test the significance of this difference, a comparison of the adjusted means was made using the Newman-Keuls sequential range test for unequal sample sizes (Winer, 1962, pp. 101-104). This comparison showed that the means of the desensitization and control groups were significantly different from each other (p < .05), with desensitization subjects reporting less test-anxiety during the final examination than did control subjects.

Further analyses were performed upon the mean Inventory of Test Anxiety post-treatment scores for High W subjects in the desensitization, study skills, and control groups and for High E subjects within those three groups. The one-way analysis of covariance for High W subjects yielded a nonsignificant F of 1.40 (df = 2,23). The
differences between the adjusted post-treatment means of the High E subjects were also nonsignificant ($F = 1.65$, $df = 2,23$). The pattern of mean scores for these three groups was different, however, for High W and High E subjects. Table 4 shows the adjusted post-treatment mean scores on The Inventory of Test Anxiety for High W and High E subjects within the two treatment and the control groups. An examination of this table shows that reported anxiety during the final

TABLE 4

ADJUSTED MEAN POST-TREATMENT SCORES ON "THE INVENTORY OF TEST ANXIETY FOR HIGH W AND HIGH E SUBJECTS WITHIN STUDY-SKILLS TRAINING, DESENSITIZATION, AND CONTROL GROUPS"

<table>
<thead>
<tr>
<th></th>
<th>Study-Skills</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Desensitization</td>
<td>Training</td>
<td>Control</td>
</tr>
<tr>
<td>Adjusted$^a$ means for:</td>
<td>Group</td>
<td>Group</td>
<td>Group</td>
</tr>
<tr>
<td>High W Subjects</td>
<td>36.2 (9)$^b$</td>
<td>37.3 (8)</td>
<td>42.7 (10)</td>
</tr>
<tr>
<td>High E Subjects</td>
<td>36.4 (8)</td>
<td>44.2 (9)</td>
<td>45.1 (10)</td>
</tr>
</tbody>
</table>

$^a$ All means adjusted to control for pre-treatment differences.

$^b$ The number of subjects in each group reported in parantheses.

examination was very similar for High W and High E subjects treated by desensitization. For those subjects treated by study-skills training, however, High W subjects reported somewhat less anxiety than did High E subjects. A test of the difference between High E and High W subjects treated by study-skills training was not significant ($t = 1.30$, $df = 15$).
In addition to examining the total scores on *The Inventory of Test Anxiety*, separate analyses were conducted on the E scores and the W scores of that instrument. There were no significant differences among the post-treatment E or W scores for treatment subjects attributable to the main or interaction effects of therapist, treatment method, or type of subject. Neither of the one-way analyses of covariance computed for the post-treatment scores of subjects within the two treatment and control groups was significant. In every instance, however, desensitization subjects reported less anxiety during the final examination than did study-skills training subjects, who, in turn, reported less anxiety than did control subjects. Separate tables showing the post-treatment E scores and post-treatment W scores for treatment subjects are included in Appendix XVIII for interested readers.

Hypotheses 1.1 and 1.2 received no support. There was no evidence to suggest that desensitization was more effective for reducing the test-anxiety of High E subjects, nor that training in efficient study techniques was more helpful for reducing test-anxiety among High W subjects. There was some support, however, for hypothesis 1.3. While study-skills training was clearly no more effective in reducing reported test-anxiety than was assignment to a control group, desensitization subjects reported significantly less anxiety during the final examination than did control subjects. Further, in every comparison of the treatment and control subjects, desensitization subjects reported the least amount of anxiety, both for High E and High W subjects.
Changes in Academic Performance.

Hypothesis 2.1 predicted that High E subjects treated by desensitization would receive higher scores on the final examination than would High E subjects receiving study-skills training. Hypothesis 2.2 predicted that High W subjects provided with training in study techniques would receive higher scores than would High W subjects treated by desensitization.

Table 5 shows the mean final examination scores of treatment subjects, adjusted to control for group differences on the first mid-term examination, in relationship to therapist, treatment method, and type of subject. Table 6 shows the summary of the analysis of covariance of the final examination scores for treatment subjects,
TABLE 5

MEAN FINAL EXAMINATION SCORES FOR TREATMENT SUBJECTS IN RELATIONSHIP TO THERAPIST, TREATMENT CONDITION, AND TYPE OF SUBJECT

<table>
<thead>
<tr>
<th>Type of Systematic Desensitization Study-Skills Training</th>
<th>Therapist A</th>
<th>Therapist B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean S.D. Mean S.D. Mean S.D. Mean S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High W</td>
<td>65.69.9 66.7 11.5</td>
<td>76.0 6.8 61.0 10.6</td>
</tr>
<tr>
<td>Subjects (N=5) (N=5) (N=4) (N=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High E</td>
<td>63.7 17.2 67.8 18.9</td>
<td>70.0 11.4 63.4 15.8</td>
</tr>
<tr>
<td>Subjects (N=4) (N=4) (N=4) (N=5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(\text{All final examination means are adjusted to control for differences in mean performance on the first mid-term examination.}\)

\(\text{The higher the score, the better the performance on the final examination.}\)
with scores on the first mid-term examination as covariate. An examination of Table 6 shows that the treatment method x type of subject interaction is clearly nonsignificant. There is no support for hypothesis 2.1 or hypothesis 2.2.

With the exception of a therapist x treatment method interaction which approaches significance (p < .10), there are no main or interaction effects upon examination performance due to therapist, treatment method, or type of subject. An examination of Table 5 reveals that this therapist x method interaction is due to slightly higher scores on the final examination for study-skills training subjects under Therapist A, and slightly better academic performance for desensitization subjects treated by Therapist B.

Hypothesis 2.3 had predicted that subjects within the two treatment methods would receive higher scores on the final examination
than would control subjects. Table 7 shows the mean scores on the final examination, adjusted for differences on the first mid-term examination, for desensitization, study-skills training, and control subjects. An examination of Table 7 shows that control subjects received higher scores than did either desensitization or study-skills treatment subjects. The $F$ for this one-way analysis of covariance is significant ($F = 4.42$, $df = 2,50$, $p < .05$). Further, the Newman-Keuls sequential range test indicates that the difference between the final examination scores of study-skills subjects and the control subjects is significant ($p < .05$).

Separate analyses of the scores for High $E$ and High $W$ subjects within the three groups were conducted to determine whether these unanticipated results were true for all subjects or were true for only one type of subject. A one-way analysis of covariance on the scores of High $W$ subjects in desensitization, study-skills, and control groups yielded a nonsignificant $F$ of 0.9. There was also

### Table 7

<table>
<thead>
<tr>
<th></th>
<th>Desensitization</th>
<th>Study-Skills Training</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group $(N=17)$</td>
<td>Study $(N=17)$</td>
<td>Group $(N=20)$</td>
<td></td>
</tr>
<tr>
<td>Adjusted Mean$^a$</td>
<td>69.5</td>
<td>65.5$^b$</td>
<td>76.2$^b$</td>
</tr>
</tbody>
</table>

$^a$ Means adjusted to control for group differences on the mid-term examination.

$^b$ Means significantly different from one another at $p < .05$. 
little difference among the adjusted mean scores, with a mean score on the final examination of 64.2 for study-skills training subjects, 70.0 for desensitization subjects, and 71.6 for control subjects.

This would suggest that the differences in academic performance favoring the control subjects would be most evident among High E subjects. Table 8 presents the mean final examination scores, adjusted for mid-term examination differences, for High E subjects in the desensitization, study-skills training, and control groups.

**TABLE 8**

<table>
<thead>
<tr>
<th>Desensitization Group</th>
<th>Study-Skills Training Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N=8)</td>
<td>(N=9)</td>
<td>(N=10)</td>
</tr>
<tr>
<td>Adjusted Mean(^a)</td>
<td>68.9(^b)</td>
<td>66.8(^c)</td>
</tr>
</tbody>
</table>

\(^a\) Means are adjusted to control for differences on the mid-term examination.

\(^b\) Means significantly different from one another at \(p < .05\).

\(^c\) Means significantly different from one another at \(p < .05\).

It will be seen that the High E control subjects received significantly higher scores on the final examination than did High E subjects in either of the two treatment groups \((p < .05)\). The \(F\) for the one-way analysis of covariance reflects this significantly better performance by High E control subjects \(F = 4.6, \, df = 2.23, \, p < .05\). It may be concluded, therefore, that the significantly
better performance on the final examination by control subjects is primarily due to High E, rather than High W, subjects.

It is important to determine whether the significant difference favoring the control subjects on the final examination was the result of improved performance by control subjects or of decreased performance on the part of treatment subjects. Since the test length was not identical for the first mid-term and final examinations, the most meaningful standard of comparison for the two examinations is the percentile rank within the total population of Introductory Psychology students taking the examinations. Table 9 shows the mean percentile rank on the mid-term and final examination for desensitization, study-skills, and control subjects. Comparisons are shown for all subjects as well as for High W and High E subjects.

<table>
<thead>
<tr>
<th></th>
<th>Desensitization</th>
<th>Study-Skills Training</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Midterm</td>
<td>Final Midterm</td>
<td>First Midterm</td>
</tr>
<tr>
<td>All Subjects</td>
<td>41.6</td>
<td>42.8</td>
<td>40.1</td>
</tr>
<tr>
<td>High W Subjects</td>
<td>44.2</td>
<td>46.9</td>
<td>37.1</td>
</tr>
<tr>
<td>High E Subjects</td>
<td>38.6</td>
<td>38.2</td>
<td>42.7</td>
</tr>
</tbody>
</table>

This table reveals that the superior performance of control subjects on the final examination was primarily due to the increase in academic performance on the part of control subjects, rather than
to decrements in performance by treatment subjects. Study-skills training subjects evidenced a slight drop in percentile rank from the first mid-term to the final examination, desensitization subjects showed almost identical percentile ranks for the two tests, and control subjects showed marked gains in percentile rank between the two examinations, particularly High E control subjects who went from a mean percentile rank of 49 on the mid-term examination to a mean percentile rank of 69 on the final examination.

In retrospect, none of the three hypotheses concerning academic performance received any support. There was no interaction effects between treatment method and type of subject of the kind predicted by hypotheses 2.1 and 2.2. Contrary to hypothesis 2.3, control subjects received significantly higher scores on the final examination than did subjects given training in the use of efficient study techniques. High E control subjects had significantly higher scores on the final examination than did High E subjects treated by either desensitization or study-skills training.

Changes in Physical Activity.

Hypotheses 3.1 and 3.2 had predicted a treatment method x type of subject interaction for the reduction of physical activity similar to those predicted for earlier measures. Table 10 shows the mean number of movements scored by the observers for treatment subjects during a three-minute period of their final examination. Table 11 shows the summary of the analysis of covariance for this measure on the part of treatment subjects. An examination of this table reveals the predicted method x subject interaction is clearly non-
### TABLE 10
MEAN NUMBER OF SELECTED PHYSICAL MOVEMENTS ON THE FINAL EXAMINATION IN RELATIONSHIP TO THERAPIST, TREATMENT CONDITION, AND TYPE OF SUBJECT

<table>
<thead>
<tr>
<th>Type of Subject</th>
<th>Therapist A</th>
<th></th>
<th>Therapist B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Systematic Desensitization</td>
<td>Study-Skills Training</td>
<td>Systematic Desensitization</td>
<td>Study-Skills Training</td>
</tr>
<tr>
<td>Mean</td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>High W</td>
<td>16.0</td>
<td>7.4</td>
<td>13.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=5)</td>
<td>(N=5)</td>
<td>(N=4)</td>
<td>(N=3)</td>
</tr>
<tr>
<td>High E</td>
<td>19.5</td>
<td>3.7</td>
<td>9.6</td>
<td>4.7</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=4)</td>
<td>(N=4)</td>
<td>(N=4)</td>
<td>(N=5)</td>
</tr>
</tbody>
</table>

*All final examination means are adjusted to control for differences in mean number of movements on the first mid-term examination.*
### Table 11

**Summary of Analysis of Covariance of the Number of Selected Physical Movements During the Final Examination for Treatment Subjects**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapist (A)</td>
<td>1</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>Treatment Method (B)</td>
<td>1</td>
<td>161.9</td>
<td>3.78</td>
</tr>
<tr>
<td>Type of Subject (C)</td>
<td>1</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>A x B</td>
<td>1</td>
<td>38.5</td>
<td></td>
</tr>
<tr>
<td>A x C</td>
<td>1</td>
<td>34.2</td>
<td></td>
</tr>
<tr>
<td>B x C</td>
<td>1</td>
<td>20.4</td>
<td></td>
</tr>
<tr>
<td>A x B x C</td>
<td>1</td>
<td>113.9</td>
<td>2.71</td>
</tr>
<tr>
<td>Error</td>
<td>25</td>
<td>42.9</td>
<td></td>
</tr>
</tbody>
</table>

significant. Table 11 also reveals a marginally significant effect \((p < .10)\) of treatment method upon the number of physical movements engaged in by treatment subjects during the final examination. An examination of Table 10 will show that desensitization subjects engaged in a slightly greater number of physical movements during the final examination than did subjects receiving training in study techniques.

Hypothesis 3.3 predicted that treatment subjects would show a greater reduction in the number of movements on the final examination than would control subjects. A one-way analysis of covariance, using the number of physical movements during a three-minute period during the first mid-term examination as a covariate, revealed that there was no support for Hypothesis 3.3 \((F = 2.4, df = 2.50, \text{n.s.})\). There was not a greater reduction in physical activity for treatment subjects. In fact, desensitization subjects showed the highest mean
number of movements during the three-minute period of the final examination (16.1), followed by control subjects (12.5), and study-skills training subjects (11.9).

Intercorrelations Among Dependent Measures

Changes in Physical Activity and Reported Test-Anxiety.

Hypothesis 4.1 had predicted that change scores in physical activity for treatment subjects would be positively and significantly correlated with changes in self-reported anxiety following treatment. This hypothesis presumes that decreases in reported anxiety during an examination will be reflected in a decrease in the number of physical movements engaged in during the same examination. Table 12 presents the product-moment correlation coefficients between change scores in the number of physical movements observed during a three-minute period from the first mid-term to the final examination and change scores occurring on the Inventory of Test Anxiety from the first administration to the second administration immediately following the final examination.

Since the scores for some subjects increased while others decreased following treatment, a constant was added to both sets of scores in order to make all scores positive. A high change score on the observed movements represents an increase in the number of movements from the first mid-term to the final examination, while a low change score represents a decrease in physical activity. A high change score for test-anxiety reflects an increased score on the Inventory of Test Anxiety on the second administration, and a low score represents a decreased score.
Table 12 reports the correlation between these two measures for (A) all treatment subjects, with a further breakdown of the correlations among all High W and all High E treatment subjects.

**TABLE 12**

**PRODUCT-MOMENT CORRELATIONS BETWEEN CHANGE SCORES FOR MEASURES OF PHYSICAL MOVEMENT AND TEST-ANXIETY**

<table>
<thead>
<tr>
<th>Correlation</th>
<th>A. For All Subjects:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.29* (N=51)</td>
<td></td>
</tr>
<tr>
<td>1. High W Subjects:</td>
<td>-.33 (N=16)</td>
<td></td>
</tr>
<tr>
<td>2. High E Subjects:</td>
<td>-.42 (N=15)</td>
<td></td>
</tr>
<tr>
<td>3. Control Subjects:</td>
<td>-.10 (N=20)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correlation</th>
<th>B. For Treatment Subjects:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.35* (N=31)</td>
<td></td>
</tr>
<tr>
<td>1. Desensitization Subjects:</td>
<td>-.44 (N=15)</td>
<td></td>
</tr>
<tr>
<td>2. Study-Skills Training Subjects:</td>
<td>-.21 (N=16)</td>
<td></td>
</tr>
<tr>
<td>3. High Es, Desensitization:</td>
<td>-.44 (N=7)</td>
<td></td>
</tr>
<tr>
<td>4. High Es, Study-Skills Training:</td>
<td>-.39 (N=8)</td>
<td></td>
</tr>
<tr>
<td>5. High Ws, Desensitization:</td>
<td>-.49 (N=8)</td>
<td></td>
</tr>
<tr>
<td>6. High Ws, Study-Skills Training:</td>
<td>-.14 (N=8)</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05.
and all control subjects, and (B) all treatment subjects, also showing correlations for subjects treated by desensitization and study-skills training and for High E and High W subjects within those two treatment groups.

The results shown in Table 12 indicate that Hypothesis 4.1 was not confirmed. For treatment subjects there was a significant correlation between changes in anxiety and changes in physical activity, but the correlation was negative, not positive \((r = -0.35, N=31, p < .05)\). This means that decreases in reported anxiety during the final examination were associated with increases in the number of movements observed during that examination. It is interesting to note in Table 12 the consistency of these negative correlations. Even with control subjects included, the overall correlation between changes in physical movements and changes in reported anxiety was significant \((r = -0.29, N=51, p < .05)\).

**Changes in Physical Movements and Changes in Academic Performance.**

Hypothesis 4.2 predicted that changes in the number of movements following treatment would be negatively and significantly correlated with changes in academic performance. Table 13 reports the product-moment correlation coefficients between change scores in the number of movements observed during a three-minute period from the mid-term to the final examination and change scores from the first mid-term examination score to the final examination score. Since the final examination was twice as long as the mid-term examination, all change scores on examination performance were positive. A high change score of academic performance represents a large increase
in the score obtained on the final examination, as compared to the score obtained on the first mid-term examination.

**TABLE 13**

PRODUCT-MOMENT CORRELATIONS BETWEEN CHANGE SCORES FOR MEASURES OF PHYSICAL MOVEMENT AND ACADEMIC PERFORMANCE

<table>
<thead>
<tr>
<th>A. For All Subjects:</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High W Subjects:</td>
<td>-.01 (N=16)</td>
</tr>
<tr>
<td>2. High E Subjects:</td>
<td>+.02 (N=15)</td>
</tr>
<tr>
<td>3. Control Subjects:</td>
<td>+.12 (N=20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. For Treatment Subjects:</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Desensitization Subjects:</td>
<td>-.01 (N=15)</td>
</tr>
<tr>
<td>2. Study-Skills Training Subjects:</td>
<td>-.04 (N=16)</td>
</tr>
<tr>
<td>3. High Es, Desensitization:</td>
<td>-.16 (N=7)</td>
</tr>
<tr>
<td>4. High Es, Study-Skills Training:</td>
<td>+.20 (N=8)</td>
</tr>
<tr>
<td>5. High Ws, Desensitization:</td>
<td>-.11 (N=8)</td>
</tr>
<tr>
<td>6. High Ws, Study-Skills Training:</td>
<td>-.21 (N=8)</td>
</tr>
</tbody>
</table>
An examination of Table 13 reveals that there is no support for Hypothesis 4.2. There is almost no relationship at all between the two measures of change.

Changes in Academic Performance and Reported Test-Anxiety.

Although no hypothesis was stated concerning changes in academic performance and in reported anxiety, previous research has failed to report the relationship between these two commonly used measures of treatment effectiveness in any detail. It was felt, therefore, that the correlation between anxiety and performance should be reported.

Table 14 reports the product-moment correlation coefficients between change scores occurring between the first and second administration of The Inventory of Test Anxiety and change scores from the first mid-term to the final examination. A positive correlation would represent a relationship such that reductions in anxiety following treatment were associated with decreases in academic performance, while a negative correlation would indicate that increases in academic performance were associated with reductions in anxiety.

The overall correlation between these two measures for all treatment subjects is extremely small ($r = -0.06$). An examination of Table 14 reveals that this overall relationship obscures important distinctions among the smaller subgroups within this investigation. The correlations between these two measures of change are substantially different for subjects treated by desensitization ($r = -0.33$) and for subjects receiving training in efficient study techniques ($r = 0.21$). The positive correlation of study-skills
TABLE 14
PRODUCT-MOMENT CORRELATIONS BETWEEN CHANGE SCORES FOR MEASURES OF ACADEMIC PERFORMANCE AND TEST-ANXIETY

<table>
<thead>
<tr>
<th>Category</th>
<th>Correlation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. For All Subjects:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. High W Subjects:</td>
<td>+.12</td>
<td>54</td>
</tr>
<tr>
<td>2. High E Subjects:</td>
<td>+.21</td>
<td>17</td>
</tr>
<tr>
<td>3. Control Subjects:</td>
<td>+.16</td>
<td>20</td>
</tr>
<tr>
<td>B. For Treatment Subjects:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Desensitization Subjects:</td>
<td>-.33</td>
<td>17</td>
</tr>
<tr>
<td>2. Study-Skills Training Subjects:</td>
<td>+.21</td>
<td>17</td>
</tr>
<tr>
<td>3. High Es, Desensitization:</td>
<td>-.43</td>
<td>8</td>
</tr>
<tr>
<td>4. High Es, Study-Skills Training:</td>
<td>-.38</td>
<td>9</td>
</tr>
<tr>
<td>5. High Ws, Desensitization:</td>
<td>-.35</td>
<td>9</td>
</tr>
<tr>
<td>6. High Ws, Study-Skills Training:</td>
<td>+.64*</td>
<td>8</td>
</tr>
</tbody>
</table>

* p < .05.
subjects is primarily the result of High W subjects, for whom a
significant positive correlation existed between changes in anxiety
and performance ($r = .64$, $N = 8$, $p < .05$). High E subjects treated
by study-skills training showed a negative correlation ($r = -.38$)
very similar to that reported by High E subjects treated by de­
sensitization ($r = -.43$) and High W subjects treated by desensiti­
zation ($r = -.35$).

None of the differences between High W subjects treated by
study-skills training and the correlations of the other three groups
reached significance. It is possible, however, that if these same
differences were to be observed for groups of a larger size, they
would then reach conventional levels of significance.
Summary of Results

Six of the hypotheses to be tested in this investigation predicted a specific kind of interaction between treatment method and type of test-anxious subject. It was predicted that High E subjects treated by desensitization would report less anxiety during the final examination, would receive higher scores on the final examination, and would engage in fewer movements during the final examination than would High E subjects given training in efficient study techniques. It was also predicted that High W subjects treated by study-skills training would report less anxiety, receive higher scores, and would engage in fewer movements than would High W subjects treated by desensitization.

None of these hypotheses received any support. There was no evidence that either of the treatment methods had significantly different effects of any kind upon the two types of test-anxious students for any of the three measures of anxiety-reduction.

Three additional hypotheses predicted that treatment subjects would report less anxiety during the final examination, would receive higher scores on the final examination, and would engage in fewer movements during the final examination than would subjects in a no-contact control group. There was some support for hypothesis 1.3. Desensitization subjects reported significantly less anxiety during the final examination than did control subjects (p < .05). Contrary to hypothesis 2.3, control subjects received significantly higher scores on the final examination than did study-skills
subjects (p < .05). High E control subjects received significantly higher scores on the final examination than did High E subjects in either of the treatment methods (p < .05).

The final two hypotheses to be tested in this study predicted the strength and the direction of correlations between changes in physical activity level during examinations and changes in reported anxiety during examinations and changes in academic performance. Contrary to Hypothesis 4.1, a significant negative correlation was shown for treatment subjects between changes in activity level and changes in reported anxiety-reduction (p < .05). Reductions in anxiety during the final examination were associated with increases in the level of physical activity observed during the final examination. There was no relationship at all between changes in activity level and changes in academic performance.

The relationship between changes in reported anxiety and changes in academic performance was also reported. For all subjects treated by desensitization and High E subjects given study-skills training, reductions in anxiety tended to be associated with increases in academic performance; for High W subjects given study-skills training, however, reductions in anxiety were significantly related to decreases in academic performance on the final examination (p < .05).
CHAPTER V
DISCUSSION

The three primary objectives of this investigation were:
(1) to examine the relative efficiency of desensitization as compared to training in effective study techniques for the reduction of high levels of examination anxiety; (2) to attempt to specify client differences which might be associated with the amount of improvement evidenced after treatment by subjects within the two different treatment methods; and (3) to explore the potential usefulness of selected physical movements, measured during examinations, for a cooperation-free outcome measure of anxiety reduction. The following discussion will focus on the extent to which these objectives were attained.

Comparison of Treatment Methods

Treatment Versus Control Subjects.

It might be possible to argue that neither desensitization nor study-skills training proved itself to be a particularly helpful treatment method. One of the most unexpected results of this investigation was the performance of the control subjects on the final examination, relative to treatment subjects. Control subjects received significantly higher scores on the final examination than did subjects provided with training in efficient study techniques.
High E control subjects earned significantly higher scores than did High E subjects in either the desensitization or the study-skills training groups.

Although study-skills subjects showed a slight decrement in performance on the final examination, the significant difference favoring control subjects was primarily the result of a sizeable increase in performance on the part of control subjects. Other investigators have reported slight academic gains for a control group made up of highly anxious subjects, but these gains were not significantly greater than those of treatment subjects (Garlington and Cotler, 1968) or else were overshadowed by academic improvement on the part of treatment subjects (Katahn, Strenger, and Cherry, 1966). Only one other study has reported a measure of academic performance at both the middle and end of a single academic quarter. Spielberger and Weitz (1964) present data which also suggest that highly anxious control subjects showed a slightly greater gain in academic performance, from the mid-point to the end of the quarter, than did highly anxious subjects receiving group counseling.

Although other studies report decreases in academic performance measures for nontreated control groups, it does appear that highly anxious students may show improved performance without the benefit of treatment.

The results of this study, showing that High W control subjects did slightly better on the final examination than did High W treatment subjects, are similar to the results reported in other
studies; the fact that High E control subjects achieved significantly higher scores than High E treatment subjects is unique.

Unfortunately, there is nothing in the data from this study which might indicate the reason for such dramatic improvement on the part of High E control subjects. Any attempt at explanation, therefore, is purely speculative.

It is possible that the tendency to perform at one's best relatively late in the quarter, as did High E subjects, is associated with a tendency to procrastinate, to put off such things as study until it is necessary to do so. There is some circumstantial evidence which suggests that High E subjects may be particularly susceptible to a pattern of procrastination. Katahn, Strenger, and Cherry (1966) reported that some of their subjects experienced anxiety during the act of studying as well as during examinations. Because of the nature of their anxiety (rapid heart beat, palmular perspiration, nausea, headache, etc.), High E subjects who experience anxiety while studying might well find these emotional reactions so distasteful that they put off study until forced to do so by the immediacy of a threatening event, such as an examination.

If treatment procedures should reduce the anxiety of High E subjects, assuming for the moment that emotional reactions to the act of studying may have led to a pattern of procrastination, two possible outcomes might occur. First, treatment procedures might lead to a reduction of the emotional reactions usually associated with study, resulting in less procrastination and more hours of study. This would lead to the prediction that treatment subjects
would perform better on the final examination than would control subjects, results contrary to those obtained in this investigation. On the other hand, treatment procedures might reduce the anxiety associated with a threatening event (e.g., performing poorly on an examination), so that the usual last-minute preparation was less intense than usual. This would lead to the prediction that control subjects would perform better than treatment subjects, results consistent with this investigation.

It has been suggested that one possible explanation for the superior performance of High E control subjects may be that treatment procedures disrupt a tendency to push hard at the end of a quarter on the part of High E subjects, a tendency due to the presence of emotional reactions associated with the act of studying. This possible explanation rests upon two basic assumptions: (1) High E subjects procrastinate more than do the majority of students, and (2) Treatment procedures disrupt a "catch-up" process engaged in late in the quarter by High E subjects. Both of these assumptions appear to be testable.

It is also possible, however, that the superiority of High E control subjects reflects some unknown selection bias. The unanticipated improvement of High E subjects without treatment should be replicated in future research, in order that greater confidence may be placed in these results.

Desensitization versus Training in Study Techniques.

The data reported earlier appear to indicate that, at least under the conditions represented by this investigation, desensiti-
zation was the more effective treatment method than was training in efficient study-skills. Although there were no significant differences on any measure favoring desensitization subjects over study-skills training subjects, three lines of evidence converge to suggest the superiority of desensitization as a treatment method. The first bit of evidence comes from a comparison of the subjects within the two treatment groups with control subjects. Desensitization subjects reported significantly less anxiety on the final examination than did control subjects, but the difference in reported anxiety between study-skills and control subjects was nonsignificant. In addition, control subjects received significantly higher scores on the final examination than did study-skills subjects, while there was no significant difference between final examination scores for desensitization and control subjects. For both measures, desensitization subjects compared more favorably with control subjects than did subjects given training in study-skills.

A second line of evidence favoring desensitization comes from a direct comparison of the two treatment methods for measures of self-reported anxiety and academic performance. Three comparisons were made for each of these two dependent measures; the effect of desensitization and study-skills training were compared for all treatment subjects, High W treatment subjects, and High E treatment subjects. In all of the six comparisons, desensitization subjects reported slightly less anxiety during the final examination and received slightly higher scores on that examination than did comparable study-skills training subjects. The probability that all
of these comparisons would favor desensitization by chance, if both
groups were equally effective, is less than .02 (binomial distri-
bution).

The final bit of evidence supporting the conclusion that
desensitization was the more effective of the two treatment methods
comes from the correlational data. A negative correlation \((r = -.33)\)
was reported for desensitization subjects between changes in anxiety
and changes in academic performance, such that decreases in self-
reported anxiety during the final examination were associated with
improved scores on that same examination. This would appear to be
a favorable outcome for any treatment method. A positive correla-
tion \((r = +.21)\), however, was obtained for study-skills training
subjects between the same two measures, so that reduced anxiety
following treatment was associated with decreases in scores on the
final examination. It is true that this positive correlation for
study-skills training subjects was almost entirely due to High \(W\)
subjects receiving training in more efficient study techniques, but
this observation only underscores the fact that reduced anxiety
following treatment was associated with improved academic perfor-
mance for a higher proportion of the desensitization subjects than
it was for study-skills training subjects. It is also true that
the difference between the correlations for the two treatment methods
failed to reach significance. It is possible, however, that the
lack of significance is the result of a relatively small sample size.
Were the same difference in correlations to be observed again in larger
groups, conventional levels of significance might be reached.
The evidence that is available from this investigation, then, supports the conclusion that desensitization was more effective for reducing test-anxiety than was training in study-skills. This conclusion must be tempered, however, by the fact that desensitization subjects were not significantly superior to study-skills subjects on any one outcome measure.

Among the unanticipated results of this investigation was the slight decrement in performance on the final examination on the part of subjects who received training in the use of study techniques. Inasmuch as study-skills training is one of the most widely used methods for helping students achieve a higher level of academic performance, the failure of study-skills subjects to evidence any academic improvement following treatment does merit some consideration.

It is possible that the six-week treatment period was too short for study-skills subjects to master the new study techniques which were presented to them in the treatment sessions. Katahn, Strenger, and Cherry (1966) had their test-anxious subjects participate in eight sessions, while Spielberger and Weitz (1964) provided from 8-13 sessions for their highly anxious subjects. In this investigation, study-skills subjects were urged to try out new study behaviors. Even though some time was spent in the treatment sessions in practicing these new behaviors, study-skills subjects may not have had enough time to master these new study techniques well enough to use them successfully in preparation for the final examination.
It may also be possible that for those treatments which involve the acquisition of new skills, there is a period during which the learning of new skills interferes with previously learned modes of responding. For this investigation, the learning of new study techniques may have interfered with the student's old method of study before the student was proficient in the use of the new techniques. The measurement of academic performance may thus have occurred during that period of interference and prior to that point at which students mastered the new study methods.

On the other hand, it is possible that some study-skills subjects did not try out the new study methods presented to them in the treatment sessions. More than desensitization, study-skills training involves the disruption of previously well learned responses. Subjects given training in study-skills may have been hesitant to give up their current study techniques for an unknown quantity without complete assurance on their part that these new methods were, indeed, likely to lead to improved grades. One of the weaknesses of the present study was the failure to obtain from study-skills subjects some estimate of how frequently they were using the new study techniques. It might have been, for example, that academic performance was related in some way to the extent to which the subjects used these new methods in preparation for the final examination.

A further possibility is that training in efficient study methods is most effective when students, themselves, come to the conclusion that they need some help. Both Katahn, Strenger, and Cherry (1966) and Spielberger and Weitz (1964) reported that the
desire to know how to study more efficiently was expressed after anxious students were given the opportunity to reflect their concerns in a relatively unstructured situation. Subjects in these previous investigations may have been more motivated to try out new study techniques by an earlier process of self-persuasion than were subjects in this study, who had no choice in determining their treatment method.

One final observation should be made concerning the relative effectiveness of desensitization and study-skills training for reducing test-anxiety. The investigator and all of the therapists had substantial previous experience with study-skills training prior to this investigation; none of them had any prior experience with the use of desensitization techniques. In addition, subjects receiving study-skills training devoted one full hour to the practice of study methods over a chapter of material, later covered on the final examination, in their Introductory Psychology textbook. The differences that existed, then, in counselor preparation and in treatment methods would appear to have favored higher academic performance by study-skills subjects. The results indicate, however, that highly test-anxious students receiving six hours of training in efficient study techniques received slightly (but not significantly) lower scores on the final examination than did highly test-anxious students given six hours of treatment by desensitization.

Client Characteristics Related to Treatment Effectiveness

A second objective of this investigation was to begin to specify those client characteristics which might lead to differential
treatment effectiveness for desensitization and study-skills training in the reduction of test-anxiety. Toward this end, subjects were selected for treatment who received high test-anxiety scores primarily because of their self-report of high levels of autonomic responses to the stress of the examination situation (High E subjects). Other subjects were selected for treatment whose high test-anxiety scores resulted primarily from their self-report of cognitive concern about how well they would perform on examinations in relation to other students (High W subjects). It was predicted that desensitization would be a particularly helpful treatment method for the reducing of anxiety of High E subjects and that study-skills training would be a particularly helpful treatment method for High W subjects.

There was no support in this investigation for the hypothesis that there would be a significant interaction between treatment method and kind of subject. There was, however, one distinction between High E and High W subjects which may have implications for future research and, ultimately, for future therapeutic practice.

There was an extremely large difference in the correlations for High E and High W subjects between change scores of test-anxiety and change scores of academic performance following treatment by study-skills training. High E subjects had a negative correlation ($r = -.38$), indicating that reductions in anxiety were related to increases in academic performance. High W subjects showed a significant positive correlation ($r = +.64$), which indicates that
reductions in self-reported anxiety were accompanied by decreases in academic performance.

Self-reports of increased performance, anxiety reduction, or other gains following therapeutic treatment are always suspect! There is always the possibility that the treatment subject is attempting to gain the favorable evaluation of the therapist or investigator (Orne, 1962; McGuigan, 1963), or else is justifying his own expenditure of time and effort in the therapeutic encounter. It is important to note, however, that self-reports of anxiety reduction among High W subjects given study-skills training should be as valid as the self-reports of High E subjects treated by either desensitization or study-skills training or of High W subjects treated by desensitization. Among these latter three groups, the correlations between changes in anxiety and academic performance were moderately high and were uniformly negative, with rs ranging from -.35 to -.43.

These correlations are based only on a small sample, with group sizes of eight or nine subjects. The possibility exists that one or two deviant subjects within a particular group may account for the strength and direction of the reported correlations. Should these results be replicated in future research, however, it would suggest that desensitization would be more appropriate than would study-skills training for treating those students who receive high scores on a scale of test-anxiety and who report unusual levels of concern about how well they will perform on examinations relative to other students.
It is difficult to speculate why reductions in anxiety for High W subjects treated by study-skills training should be related to decreases in academic performance. It might be possible to assume that the High W subjects who reported the most anxiety following treatment were those who had the least confidence in their ability to successfully use the new techniques of study. Excessive anxiety about one's level of performance relative to other students may also serve as a measure of drive, causing students to study hard in order to do well in comparison with others. Students who felt least confident in their use of the new study methods may thus have felt the greatest need to study as a means of overcoming their pre-examination anxiety. It would be possible to investigate this admittedly tentative explanation by obtaining a measure of the extent to which subjects felt confident about their ability to use the new study techniques following treatment, and by also obtaining a measure of the amount of study time spent in preparation for examinations following treatment. Given the explanation above, it would be predicted that, after treatment by study-skills training, students with the greatest degree of confidence in the new study techniques would spend less time in preparation for examinations than would subjects with low degrees of confidence in their ability to use the new methods successfully.

While there was no support in this investigation for any of the hypotheses related to client differences, there was a large amount of variance within both treatment groups on all three of the dependent measures. Some students reported less anxiety following
treatment while other reported more; some students improved while others did more poorly on the final examination; some students gave evidence of higher levels of physical activity on the final examination while others decreased in movements. Although the High W-High E distinction did not account for much of this variance, it still seems important to continue the search for client characteristics which may help in the more accurate prediction of which clients will profit most from the different therapy methods currently available.

Physical Movement As an Outcome Measure

A final objective of this investigation was to examine the potential usefulness of the observation of physical movements during examinations as an outcome measure of anxiety reduction. The need for an additional outcome measure of test-anxiety reduction was prompted by the lack of a consistent relationship between changes in reported anxiety and changes in academic performance in previous investigations. The use of this particular measure was suggested by the lack of previous investigations into the actual behaviors of test-anxious students during the period in which they report the greatest amounts of stress.

It was predicted that changes in physical movements following treatment would be positively and significantly correlated with changes in reported anxiety, based on the assumption that reduced anxiety would be reflected in decreases in the level of physical activity. The correlation between the two change scores, however, was negative ($r = -0.29$), a relationship which suggests
that those students who reported the greatest anxiety reduction following treatment increased their level of physical activity during the final examination. This may mean that there is a linear relationship between anxiety and physical activity in the opposite direction from that which had been assumed. This would lead to the assumption that students with high levels of anxiety are inhibited or "frozen" by their anxiety rather than activated. It may also be possible that anxiety and physical activity are related to one another in a curvilinear relationship, such that low and high test-anxious subjects evidence relatively little movement while moderately test-anxious students move more freely during examinations. If this should be the case, the increase in movements following treatment for desensitization subjects might reflect the general change from highly to moderately anxious.

Contrary to predictions, there was no relationship between changes in academic performance and changes in the number of physical movements engaged in during the three-minute observation period. This lack of relationship is demonstrated clearly in Table 12 and Table 14 where it will be noticed that the correlations between changes in physical activity and changes in reported test-anxiety are almost identical to the correlations between changes in academic performance and changes in reported test-anxiety for three of the four treatment groups.

Since this new measure adds little to what is already known by the use of the more conventional measures, it appears that the observation of physical movements has little value as it is currently
constituted. If this measure is to be used again, certain changes should be made. There is a need first of all to validate the scale of fifteen specific movements. It will be recalled that this scale was constructed by a simple frequency count of those behaviors most frequently associated with highly test-anxious students as they took an examination. The next step would be to administer a test-anxiety scale to a population of students. Students with high and low scores should be observed by judges trained in the use of this instrument, and specific movements which distinguish between high and low scorers at some predetermined level of confidence should be retained on the scale. Those movements which fail to distinguish between high and low scorers on the test-anxiety scale should then be eliminated. After a cross-validation, the remaining behaviors would be a much more useful instrument and would, no doubt, be an easier scale to use in observation. If the observers have fewer behaviors to keep in mind as they watch students, it is likely that the reliability of the observers will be more substantial. Until these steps are taken, the measurement of physical activity will remain an exploratory step.

Implications for Further Research

A number of research possibilities are suggested as the result of this investigation. For example, it was reported that desensitization appeared to be the more effective of the two treatment methods for reducing the test-anxiety of the present sample of subjects. It is not possible, however, to generalize these results to other populations because of the selection procedures used
and because of the necessity to treat the variables as fixed, rather than random, factors. In order to make practical use of the results of this study, the relative effectiveness of desensitization and study-skills training would need to be tested on more normal populations of test-anxious students. In addition, the length of the treatment period should be varied.

If the results reported here were to be replicated, with different samples and for different treatment periods, some implications for therapeutic treatment practice would follow. College counseling centers might implement a program in order to obtain some measure of test-anxiety before a counselor determines the most appropriate treatment method for students who come to the center for assistance with academic difficulties. If high levels of test-anxiety were to be present, desensitization of anxiety would appear to be the more helpful treatment method in terms of potential academic performance. Or, training in more effective study-skills or other kinds of treatment methods might follow an initial period of desensitization.

The increase in academic performance between the first midterm and final examination for control subjects, particularly High E control subjects, is an area that offers some potentially fruitful research possibilities. If further investigations should show these findings to be replicable, it would be helpful to identify and interview High E students in an effort to determine what factors are associated with this potential increase. The information gained from these interviews might well lead to some further investigations
and might be helpful in beginning to develop a theory about the relationship between test-anxiety and academic performance.

Because of the small sample size, it is difficult to determine how much confidence should be placed in the fact that the correlation for High W subjects treated by study-skills training showed that anxiety reduction was accompanied by decreased performance on the final examination. It might be possible to check on the reliability of these results by using a sample of students enrolled in a study-skills course. A population of High W test-anxious students could be identified and a test-anxiety scale administered at the beginning and end of the quarter. If the same pattern were observed for this group (decreases in anxiety associated with decreases in academic performance), a following step might be to take steps to increase the anxiety of High W subjects to determine whether or not academic performance would also increase.

The fact that decreases in test-anxiety were significantly related to increases in the physical activity level following treatment also raises some interesting possibilities. If the steps outlined earlier are taken to develop a more valid measure of physical activity, the whole relationship between test-anxiety and observable behavior during examinations is opened up to investigation.

At this point we really know very little about test-anxiety. Much of the research on test-anxiety has been devoted to understanding the effects of the presence of test-anxiety upon academic performance, but many questions remain to be answered there. This investigation has been one of several whose purpose has been to
determine the most effective method for alleviating or reducing test-anxiety. Of all the treatment methods tested thus far, it appears safe to conclude that systematic desensitization holds the greatest promise for the reduction of test-anxiety. The results from this study indicate, however, that for at least certain kinds of test-anxious students (e.g., High E students), the most appropriate treatment for maintaining academic performance may be no treatment at all!

Because of the present national concern for the utilization of available talent, because test-anxiety is so prevalent among a college population, and because of the potentially aversive effects of test-anxiety upon academic performance, it would also appear that future research will be forthcoming in an attempt to understand the determinants of test-anxiety, the consequences of test-anxiety, and more effective methods for reducing test-anxiety.
CHAPTER VI

SUMMARY

An experiment was designed to compare the relative effectiveness of systematic desensitization and training in more efficient study techniques as treatment methods for the reduction of test-anxiety among two kinds of test-anxious students. A scale for the measurement of physical activity during examinations was developed, and its potential for use as an outcome measure of anxiety-reduction was explored.

It was predicted that systematic desensitization would be most effective in reducing the test-anxiety of students who report unusual levels of autonomic or physiological reaction to the stress of an examination. It was also predicted that training in study methods would be the most effective method for reducing the test-anxiety of students who report unusual levels of cognitive concern about their examination performance relative to other students.

Sixty subjects, designated as highly test-anxious on the basis of their responses to The Inventory of Test Anxiety, were obtained from the Introductory Psychology class at The Ohio State University. Thirty of these subjects were designated as High E subjects, since they reflected a high level of emotional reactivity.
to examination stress. The other thirty subjects were designated as High W subjects because of their worry about their level of performance on examinations. Both High E and High W subjects were randomly assigned to treatment by desensitization, treatment by study-skills training, or to a no-contact control group.

Two Ph.D. psychologists were employed to serve as therapists. Four treatment groups were formed by having each therapist handle a desensitization and a study-skills training group. Each treatment group was comprised of five High E subjects and five High W subjects.

Pre-treatment measures of academic performance and physical activity were obtained for all subjects at the first mid-term examination in their Introductory Psychology class. After a six-week treatment period, post-treatment measures of physical activity and academic performance were obtained during the final examination in the same class. The Inventory of Test Anxiety was readministered to all subjects immediately after that examination.

The results showed that subjects treated by desensitization reported significantly less anxiety on the final examination than did control subjects. Control subjects received significantly higher scores on the final examination than did subjects treated by training in efficient study methods, but this was more the result of improved performance of control subjects on the final examination, particularly High E control subjects, than of decrements in performance by study-skills training subjects. None of the predictions related to the differential effectiveness of the two treatment methods for High E and High W subjects was supported.
Correlational data showed that for all subjects treated by desensitization and for High E subjects treated by study-skills training, reductions of test-anxiety following treatment tended to be associated with higher scores on the final examination. For High W subjects treated by study-skills training, however, reduced anxiety following treatment was accompanied by lower scores on the final examination.

The correlational data also showed that the reductions in test-anxiety following treatment were associated with increased levels of physical activity during examinations. A comparison of the level of physical activity with the other outcome measures led to the conclusion that further changes must be made in the scale for observing physical activity before it could become useful as an outcome measure of anxiety reduction.
APPENDIX I

DIRECTIONS TO JUDGES WHO RATED TEST-ANXIETY ITEMS
AS EITHER E OR W
DIRECTIONS

On the following pages are 21 items dealing with test-anxiety. Previous research, primarily at Vanderbilt University, has shown that items assessing test-anxiety are generally of two types. Based on the descriptions below, please rate the items on the following pages.

W (Worry) Defined as any cognitive or intellectual expression of concern about one's own performance. Later descriptions of this component have been broadened to include cognitive concern about one's preparation, about one's examination performance (including the relationship to the performance of others), and about the consequences of doing poorly.

E (Emotionality) Defined as (1) autonomic reactions which tend to occur in response to the stress of test-taking situations, and (2) primarily physiological-affective in nature. These descriptions have been broadened to include emotional reactions occurring during a test which are related to stress.

Before each item on the following pages which you think reflects Worry, place a W.

Before each item on the following pages which you think reflects Emotionality, place an E.

As a last step, note below the last item the numbers of the 3-4 items which caused you the most difficulty in reaching a decision.

Raters Name: ____________________________

Date: ____________________________
APPENDIX II

TEST-ANXIETY ITEMS RATED BY JUDGES AS EITHER E OR W
1. I get so tense during course examinations that my stomach becomes upset.

2. I do not feel very confident about my performance before I take a course examination.

3. During course examinations, I find myself thinking about the consequences of failing.

4. I frequently get a headache during course examinations.

5. I often feel, during course examinations, that I won't be able to finish the examination on time.

6. I have an uneasy, upset feeling during course examinations.

7. My mind goes blank at the beginning of a course examination - it takes me a few minutes to function.

8. I feel that I am letting myself and other persons down by my performance on course examinations.

9. While taking a course examination, I find myself thinking of how much brighter the other students are than I am.

10. During course examinations, I feel extremely tired.

11. My emotional feelings interfere with my performance on course examinations.

12. Before taking a course examination, I find myself worrying a great deal.

13. I feel very panicky when I take a course examination.

14. My mouth gets dry during course examinations.

15. During course examinations, I find myself thinking of things unrelated to the actual course material.

16. After finishing a course examination, I always feel that I could have done better than I actually did.

17. I get so nervous during course examinations that I may forget facts which I really know.

18. My hands perspire during a course examination.
19. I find myself worrying about a low grade before my course examinations.

20. Prior to taking a course examination, I feel that other students are better prepared for the examination than I am.

21. I feel my heart beating fast while taking a course examination.
APPENDIX III

THE INVENTORY OF TEST-ANXIETY
INVENTORY OF TEST ANXIETY

This questionnaire is part of a research project investigating, among other things, the relationship which exists between a person's reactions to taking tests and his actual performance upon tests. On the following page are sixteen items relating to your reactions to tests, along with directions for responding to the items. After completing the information called for on this page, please turn to the following page. Your responses to the individual items will be confidential. They will not be made available to faculty members or administrative personnel of the university.

NAME: (Please Print) ____________________________________________________________

Last First Middle

Campus Address: _____________________________________________________________

Your Psychology Instructors Name: _____________________________________________

Time Your Psychology Section meets: ________________________________

Circle your class standing below:

- Freshman (0-45 quarter hours completed)
- Sophomore (46-90 quarter hours completed)
- Junior (91-135 quarter hours completed)
- Senior (136 or more quarter hours completed)
- Graduate Student

Quarter you first entered OSU ___________________________ Quarter __ Year __________

Number of quarters in residence at OSU __________

Approximate Grade Point Average for courses taken at OSU __________

Phone number where you could be contacted in Columbus __________

PLEASE GO ON TO THE NEXT PAGE!
Directions: Read each of the following statements carefully. In the space before each item, indicate how you usually feel during course examinations. Use the following scale:

1. The statement does not describe my feelings, condition, etc.
2. The feeling, condition, etc., is barely noticeable.
3. The feeling, condition, etc., is moderately intense.
4. The feeling, condition, etc., is strong.
5. The feeling, condition, etc., is very strong.

1. I feel panicky while taking course examinations.
2. I feel, during course examinations, that I won't be able to finish the examination on time.
3. My mouth gets dry during course examinations.
4. Prior to taking a course examination, I feel that other students are better prepared for the examination than I am.
5. My mind goes blank at the beginning of a course examination - it takes me a few minutes to function.
6. I feel that I am letting myself and other persons down by my performance on course examinations.
7. I feel my heart beating fast while taking a course examination.
8. I find myself worrying about a low grade before a course examination.
9. During course examinations, I find myself thinking about the consequences of failure.
10. I get so tense during course examinations that my stomach becomes upset.
11. After finishing a course examination, I feel that I could have done better than I actually did.
12. I get a headache during course examinations.
13. While taking a course examination, I find myself thinking of how much brighter the other students are than I am.
14. My hands perspire during a course examination.
15. I do not feel very confident about my performance before I take a course examination.
16. I get so nervous during course examinations that I may forget facts which I really know.
APPENDIX IV

INSTRUCTIONS TO THERAPISTS FOR DESENSITIZATION SESSIONS
Desensitization Groups - Session I

A. Getting Acquainted: (15-20 minutes)

1. After students arrive, introduce yourself to them. Tell them a little bit about your activities since you received the Ph.D.

2. Have students introduce themselves to the group. (Note: There may be a tendency for students to address all comments to you. Try to get students to speak to the group as a whole, not to you alone.)

3. Have them give their name, class in school (freshman, etc.) and where they are from. Also have them describe the feelings they have when they take classroom examinations. After they have described these feelings of apprehension or tension, you might inquire of some of them how long they have had these feelings. Encourage other members of the group to ask questions of those introducing themselves.

B. Overall Rationale: (5-10 minutes)

1. You may want to point out that test-anxiety is a complaint of large numbers of students. Many students feel that they perform poorly on examinations because they are anxious or nervous. Perhaps the more important question is whether or not feelings of anxiety cause a person to perform more poorly than he might if he weren't anxious.

2. The effects of anxiety upon performance: A number of experimental studies have demonstrated the relationship between general feelings of anxiety and performance upon complex tasks. This general relationship may be pictured on the blackboard as follows:

3. Most psychologists who have studied test-anxiety feel that the relationship between test-anxiety and grades is very much the same:
B. Overall Rationale: (Continued)

4. Encourage students to ask any questions they may have and then answer them to the best of your ability. If you aren't clear as to the answer, say so!

5. As a means of summarizing this topic you might point out that:
   a. Extremely low levels of test-anxiety may indicate that the consequences of the test aren't too important for that person.
   b. Extremely high levels of test-anxiety appear to disrupt performance.
   c. A moderate level of test-anxiety seems to be associated with the best performance.

6. Point out that they were selected for this program because of the fact that they were among the top 1/4th of the persons who took the Inventory of Test Anxiety at the beginning of the quarter. It does appear possible that they are among those for whom anxiety disrupts their performance.

C. Particular Rationale: (5-10 minutes)

1. Point out that for those who are highly test-anxious, a vicious cycle tends to operate:

   High Anxiety --- --- Lowered Performance --- Even Greater Anxiety

2. We will be working in this group with a method to break the cycle. The method we will be using is called systematic desensitization. Inform them that you would like them to listen to a tape which will describe in more detail what we will be doing in the next six weeks.

   Play introduction tape!

3. Ask for questions from the group - answer to the best of your ability.
D. Relaxation Training: (30 Minutes)

1. Play Relaxation Tape. Check subjects to make certain that they are relaxing. Occasionally check muscles to see if they are limp and free of tension.

2. When the tape is over, point out that relaxation training, in itself has not been shown to be helpful in reducing anxiety. Rather, the ability to thoroughly relax is a necessary step in getting maximum benefit from the procedures which follow.

3. Distribute Exercise practice sheets and the recording sheet to keep a record of their practice in relaxation - explain.

4. Have students fill out five (5) post cards with name and address. Explain that these may be mailed to them or that they may be distributed to them in class by their instructor.

5. Dismiss.
Desensitization Groups - Session II

A. **Introduction:** (5 minutes)

1. Collect from the students their record of time spent in practice of relaxation procedures the previous week.

2. Ask them whether or not they are finding it any easier to relax when they practice it. If some indicate that they were having trouble relaxing the previous week, encourage suggestions from those in the group who feel that they are learning to relax more deeply and more rapidly.

B. **Play the Relaxation Tape:** (30 Minutes)

C. **Visualization Tape** (12 minutes)

   1. Introduce this tape by indicating that this tape will describe neutral scenes that most of them will find familiar. The purpose is to get them used to visualizing scenes so that they will be better able later on to visualize the kinds of situations in which they traditionally become anxious.

D. **Anxiety Hierarchy** (10 minutes)

   1. Have subjects rank the hierarchy items from least to most anxiety-provoking for them as individuals. These will be mimeographed and each group member will rank the items.

E. **Closing:** (3 minutes)

   1. Pass out a record of relaxation practice sheet, and ask them to keep a record again this week of the time they spend in relaxation training. Point out that next week we will get into the main part of the training, and it is important that they feel that they can relax when they want to.
Desensitization Groups - Session III

1. This session will be very similar to session II. Collect their practice sheets. If they didn't turn one in last week, have them indicate which one is for the previous week and which one is for the current week. Again, try to determine whether or not they are finding it any easier to relax. See if any of them have discovered techniques that lead to deeper relaxation.

2. Play the relaxation tape (30 minutes), and the Visualization Tape (12 minutes). Before playing the visualization tape, inform the group that this is the last time that we will use it.

3. After the visualization tape, indicate that we will now begin the anxiety hierarchy. Point out that there was a wide discrepancy in the items rated least and most anxiety-provoking. Since we are dealing with the group average, it is possible that we will go through some of the items that they rated as anxiety-provoking very early in the sequence.

4. The procedure will be as follows: You will be provided with a test-anxiety hierarchy for your group based on mean responses. You will also be provided with a short description of each of the eighteen items. Start with the item rated eighteenth on the hierarchy. Explain to the group that they are to relax completely. Have them try to note the absence of tension, the feelings of pleasantness. Then you will read a brief description of a scene which may have caused them to be anxious in the past. If they feel any anxiety or tension when the scene is described, they are to signal you by raising their right hand when the scene has been completed. Go through each new scene at least three times. If anyone indicates anxiety after the third reading of the scene, read it a fourth time. If one or more indicate anxiety following the fourth reading, ask them if they still feel comfortable enough to go on to a new scene. If they do, then go on to the item ranked seventeenth on the hierarchy. If they should indicate that they are too anxious to go on, suggest that they wait for you outside the room until the session is over and then contact you for individual help with that item. You can either go through the scene with them a few times more, or else make arrangements for them to get together with me to go over the item until they feel comfortable enough to continue on with the group.

For each item, repeat the description three times, repeating it a fourth only if anyone still signals the presence of anxiety. For each item, ask anyone who still signals tension and anxiety if they feel comfortable enough to go on. Then go on to the next ranked item of the hierarchy.
Desensitization Groups - Sessions IV to VI

A. Procedures: (Each Week)

1. After instructions or opening activities, play relaxation tape.

2. Go through the items of the hierarchy previously covered two times.

3. When you come to new items, repeat three times. Repeat a fourth time if anyone indicates tension after the third reading. If any group members still indicate tension after reading the item a fourth time, be certain to offer the opportunity to leave the room if they feel too uncomfortable to continue. Also, be certain to tell them that special arrangements can be made for special sessions so that they can catch up with the group.

B. Special Instructions:

1. At the beginning of each session, ask whether or not any of the group were able to use relaxation techniques to calm themselves during anxiety-provoking situations during the previous week. Reinforce any evidences that they were able to relax in tension-provoking situations. Remind them each week to take a deep breath and to relax their muscles in any situation where they feel tension or anxiety.

2. Special Instructions - Session IV

a. There was a wide discrepancy among the items as to which situations made persons most anxious. This means that for some of the group, situations which make them quite anxious may occur fairly early in the sequence from least to most anxiety-provoking.

b. The success of this method depends upon the student’s complete honesty. If the scene, as described, causes any feelings of tension, whatsoever, they should signal this to the group leader. They should not indicate the absence of tension simply because others in the group are doing so or because they think the group is impatient with them. Remind them that it is their progress that is important.
B. (Continued)

2. Special Instructions - Session IV

c. Mention that we will go through each scene that we covered last week two additional times at the beginning of this session. Then we will move on to new scenes. Whenever they feel tension they are to indicate it, but we will proceed on after two repititions of previously described scenes.

d. If at the end of the fourth presentation of a new scene, anyone still indicates tension, they are to be offered the opportunity to leave the room for a while. Try to develop with the students the idea that this is for their protection, rather than a punishment for failing to keep up with the group. Special arrangements can be made if someone becomes so anxious that they cannot continue to another item on the hierarchy. Try to help students understand that it is no disgrace to become so anxious that they feel they would rather not continue.
APPENDIX V

INTRODUCTION TO DESENSITIZATION PRINCIPLES
INTRODUCTION TO DESENSITIZATION PRINCIPLES

Note: The following material was taped.

The procedure we will use to help you overcome any unusually strong fears of examinations is called Desensitization. It was developed a few years ago by a psychiatrist named Joseph Wolpe. He and a number of other psychiatrists and psychologists have used the method with all kinds of fears and report almost universal success.

This approach is based upon the fact that it is impossible to be afraid and relaxed at the same time. For example, a student might want to ask a professor a question, or perhaps criticize something the professor has said. He may find, however, when he starts to speak he suddenly experiences shortness of breath, his heart pounds and his hands perspire. He is unable to make his point. These are anxiety reactions and don't occur when the student is relaxed. Therefore, an important part of the method involves teaching you to relax as completely as possible. You may think that you don't have to be taught how to relax, but the fact is that most people are frequently unaware of their tensions.

Once you have learned to relax, then this group will develop a list of situations in which the fear occurs. This list will be made up so that it contains items representing all different degrees of fear. For example, when an instructor announces an examination will be given in two weeks, you may experience a slight degree of fear, but nothing compared to the anxiety you experience as he actually passes the examination out to the class. In between these two extremes there are probably a number of situations that call out varying degrees of fear. This group, working together, will put the items on the list in order from the one that produces the least amount of fear up to the one that produces the most. This list is called a hierarchy.

One of the most interesting aspects of this procedure is that it tends to generalize to the real life situation. That is, even though the procedure only requires you to imagine yourself in situations related to fear of examinations, there is a strong tendency for fear to decrease in the actual situation.

We will go through the various steps in this procedure over a period of six weeks. In the first week, you will learn relaxation techniques. The second week will be devoted to developing the hierarchy, learning to visualize clearly, and practicing relaxation techniques. The final four weeks will be spent in going through the hierarchy and actually reducing your fear of examinations.

Now, are there any questions about the program?
APPENDIX VI

A GUIDE FOR TRAINING IN MUSCLE RELAXATION
A GUIDE FOR TRAINING IN MUSCLE RELAXATION

Instructions: The following exercises will help you learn to relax more completely, so that you can achieve the maximum benefits 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 the wrist, point fingers at ceiling - note tension in back of hand and forearm - relax.
4. Bend right hand upward at the wrist, point fingers at the 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.
13. Arch your back, move away from the 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 - exhale.
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 stomach muscles - note tension in stomach - relax.
18. Tense buttocks by pushing them into chair hard - note tension in buttocks 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 feet - relax.
APPENDIX VII

REPORT OF PRACTICE IN MUSCLE RELAXATION
REPORT OF PRACTICE IN MUSCLE RELAXATION

Name: _____________________________

Directions: Note 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>NUMBERS OF EXERCISES ENGAGED IN</th>
<th>TIME SPENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e.g.)</td>
<td>Wednesday</td>
<td>April 16</td>
<td>Exercises 1-18 (18)</td>
</tr>
<tr>
<td>(e.g.)</td>
<td>Thursday</td>
<td>April 17</td>
<td>All of them (21)</td>
</tr>
</tbody>
</table>

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.
TEST ANXIETY HIERARCHY

Instructions: Below are eighteen items which tend to elicit varying degrees of anxiety. You are to rank these items, from least to most anxiety provoking for you. In the space before each item, place a number corresponding to the degree of anxiety you normally feel when you encounter it. Number 18 would be the item which elicits the least anxiety, number 1 the item which elicits the most anxiety. Work carefully and slowly.

______ You are studying for a midterm examination to be given the next day. You are wondering how you will remember the information on the test.

______ You are in bed the night before a midterm examination. Your mind flashes to the examination.

______ You wake up and realize that you have a midterm examination later that same morning.

______ You are walking to the class in which you are to take a midterm examination.

______ You are sitting in class, waiting for the midterm examination to be passed out.

______ Your instructor is passing out the midterm examination.

______ You receive a midterm examination. You look at the first question and cannot recall the answer.

______ With five minutes left, you look at the examination and see that you have left a number of items blank.

______ On your midterm examination, you find out that you have spent too much time on the first portion of the exam and must hurry up a bit in order to finish on time.

______ You are studying for a final examination to be given the next day. Your grade in the course will probably depend upon your performance on the final exam. You are wondering how you will remember the information on the test.

______ You are in bed the night before a final examination which will determine your final grade. Your mind flashes to the exam.

______ You wake up and realize that you have a final examination which will determine your grade. The test is scheduled for later that same morning.
You are walking to a final examination which will probably determine your final grade.

You are sitting in class, waiting for the final examination to be passed out.

Your instructor is passing out a final examination which will probably determine your final grade.

You receive your final examination. You look at the first question and cannot recall the answer.

With five minutes left on a final examination which will probably determine your final grade, you see that you have left a number of items blank.

On your extremely important final examination, you find that you have spent too much time on the first portion of the exam and must hurry up a bit in order to finish on time.
APPENDIX IX

VISUALIZATION TRAINING WITH FAMILIAR SCENES
Note: The following material was taped.

---1---

You are on the beach! Laying on your side, on a red and white striped towel, you can see the water only a short distance away. The waves, greenish-blue in color, are breaking about fifty feet from shore. The water comes rushing into the beach with a dirty white foam upon the top. You can distinctly hear the sounds of laughing and yelling from a group in the water who are throwing a ball.

As you turn over and lay down, with your head cradled in your arm, you can feel the warmth of the sun upon your back. There is, however, a cool breeze blowing from the ocean. The sounds of the group in the water become less distinct, but the rhythm of the waves becomes more noticeable. A sea-gull cries out overhead. The continuous roar of the breaking waves, every few seconds, has a soothing sound. As you move your feet, you become conscious of the feel of the coarse sand between your toes.

As a shadow crosses you eyes, you raise your head. A young couple is walking by. The boy, about 17-18 years old, is deeply tanned. Somewhat stocky, he is carrying a portable radio and a lunch basket. He is wearing bright red briefs and a white sweatshirt. The girl appears to be about the same age. She is wearing a one-piece black bathing suit, and carries a dull blue beach blanket under her arm. They appear to be laughing about something the girl has said, although they are now too far away for their voices to be heard distinctly.

As you settle back down on the towel, with your head again cradled in your arms, you hear the familiar sounds and feel the warmth of the sun. The sand beneath your towel feels comfortable. You are completely relaxed and at ease!

---2---

You are sitting in a lawn chair on a patio in the back yard of one of your friends. Your friend has gone inside for a few minutes to make a phone call. It is a summer evening, and there is about one hour of daylight left. The lawn chair is green, with a metal mesh, and has white metal arms on the side. As you sit, slowly rocking, the sound of a power lawn-mower nearby catches your attention. The grass in the back yard is deep green. The shrill sounds of children yelling a few houses down the street becomes noticeable and then fades away.

The power-mower sputters for a moment and then stops. It is silent for a minute. There is no breeze and the air seems to hang suspended. A
male Cardinal, bright red in color, swoops down from a nearby tree and hops along the redwood fence at the back of the lot.

Next door, the rear door slams and you notice an elderly, white-haired man walk out into the back yard. He is carrying a package wrapped in newspaper. Although you can't see all of his actions clearly, you can see him pause at a metal container and lift off the cover. After he deposits the package into the container, you distinctly hear the metal top being replaced onto the garbage can.

A car horn sounds in the street in front of the house. You continue to relax and to rock, soaking up the sights and sounds that come your way. All of a sudden, you notice off to your right some flowers you had previously ignored. Pale yellow and violet, they make an irregular pattern along the redwood fence at the side of the yard.

A screen door slams nearby. The young twelve year old brother of your friend comes racing through the back door onto the patio. As he sees you, he is startled, but only for a moment. With a mumbled excuse, he looks swiftly around the patio and then locates his baseball glove lying against the side of the house. He picks up the glove, races to the stairs leading into the house, bounds on to the top step, and opens the rear door with one quick motion. He runs off with only the slam of the rear door to remind you of his appearance only a few moments ago.

You continue to rock, completely at peace. The sounds of the neighborhood children are familiar and, at the same time, somewhat comforting. You are pleasantly relaxed. You continue to rock, waiting for your friend to return.

You are in a supermarket! Your parents have asked you to go to the store to pick up a couple of loaves of bread, three veal cutlets, two half-gallons of milk, and a half-gallon of chocolate ice-cream. As you near the entrance, you notice a small brown dog waiting patiently outside the door. As you step between the steel posts, the door swings inward with a slight "swoosh."

The sounds of the cash registers clacking away are distinctly noticeable and the lines of people attest to the fact that the store is busy today. You select a shopping cart from those carts not yet returned to the long line of carts along the front wall of the store. As you start down the aisle straight ahead of you, you notice the breads, pastries, hot dog buns, and hamburger buns off to your right. In front of this stand, however, is a large lady with a small boy in tow. She appears to be having a difficult time making up her mind,
as she carefully looks at each brand of bread. Pushing your cart beyond her, you walk back and pick up the first two loaves of bread you see.

The brown and white checkered floor is littered with cigarette butts and discarded papers. Off to your left is the produce department where a number of lettuce leaves have fallen on to the floor and been ground into a shapeless, dull-green mass.

As you approach the rear of the store, you see the meat counter stretching along the back wall. After finding the porks, the sausages, the steaks, and the hamburger, you finally locate the veal outlets. As you reach down into the refrigerated shelves, you notice that the meat is brick-hard. Little slivers of ice cling to the packages.

The dairy products are in the corner of the store. The milk, located among the buttermilks, chocolate drinks, yogurts, and cheeses, is in bright red and white cardboard containers. After grabbing the milk and placing into the cart along with your meat and bread, you begin to look for the ice-cream container. Your attention is caught by a young mother with a small child sitting in the cart, facing backward. There are also two other small children, a little boy about 6 and a little girl of about 4. The mother appears to be having a difficult time keeping her children from touching all the products on the shelves. As you approach, she gives you a brief, furtive smile and then turns her attention back to the two children who have wandered away in the meantime.

After locating the chocolate ice-cream, you push your cart toward the front of the store and the check-out aisles. You are fourth in line, behind a man with only a few items under his arm, an elderly, white-haired lady in a light blue dress, and a middle-aged lady in a brown suit who has only a few groceries in her cart. Once again, you become aware of the ringing of the cash registers as the checkers ring up the items rapidly. As you wait with little patience, you hear the sounds of the supermarket: the cash registers, two women ahead of you talking about the terrible weather, the clang of metal as a cart gets pushed past the check out stand into the row of carts, and the squeak of an unoiled wheel as a cart goes by.
APPENDIX I

TEST-ANXIETY HIERARCHY ITEM DESCRIPTIONS
TEST ANXIETY HIERARCHY ITEMS

You are in your regular place of study. You have just finished reading the last chapter of the material which will be covered on your midterm examination tomorrow. You feel that you should review all of the material, since you are very concerned about your ability to remember the vast amount of material to be covered on the examination. Somehow, the material doesn't fit together in your mind and you are wondering how you will remember the information during the examination.

You are in your bed, trying to get to sleep. As you roll over on to your side, your mind flashes to the midterm examination you have tomorrow. You feel that you are uncertain as to how well you will do, even though you have studied for the examination. Somehow, you can't seem to get very comfortable. As you shift your position, your mind flashes once again to the examination the next day.

Slowly you awake. It takes you a few minutes to realize where you are. As you struggle out of the bed and begin the familiar process of getting ready for today's activities, you suddenly remember that you have a midterm scheduled later that same morning. Since you have other classes that morning, there will be little chance of doing any more review before the examination. You begin to wonder whether or not you will be able to remember what you have studied.

You are walking to the class session in which a midterm examination is to be administered. It is cool outside, and you notice a chill breeze which causes you to shiver. Although you are aware of all the other students on their way to or from class, your mind is occupied with trying to remember everything you have previously studied for the test. The material seems to be disorganized in your mind. You have the vague feeling that you won't be able to remember much when you actually take the examination.

You are sitting in class in your normal seat. The instructor has just walked into the room with the midterm examinations under his right arm. A few students are talking together, a short distance away, and one of them laughs loudly. There seems to be more students in the room than is usual. You look over a few notes and they seem familiar as you read them. When you put them away, however, it is hard to recall what you had written down.
The bell sounds in the hall outside and a few more students walk into the classroom, looking for seats. The midterm examinations are in a pile on the table at the front of the room. The instructor walks over and closes the door. It is quieter in the classroom than is normally the case. The instructor tells you that there are no special instructions, other than those included on the examination. He starts to pass out the correct number of copies and moves to the second row. You begin to wonder what the test will be like. Will it be multiple-choice? Short Answer? True-false? Essay?

The instructor has handed the midterm examination to the girl in the yellow dress on the aisle. She takes a copy of the examination and passes the rest down the row. As you receive your copy and hand the remaining copies to the boy next to you, you see that the first page of the test is composed of multiple-choice questions. You look at the first question and the possible responses and realize, with a feeling of panic, that you are not at all certain of the correct answer. Two of the five possible answers are obviously incorrect, but you do not know which of the three remaining choices is the correct answer.

A number of people have already left the examination. A hurried glance at the clock shows that there are only five minutes left in which to complete the examination. As you quickly leaf through the examination, you realize that you have left a number of questions unanswered. These are the questions that you were uncertain about as you went through the examination the first time. The instructor appears to be somewhat impatient, waiting for the rest of you to finish. With only five minutes to go, you have about ten questions yet to answer.

As you look at the clock, you realize that you are behind schedule in completing your midterm examination. You have completed the multiple-choice portion of the test, but it has taken you longer than you had anticipated. You suddenly realize that you will have to write the answer to two essay questions more rapidly than you ordinarily do. Unless you hurry up a bit in working on the final portion of the test, you will not be able to complete it.
Test Anxiety Hierarchy Items

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You are in your regular place of study. You have just finished reviewing the last chapter of the material which will be covered on your final examination the next day. You wish that there was more time so that you could review the material again, because this test will probably determine your final grade in the course. Somehow, the material doesn't fit together in your mind, and you are wondering how you will remember all this information during the examination.

You are in your bed, trying to get to sleep. As you roll over on to your side, your mind flashes to your final examination tomorrow. This examination is particularly important to you, since you were right on the borderline on your first midterm and your performance on this examination will determine your final grade. You feel that you are uncertain as to how well you will do, even though you feel that you have studied for the test. Somehow, you can't get very comfortable. As you shift your position, your mind flashes to the examination once again.

Slowly you awake. It takes you a few moments to realize where you are. As you struggle out of the bed and begin the familiar process of getting ready for today's activities, you suddenly remember that you have a final examination scheduled later that same morning. This examination is even more important than usual, for your final grade in this class is directly dependent upon how well you will do today. There will be little, if any, chance for any further review. You begin to wonder whether or not you will be able to remember what you have studied.

You are walking to your classroom where the final examination is to be administered. It is cool outside, and you notice a chill wind which causes you to shiver. You notice that there are fewer students than usual, but your mind is occupied with trying to remember everything you have studied for this examination. This test is extremely important to you, for your final grade in the course depends upon how well you do on this investigation. The material seems to be disorganized in your mind. You have the vague, discomforting feeling that you won't be able to remember much when you take the examination.
Test Anxiety Hierarchy Items

You are sitting in the classroom where the final examination will be administered. The instructor has just walked into the classroom with the examinations. There seems to be more students talking than is usually the case. A short distance away, a few students are talking together. One of them laughs loudly. The room is almost full, an unusual occurrence this early before the bell. This examination is very important to you, for your grade on this examination will determine your final grade in the course. You look over some of the notes and they seem familiar to you as you read them. When you put them away, however, it is hard to recall what you had just read.

The bell sounds in the hall outside your classroom. A few students walk into the classroom and look for available seats. The final examinations are in a pile on the table at the front of the room. The instructor walks over and closes the door. It is quieter in the classroom than is normally the case. The instructor tells you that there are no special instructions beyond those included on the examination. He starts to pass out the examination copies, beginning at the first row. As he counts out the correct number of copies and moves on to the second row, you begin to wonder what the test will be like. Will it be Multiple-choice? True-false? Short-answer? Essay?

The instructor has handed the final examinations to the girl in the yellow dress on the aisle. As she takes a copy of the test and passes the remaining copies down the row, you receive your copy. You see that the first page is composed of multiple-choice items. You look at the first question and realize, with a feeling of panic, that you are not at all certain of the correct answer. You feel even worse because you really need to do well on this examination. Your midterm had left you on the borderline, so that your final grade will depend on how well you can perform today. You look again at the first question. Two of the five answers are obviously wrong, but you don't know which of the remaining three is the correct answer.

As you look at the clock, you realize that you are behind schedule. You have completed the multiple-choice portion of the test, but it has taken you longer than you had anticipated. You suddenly realize that you will have to write the answer to two essay questions more rapidly than you ordinarily do. This bothers you even more than usual. Since your grade in the class will depend upon your grade on the final exam, you are trying to budget your time carefully. Unless you hurry up a bit, you will not be able to complete the examination.
A number of people have already left the examination. A hurried glance at the clock shows that there are only five minutes left in which to complete the final examination. As you quickly leaf through the pages of the examination, you realise that you have left a number of questions unanswered. These are the questions that you were uncertain about as you went through the examination the first time. You had determined that you would not make any foolish mistakes today because this examination was so important to you. Your whole grade in this course would depend on your performance on this test. The instructor appears to be somewhat impatient, waiting for the rest of you to finish. With only five minutes to go, you have about ten questions yet to answer.
APPENDIX XI

INSTRUCTIONS TO THERAPISTS FOR STUDY-SKILLS TRAINING SESSIONS
Study-Skills Training  Session I

A. Getting Acquainted  (15-20 minutes)

1. After students arrive, introduce yourself to them. Tell them a little about your activities since you received the Ph.D.

2. Have students introduce themselves to the group. (Note: There may be a tendency for students to address all comments to you. Try to get students to speak to group as a whole, not to you alone).

3. Have them give their name, class (freshman, etc.) and where they are from. Also have them describe their feelings when they take classroom examinations. After they describe their feelings of tension or apprehension, inquire of some of them how long they have had these feelings. Encourage other members of the group to ask questions of those introducing themselves.

B. Overall Rationale  (5-10 minutes)

1. You may want to point out that test-anxiety is a common complaint. Many students feel that they perform poorly on examinations because they are anxious or nervous. Perhaps the more important question is whether or not feelings of anxiety cause a person to perform more poorly than he might if he weren't anxious.

2. The effects of anxiety upon performance: A number of experimental studies have demonstrated the relationship between general feelings of anxiety and performance upon complex tasks. This relationship may be pictured on the blackboard as follows:

   ![Diagram of the relationship between anxiety and performance](image)

   **Low**  **High**

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

3. Most psychologists who have studied test-anxiety feel that the relationship between grades and test-anxiety is very much the same:

   ![Diagram of the relationship between grades and anxiety](image)

   **Low**  **High**

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
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</tbody>
</table>
B. Overall Rationale (Continued)

4. Encourage students to ask any questions they may have, and then answer them to the best of your ability. If you aren't clear as to the answer, say so!

5. As a means of summarizing this topic, you might point out that:
   a. Extremely low levels of test-anxiety may indicate that the consequences of the test aren't too important for that person.
   b. Extremely high levels of test-anxiety appear to disrupt performance.
   c. A moderate level of test-anxiety seems to be associated with the best performance.

6. Point out that they were asked to participate in this program because they were among the top 1/4th of the students who took the Inventory of Test Anxiety at the beginning of the quarter. It appears possible that they are among those for whom anxiety may disrupt performance.

C. Particular Rationale: (5-10 minutes)

1. For those who are highly anxious while taking an examination, a vicious cycle begins to operate:

   High Anxiety -------- Lowered Performance -------- Even Greater Anxiety

2. This project is an attempt to break that cycle.

3. Ask the students at this point if they can think of ways in which test-anxiety might be reduced. What techniques have they used to become less anxious or to deal with their feelings during examinations. Encourage any responses and encourage other students to react to what students may suggest.

4. As a means of summarizing, point out that there are probably two large strategies available to help students become less anxious during examinations:
   a. You might work on the reduction of anxiety so that students could later perform more adequately.
   b. You might help students learn how to become better prepared for examinations so that they feel more confident and less nervous when they actually take examinations.
Study-Skills Training  Session I  (Page 3)

C. Particular Rationale: (Cont'd)

5. This group will use the second approach mentioned. During the six-week period, we will be looking at such things as:
   a. Effective use of time.
   b. Efficient study conditions.
   c. The use of a study method which has been shown to lead to a better selection of what is important and which leads to increased retention.
   d. Tips for taking examinations.
   e. Predicting questions which are likely to appear on an examination.
   f. Organization of course material.

6. At this point, it might be well to point out that this will not be a lecture or discussion group. The emphasis will be on actually trying out new ways of organizing for study and new ways of studying. Remind them again that the basic purpose is to help feel more comfortable during classroom examinations.

D. Discussion of Time Requirements in College: (10-15 minutes)

1. Someone has remarked that college students are the most overworked and underpaid segment of today's society. Let's see if it is possible to determine why this remark might have been made.

2. Ask the group how many hours a week they have to study in order not to fall behind in their studies. There will probably be a wide variety of responses. Try to draw an estimate from as many as possible. Ask the group what other kinds of activities take up their time (waiting for meals, sorority meetings, going to and from classes, bull-sessions, etc.).

3. Use the blackboard to build the actual time requirements of an average student with 17 hours of classes:
   classes = 17 hours
   Study = Get a group consensus - add in.
   Meals = " " " " " " " "
   Meetings = " " " " " " " "
   Add on to this the other activities suggested by the group, and then total the suggested number of hours.

4. It becomes clear that many of them are being asked to balance 70-80 hours of activities a week.

5. For many students, the transition from high school to college is difficult. This may help to point out one of the reasons why! In high school, students time was relatively structured
D. **Time Requirements** (continued)

5. and fewer demands were placed upon them. In college, their use of time is relatively unstructured and teachers make greater demands on their time.

6. At this point, draw from the group the things which cause them the most difficulty in their use of time. Try to get them to express any feelings they have of not being able to accomplish all they would like. What kinds of activities interfere with the time they need to adequately prepare for classes and examinations? Spend about 5-7 minutes in this portion of the session, and try to draw as many students into the conversation. Ask direct questions, if needed, of those who have been hesitant to participate to this point. Keep the focus on their problems in balancing out the demands of school and personal activities.

E. **Assignment and Closing procedures:** (5-7 minutes)

1. We will try out next week some activities that may make it easier to balance out these demands we have just discussed. Point out that it will be helpful if they know how they presently use their time. Pass out the yellow sheets and explain their use. Have them record how they actually used their time. Emphasize the need for honesty—no punishment or credit or grades! Have them mark down what subject they studied when they list "study" on their time record. It will work out better if they fill out their activities 2-3 times a day rather than wait until evening. There is a tendency to forget what they did.

2. In addition to keeping a record of their time use, ask them to pay particular attention to the interruptions they experience when they do settle down to study. Pay attention to the interruptions of roommates, the need for additional supplies, and anything which causes them to have to interrupt study for any reason.

3. Pass out five postcards to each person, and ask them to fill out their name and address. Explain that these will serve as reminders of the weekly meetings. Point out that they will either be distributed to them in their sections of Psych. 100 or else will be sent to them in the mail.
Study-Skills Training  Session II

A. Review: (3 minutes)

1. Last week, we looked briefly at the relationship between test-anxiety and test performance. You will recall that the relationship was curvilinear with the poorest performance associated with either very low or very high test-anxiety. It was also pointed out that being very nervous or anxious about examinations appears to disrupt performance, to keep you from doing the very best that you might otherwise do.

2. We also suggested that there are two basic methods by which we might attempt to reduce the feelings of anxiety which occur during an examination:
   a. We might help persons learn how to relax so that they would feel more comfortable when they take examinations, assuming that performance will then become better.
   b. We might also help students learn more effective methods of preparing for examinations so that they would then feel more comfortable than usual.
   c. In our attempt to help this group reduce test-anxiety, we have chosen the second of these two approaches.

3. Last time, you were asked to become aware of two components of effective study:
   a. The interruptions that occurred as you tried to study, and the conditions when you actually did study.
   b. An accurate record of the way you spent your time last week.

B. Study Conditions: (7-10 minutes)

1. For Leader: The focus of this and the following section should be on helping the group to realize that they can take an active role in determining what happens to them. Where study conditions are poor, where inadequate amounts of time are devoted to classes, where interruptions occur at the hands of other people, try to guide the discussion toward considering what actions an individual can take so that he is less dependent upon other persons and more dependent upon his own actions.

2. Leader to group:
   Ask whether any members of the group were interrupted as they tried to study last week. Let 3-4 members volunteer some of their experiences. If not that many respond, ask other members of the group how they got along last week in terms of interruptions. Some of the following are frequently mentioned by students:
   a. interruptions by roommates, friends, family, etc.
2.  
   b. distractions from outside influences (excessive noise in dorms, etc.).  
   c. breaking off study periods for unanticipated activities.  
   d. need for more information about assignments, lessons, etc.  
   
3. As these problems are brought out by group members, ask other members if they have any suggestions as to how to arrange their study conditions so as to be less distracted. Keep the focus of the discussion on how they become dependent upon the actions of other persons when they allow themselves to be in a situation where they can be distracted or interrupted.  
   
4. After a few minutes of discussion, ask the group what areas for study are available where they would be less likely to be distracted or interrupted when they do study. You might point out that two hours of uninterrupted study is usually more productive than is four hours of study where frequent distractions occur.  
   
   a. Main library has individual study cubicles on second floor—some students, however, don't like the "closed-in" feeling. Be certain to acknowledge the disadvantages for those who need lots of room.  
   b. Dorms usually have a room set aside for study—main disadvantage is that you frequently run into someone you know well so that interruptions continue to occur.  
   c. Many students are unaware of the branch libraries on campus. Pages 6-7 of the OSU Library Handbook show these branch libraries and their locations. (There will be enough copies for examination at this session, but the students can't keep them, we haven't enough copies)  
   
5. Summarize briefly some of the kind of interruption that occurred for students, some of the group suggestions for alleviating these interruptions, and the basic idea that if you study in places where interruptions are likely to occur you are really at the mercy of other people. Try to secure some kind of verbal commitment from at least some of the group members that they will try to arrange study conditions this week so that they are less frequently distracted. If they agree to try to do this, try to find out how they plan to do it.  
   
C. The Use of Time: (10-15 minutes)  
   
1. Most of the group will have brought with them the record of their time use for last week. Provide each member with a sheet of paper and ask them to answer briefly four questions.
C.  

1. 

a. How many actual hours of study did you put in last week? (They can get this figure from their record of time use or through estimation). Point out again that there are no grades awarded here, that we are trying to be honest with ourselves and one another.  
b. How many hours should they have spent if they followed the widely accepted standard of two hours of study for each hour in class?  
c. How many hours were they short or did they exceed what they probably should have put in?  
d. Did they feel that they achieved last week what they needed to remain current in all of their classes (yes or no)?  

2. Have each of the group respond in turn to these four questions. Ask the group what things they particularly noted about their use of time the previous week when they kept a record of their time use.  

3. Try to encourage discussion at this point by having other students respond whenever a student brings up difficulties in his use of time. Ask other students what suggestions they might have for the one who presents the problem. You might also ask the student if he, himself, has thought of ways to use his time more effectively.  

4. Try to avoid any moralistic concern over their use of time (e.g., You should be studying more hours, you know!). Rather, focus on their self-interest. Many of these students are facing expulsion from school because of their grades. Point out that in general, grades are directly related to the number of hours spent in preparation. You can point out that many high school students get good grades with little effort (due to the kind of population with which they are competing), but that college students have traditionally found this more difficult to accomplish (because of the limited portion of the population against which they are competing).  

5. Near the end of this discussion, point out that our purpose is not necessarily to get them to spend more hours in study. From this point on, the emphasis will be on making their study hours more productive. There is, however, a minimum number of study time needed so that they won't feel panicky or extremely nervous as they take examinations.
D. **Building a time schedule for next week: (20 minutes)**

1. The previous discussion will probably have pointed up the multiplicity of tasks which they are assigned, and the limited number of hours in which to accomplish them. One technique which has been extremely beneficial to those who have tried it is the actual scheduling of their time. This allows for a feeling of confidence that it is actually possible to accomplish all that is being asked of them.

2. Indicate to the group that we will try building a proposed time schedule to see how it works out for them. You might indicate that many students are dead set against a schedule when it is first proposed, only to find later that it is very helpful! Our basic purpose for this exercise is not to turn the students into automated robots, but rather to have them plan for themselves what they hope to accomplish this week and how they hope to accomplish it. Schedule building is always difficult for students the first time they try it - we can expect that they will make schedules which are somewhat unrealistic and too crowded with study hours.

3. The following steps are suggested in the use of the yellow sheets:
   a. Have them turn to the side headed "Proposed Schedule."
   b. In Section B, have them plan the number of hours they need this week for each of their courses.
   c. Have them mark in some fashion the hours when they will not be available for study (e.g., classes, dates, Sunday mornings for sleep or church, group meetings, these sessions, etc.).
   d. In the remaining hours available to them, have them plan when they plan to study those hours indicated as necessary in Section B. Make the schedule as specific as possible. Rather than indicate "study" from 7-9 Tuesday evening, for example, have them indicate "study history" or "write English theme" during that same period. They should have one hour scheduled for each hour indicated as necessary in Section B.

4. Indicate that while we expect mistakes and failures to follow the schedule precisely, we are interested in determining if the study schedule helps them to accomplish what they feel they need to accomplish.

E. **Assignment (1-2 minutes)**

1. Ask the students to become aware of how they study a chapter once it is assigned. What techniques do they use to understand and remember assigned material. Ask them to jot down a few notes about their method and bring it with them the next time.
Study-Skills Training  Session III

A. Review of Last Week's Activities: (15 minutes)

1. Arranging more effective study conditions: (5 minutes)

   Last week, the group considered possible methods to arrange study conditions so that unwanted interruptions occurred less frequently. The purpose of this discussion is to determine whether or not any of the group made an effort to study in a more productive environment. You might begin by asking the group whether any of them felt that they were interrupted or disrupted less frequently this week than last. If members respond affirmatively, try to find out just what they did to cause this to happen. Other questions you may use to draw out the group's reactions toward arranging more effective study conditions are:

   Did any of you have more interruptions this week than last?
   If so, why do you think this occurred?
   Did any of you try studying in a more productive environment (e.g., library, study room, etc.)? If so, did you think it was helpful?

   Conclude this part of the discussion by again pointing out that uninterrupted study is much more helpful for preparation for examinations than is interrupted study.

2. Scheduling of Time: (7-8 minutes)

   Last week the group built individual projected study schedules. The purpose of this portion of the session is twofold: (1) to get the student's reactions to what happened last week, and (2) to correct any misperceptions about what a study schedule is supposed to accomplish.

   You might begin by asking the students for their reactions to their study schedule. Did it help them in any way, or did it appear to be worthless? Encourage both positive comments and negative comments. As the first few respond, you might directly ask other members if their reactions were the same as those who had volunteered. You might also want to determine whether or not any of them found the schedule particularly helpful? If so, how did they feel it helped them.

   Once you have received the above information, you might point out that many students begin to feel that following a certain schedule, once they have drawn it up, is an end in itself. Rather, a schedule is only a vehicle for getting accomplished what they, themselves, decide they need or want to accomplish. There are a few reasons why, however, using a schedule seems to help the great majority of students. You may want to mention a few of them as a means of showing why we have attached so much importance to it:
Study-Skills Training  Session III  (Page 2)

A. Review (Cont'd)

2. Time (Cont'd)

a. It eliminates the act of deciding what you will study every time you sit down. This saves time for study.

b. A study schedule keeps you from spending excess time on a course you enjoy while ignoring a course you dislike. Each course gets its share of the available time.

c. When unanticipated interruptions do occur, so that study is impossible, a schedule makes it much easier to determine exactly what needs to be done in order to get caught up.

3. Important factor in Time Use - Regular Pattern of Activities

At this point, ask the group what they feel is the most important factor in using time wisely and effectively. Draw responses from as many as possible. Most students feel that they need to develop more will-power, more "stick-to-it-iveness". Actually, as Robinson has pointed out in Effective Study, the one major factor in effective time use is establishing a regular pattern of activities. If you study the same subject at the same time each day in the same place, it soon becomes much easier to turn to that particular subject. The hardest part is the initial period when you are establishing the pattern of study at regular periods. Once you get past this period, however, it becomes easier to settle down to study. This leaves more free time for other activities.

You can conclude this section of study conditions and time use by stating that we will try scheduling our study assignments for one more week. Next week, the group can decide whether or not they would like to continue this activity.

B. Introduction to the SQ3R Study Method (20-25 minutes)

1. What should an effective study method do for a student?

a. Last week, students were asked to think about the techniques they used to study assigned materials. How did they go about studying material in order to learn it well enough to take examination over that material?

You might begin by asking members of the group to give you some idea of the specific techniques they used last week. Try to draw them out into becoming very specific. Did they take notes? Underline? What kinds of things did they look for as they read?

b. Next, ask the group what things they would like a study
B. **SQ3R (Cont'd)**

1. **What it should accomplish (Cont'd)**

   method to do for them. They will probably be uncertain what you mean at this point. If so, give them one example. Most students want a study method that will help them select the important material from the unimportant. Try to draw from the students other things they would like their study method to do for them. Some of those that are likely to be mentioned are:
   
   (1) a study method should help you to understand material as you read it.
   
   (2) a study method should help you organize material you read.
   
   (3) a study method should help you to remember material after you have read it.
   
   (4) A study method should help you to review effectively when it is time for examinations over the material.

2. **The SQ3R Study Method**

   a. Francis Robinson, a faculty member here at Ohio State University, developed a few years ago a study method that was designed to:
   
      (1) Help the student select what he is expected to know.
      
      (2) Comprehend these ideas rather rapidly.
      
      (3) Fix them in his memory, and
      
      (4) Review efficiently for examinations.

   Dr. Robinson also felt that this study method should be more efficient and less time consuming than rereading material, and that the method should not be too difficult to master. The result was the SQ3R method of study, recognized by many authorities in this area as probably the single most effective study method.

   At this point you might put on the blackboard these letters:

   S
   Q
   R
   R

   b. Point out that you will give them an introduction to this study method tonight, but that there won't be time enough to practice the method during the session this evening. Encourage them to ask questions or to indicate to you if they are uncertain exactly what you are describing.
B. SQ3R (cont'd)

c. **SURVEY**

Write out on the board the word "survey" following the letter "S".

Recently, a Harvard Dean, addressing educators, remarked that he had observed very few of these bright students who looked ahead in their text to see what was coming. Those who did, he felt, did so to see how many pages were in the chapter.

Actually, however, surveying or previewing a chapter before you read it has some real advantages. It alerts you to what the author thinks is important, it helps you to fit what you are reading into an overall pattern, and experiments have shown that students who preview a chapter prior to reading it can read the chapter with more speed and greater comprehension than those who read the chapter without previewing it.

You might point out how textbooks are organized and written, with much explanatory material designed to surround a basic outline. One method for determining what the author thinks is important, then, is to look at the bold-faced headings in the text. What are the 2-3 basic divisions of the chapter? Is there a summary at the end of the major divisions or at the end of the chapter?

The survey step of the SQ3R takes no more than 3-4 minutes. Its basic purpose is to get an idea of what the chapter covers and what are the major divisions of the material.

d. For the Question, Read, Recite, and Review steps, please review pages 28-35 of *Effective Study* so that you can describe the basic method well enough that the students get a feel for it. You might also look over the first part of Chapter 2 and Chapter 3 as background material.

e. When you have completed your description of the SQ3R study method, ask the group if they are clear as to how the method works. While it might be difficult to use with so little practice, ask them if they would be willing to try it out in one course this week and report back as to the results next week.
C. **Building a Time Schedule for Next Week:** (15-20 minutes)

1. Review last week's directions (page 4) for suggestions for building a time schedule. Urge students to use last week's schedule as a guide, scheduling in the same manner those hours successfully followed last week, and revising those hours unsuccessfully scheduled.

2. Also suggest that, if possible, they try to schedule the same subject at the same time each day. While this can't always be done, it is very effective if it can be done. Once they have completed the time schedules, students are free to leave.
Study-Skills Training  Session IV

A. Review:  (2-3 minutes)

1. In the attempt to help reduce examination anxiety, we have focused our efforts so far on efficient study techniques. A basic assumption has been that the person who is fairly well prepared for an examination will experience less anxiety during the examination than will the person who is not so well prepared.

2. Thus far, we have specifically talked about:
   a. Arranging study conditions so that interruptions are less frequent and so that more can be accomplished during study periods.
   b. Using time more effectively, particularly through the use of a time schedule.
   c. A study method, the SQ3R, which is designed to help the student select what is important and to remember the main ideas.

B. Discussion Period:  (12-13 minutes)

1. To Leader: This portion of the session will be devoted to feedback from the students about their attempts to implement the suggestions we have made, and also to get their reactions to what has happened to them.

2. You might point out that while the largest portion of this session will be spent in trying out the SQ3R study method on practice material, we are interested in their reactions to what has happened up to this point.

3. Arranging study conditions. You might ask the group whether or not any of them have made an effort to arrange their study conditions so that they can be more productive when they study. If any of them indicates that he has done so, try to find out what changes have been initiated and the results of those changes. Do they feel that they are accomplishing any more because of the changes? Try to reinforce any responses which indicate that a student is taking responsibility for becoming more productive (e.g., studying in the library, studying during times of the day when he is less likely to be interrupted by friends or roommate, trying to keep interruptions at a minimum). If only a few students respond, you might directly ask other members what problems they are running into during study periods. If anyone mentions difficulties in study conditions, try to draw suggestions from the rest of the group as to actions the person could take so as to reduce the difficulty.
B. Discussion Period: (Cont’d)

4. Effective Use of Time. What reactions did the group have to the use of the time schedules they drew up last week? Perhaps the most important question to be raised is whether or not they feel that they accomplished more with the schedule than they did when they weren’t using a schedule. What kinds of problems did they encounter this week in trying to accomplish what they felt they ought to. If anyone expresses resentment at not being able to follow the schedule, point out again (as you did last week) that the ultimate goal is not to follow a schedule precisely. Rather, the schedule is only a vehicle for getting accomplished those things the student feels must be accomplished in order to remain current in his classes.

Again, reinforce any expressions that the schedule was helpful or that the student accomplished more last week than usual.

5. SQ3R Study Method. Did any of them try out the SQ3R study method on any of their course material last week? If so, what was their reaction to it? Did they find it time consuming? Did they feel that they knew the chapter better than they would have if they had used their ordinary study technique? Did they have any problem with the use of brief notes to summarize main ideas? At this point, postpone any questions about how you use this method or questions related to any of the specific steps. Explain that we will go over the method in detail in a few minutes and will spend some time this evening in practicing the method. You are mainly interested in their reactions if they have tried the method. If any of the reactions are negative, acknowledge that the SQ3R is difficult to master at first. Later on, however, they will find that they can accomplish more in the same period of time than they might have previously.

C. Further Explanation of the SQ3R Study Method (5 minutes)

1. Pass out the white sheet headed Steps in the Survey Q3R Method of Studying. Give them 3-4 minutes to read it carefully. Have them raise their hand when they feel that they understand the method. Give them the opportunity to raise questions about the method and the use of it. Answer any questions to the best of your ability.

D. Practice on the Use of the SQ3R (30 minutes)

1. Explain that while the practice material was written in 1940, and is now out of date, it is representative of the kinds of material frequently encountered in a college class.
D. Practice of SQ3R (Cont'd)

2. Pass out *A Test of Reading Ability: Canadian History* to each of the members. Allow them 2-3 minutes to become acquainted with the general outline of the chapter (survey step) by looking at the bold-faced headings. Point out that while there is no overall summary at the end of the reading, they can get a good idea of how the chapter is organized by (a) examining the bold-faced headings, and (b) quickly reading the first and last sentence of each paragraph.

3. After three minutes for the survey, announce that they will have seventeen minutes to try out the SQ3R method on the material, after which time they will be given a test over the material. The test will be of the multiple-choice, true-false variety. Ask them to turn each heading into a question, read actively, looking for the answer to the question they raised, and then to recite the answer to the question (to themselves) at the end of each section. They may recite silently if they wish, but preferably by writing down a brief phrase or so in their own words to answer the question. Once they have done this, they should go on to the next section.

4. Time them, allowing 17 minutes to get as far as they can. Then, pass out the test booklets and allow them ten minutes to complete the answers. If any of them finish within the ten-minute period, ask them to check their answers.

5. Read the answers aloud (from the Robinson-Hall manual) and have them check any incorrect answers. Have each student determine the number of correct answers, and get a class range against which the individual student can get some comparison of his relative ability to use this new method at this point.

E. Conclusion (5 minutes)

1. Point out again that the use of the SQ3R method can help them to be less anxious during examinations by helping them to select what is important and by helping them to remember what they have read.

2. Also point out that the SQ3R method is difficult to master at first. If, however, they are willing to put forth the effort to use it on their classroom assignments, it will become easier and easier as they go along.
E. Conclusion (Cont'd)

3. Next week, we will be talking about question prediction and helpful hints for taking examinations. Ask them to bring along their Psych 100 textbooks with them to the next session.

4. While the hour will be up by now, those who want to may fill out one of the time-schedules for next week. Make certain that students are aware that this is a voluntary, not a required, procedure.
A. Feedback on SQ3R Use: (5 minutes)

1. During this period, try to draw from the group their reactions to the use of the SQ3R study method last week. Among the questions you might want to consider are:
   a. How many tried it on their studies last week?
   b. How frequently did they use it?
   c. What were their reactions to the use of the SQ3R?
   d. What problems or difficulties did they encounter?

Deal as best you can with the questions they raise, difficulties they encountered, and objections to the use of the method.

B. Setting the Stage for the Evening's activities:

1. We mentioned last week that we would be dealing with some tips for taking examinations. That topic has been postponed, however, until our last session, next week.

2. Our purpose this evening will be to demonstrate how the SQ3R study method can be applied to a chapter from the student's textbook. We also want to demonstrate how the SQ3R study method can be used to help predict questions that the students will likely encounter on examinations. Dr. Francis Robinson, in *Effective Study*, has pointed out that the most effective way of combatting a tendency to "blow-up" on examinations is to predict quiz questions in advance and to concentrate on answering them in the study period. The usual student attitude is that one must "study everything, because there is no telling what will be asked." The use of the SQ3R method does, however, tend to make quiz questions seem more familiar, since questions are usually over the material the instructor feels is most important.

3. To the Leaders: The text for Psych. 100 is *Principles of General Psychology* by Kimble and Garmezy. I will arrange to have a few extra copies available for those who forget their text and for the leaders.

C. Practice With the SQ3R: (55 minutes)

1. Over-view: (15 minutes) (Chapter 22-Modification of Deviant Behavior)

Have the students take exactly ten minutes to do the following two things:
   a. Look at the table of contents, to see how Chapter 22 fits into the overall outline of the whole book.
   b. Outline the chapter, using only the bold-faced headings.
C. Practice: (Cont'd)

2. After they have completed the bold-faced outline, your purpose is to try to point out that knowledge of the organization of the chapter and the main divisions is very helpful in understanding and remembering the facts contained in the chapter. The following steps may be used:
   a. Pass out the mimeographed outline of Chapter 22. Have the students see if there are any discrepancies between their outline and the one provided them. If there are discrepancies, have the students return to the book to determine where they missed or added material.
   b. How does the chapter fit into the larger organization of the book? Chapter 22 is one of four chapters making up the seventh major division of the text, Personality and Social Behavior. While Chapter 21 dealt with Abnormal Behavior, Chapter 22 is concerned with the treatment of unusual behavior.
   c. What are the major divisions of this chapter? (Have them try to recite without the use of an outline)
      (1) A history of the problem.
      (2) Three kinds of therapies (Physical, Psychotherapy, and Behavior therapies).
      (3) Common elements of the three therapies.
      (4) Limitations and research of psychotherapy.
      (5) Positive Mental Hygiene.
   d. Once this basic outline of the chapter is fairly well in mind, it becomes much easier to understand the chapter as you read it. Individual bits of information are much easier to retain, if you have an organization into which they may be placed.

3. Practice (20 minutes)
   a. Divide the group into two subgroups, A and B.
   b. The members of group A are to take 15 minutes to try out the SQ3R method over pages 632-637, from "Medical History of the problem" to "Psychotherapy." They are to apply the steps of the SQ3R method. Survey the whole 5 pages first to get a quick overview, turn each bold-faced heading into a question, read the section in an active search for the answer, recite the answer in a brief note, and then review for a few minutes at the end of the five pages.
   c. Meanwhile, have the members of group B take one section each and have them develop a multiple-choice question over what they believe to be the central point developed in that section. This will require a careful reading of that section and looking for the most important point, and then developing
C. Practice (Cont'd)  
3. (Cont'd)  
c. (Cont'd)  
the best multiple-choice question that they can. Cards will be provided for the questions. If they finish within the 15 minute period, have them spend the remainder of the time in getting a better overview of the whole chapter. The following sections should be assigned to one member of group B:  
1. Medical History of the problem (Pages 632-634)  
2. Shock Therapies (Page 635)  
3. Psychotherapy (Page 635)  
4. Drug Therapy (Pages 635-636)  
5. Drugs, Placebos, and Symptom Changes (Page 636)  
d. At the end of fifteen minutes, give each of the members of group A one of the questions prepared by group B. Have Group A members answer all of the questions on a sheet of paper. Then, let group B members give the correct answers to their questions. Did Group A members get the majority of the questions correct? If so, they are beginning to get the hang of the SQ3R method. If not, they still need practice in reading to answer the question they posed at the beginning of a section.  
4. Further Practice (20 minutes)  
a. Reverse the two groups. Have group B apply the SQ3R method to pages 655-660 ("Limitations of Psychotherapy" to the end of the chapter).  
b. Have group A members take a section each and develop a multiple-choice question after a careful reading for the major point. They can also get a clearer overall picture of the chapter if they finish early. The sections are:  
1. Limitations of Psychotherapy (655-656)  
2. Research in Psychotherapy (656-657)  
3. Therapist Variables (657-658)  
4. Patient Variables (658)  
5. Positive Mental Hygiene (659-660)  
c. Repeat the "d" step above, with the members of B group trying to answer the questions drawn up by A group members.  
D. Review (2 minutes)  
1. Some students seem to feel when they study they need to know everything, that every little bit of information is important. NO one, with the exception of those with a photographic memory, can remember all the facts.
Study-Skills Training  Session V (Page 4)

D. Review (Cont'd)

2. We have presented tonight two ways to pick out what is important:

   a. If you know how (1) the chapter fits into the overall organization of the book, and (2) the chapter is organized, then you have a framework so that the facts are more easily recalled as illustrations.

   b. The use of the SQ3R method (Survey, Question, Read, Recite, Review) leads to the selection of what is important, leads to better retention, and leads to the finding that many examination questions are (happily) familiar.
Study-Skills Training  Session VI

A. **Introduction** (3-4 minutes)

1. Indicate to the group that Mr. Osterhouse will come in about ten minutes before the end of the hour to sign their research participation cards.

2. Tonight, we will be considering tips for taking examinations that the students may find very useful for calming feelings of anxiety and for achieving higher grades on examinations.

B. **Reading** (20 minutes)

1. Robinson, *Effective Study:*

2. After students have completed this reading, have them become familiar with the Counseling Center passout on *Examinations*.

3. Ask students to read thoroughly, but rapidly. Allow 20 minutes for them to become as familiar as possible with the material.

C. **Discussion** (15 minutes)

1. The focus of this discussion should be on ideas they received from their earlier reading. Were there suggestions that they might find helpful in preparing for or taking exams? You might begin by asking a few of the group what ideas they got from their reading that they think might be helpful for them. As they respond, ask others in the group if they practice the suggestions made by the initial responder. Does it help them? Try to encourage as much honest group discussion about the suggestions advanced as possible. On your copy of the Counseling Center passout, I have starred a number of items I feel to be important. If the discussion lags during this portion of the session, you may want to sound out their reactions to the suggestions in the passout. Are they impractical? Do the group members feel that they might work for them if they were to try them out?

2. As a final step in the discussion, ask each group member to pick out two suggestions from their previous reading and discussion that they would like to try out during their final examinations. Point out that when we are anxious, we tend to revert to previously well-learned behavior. This means that, if they become highly anxious on their tests, they will probably forget this new behavior they were going to try out!
Study-Skills Training  Session VI (Page 2)

C. Discussion: (Cont'd)

2. (Cont'd)

They will need to keep firmly in mind what they want to do during their exams, or they will probably forget it in the anxiety generated by the testing situation. After they have decided on the two things they want to try out on their exams, have them share them with each other (Public commitment is more likely to lead to new behaviors).

D. Review: (5 minutes)

1. The purpose of this review period is to give a brief overview of what we have done so far:
   a. We have mentioned previously how anxiety affects performance:
      (1) Curvilinear relationship between test-anxiety and academic performance.
      (2) High test-anxiety may well disrupt the ability of a person to perform as well as he could otherwise.
   b. The areas of concern have been:
      (1) Arranging study conditions so that there are fewer interruptions and less distraction (e.g., use of library instead of dorm room).
      (2) The use of a study schedule only so that you can accomplish those things you feel need to be done.
      (3) The use of a study method (SQ3R) which is designed to help you pick out what is important and to help remember the material (You might briefly review the steps of the SQ3R).
      (4) Some helpful tips for more effective examination taking.
   c. We have pointed out that one method for attacking the problem of test-anxiety is by helping students to learn more effective study techniques so that they will better prepared and less tense or anxious during examinations.
   d. For each of the above, you can add whatever comments you have to summarize and pull the material together. The over-riding principle in these sessions has been to have the group members assume an active role in trying out new behaviors designed to reduce their examination anxiety. No one can help students reduce anxiety if the student is unwilling to try out new and more effective ways of preparing for examinations.
E. Reactions of Group Members to the Program: (10 minutes)

During this period, try to get the reactions of the group to the whole program. What were their reactions? What did they find the most helpful? The least helpful? If we were to do this again next year for other students, could they make suggestions about how the program could be made more helpful? What things have they tried that have worked for them? Which haven't worked.

F. Signing of Research Participation Cards: (Mr. Osterhouse)

I will come into the group 50 minutes after you start. If you should finish earlier, you can come to my office and get me.
APPENDIX XII

Steps in the Survey Q3R Method of Studying
STEPS IN THE SURVEY Q3R METHOD OF STUDYING

The title for this new higher level study skill is abbreviated in the current fashion to make it easier to remember and to make reference to it more simple. The symbols Survey Q3R stand for the steps which the student follows in using the method; a description of each of these steps is given below.

SURVEY 1. Glance over the headings in the chapter to see the few big points which will be developed. Also read the summary paragraphs if the chapter has one. This survey should not take more than a minute, and will show the three to six core ideas around which the discussion will cluster. This orientation will help you organize the ideas as you read them later.

QUESTION 2. Now begin to work. Turn the first heading into a question. This will arouse your curiosity and so increase comprehension. It will bring to mind information already known, thus helping you to understand that section more quickly. And the question will make important points stand out while explanatory material is recognized as such. Turning a heading into a question can be done on the instant of reading the heading, but it demands a conscious effort on the part of the reader to make this query for which he must read to find the answer.

READ 3. Read to answer that question, i.e., to the end of the first headed section. This is not a passive plodding along each line, but an active search for the answer.

RECITE 4. Having read the first section, look away from the book and try to briefly recite the answer to your question. Use your own words and name an example. If you can do this you know what is in the book; if you can't, glance over the section again. An excellent way to do this reciting from memory is to jot down cue phrases in outline form on a sheet of paper. Make these notes very brief.

Now, repeat steps 2, 3, and 4 on each succeeding headed section. That is, turn the next heading into a question, read to answer that question, and recite the answer by jotting down cue phrases in your outline. Read in this way until the entire lesson is completed.
STEPS IN THE SURVEY Q3R METHOD OF STUDYING (Page 2)

REVIEW 5. When the lesson has thus been read through, look over your notes to get a bird's-eye view of the points and of their relationship and check on your memory as to the content by reciting on the major subpoints under each heading. This checking of memory can be done by covering up the notes and trying to recall the major points. Then expose each major point and try to recall the subpoints listed under it.

These five steps of the Survey Q3R Method—Survey, Question, Read, Recite, and Review—when polished into a smooth and efficient method should result in the student reading faster, picking out the important points, and fixing them in his memory. The student will find one other worthwhile outcome: Quiz questions will seem happily familiar because the headings turned into questions are usually the points emphasized in quizzes. In predicting actual quiz questions and looking up the answers beforehand, the student feels that he is effectively studying what is considered important in a course.
I. Studying for exams.
A. When to review.
1. Frequently during quarter - try to review subjects daily and weekly for more effective learning.
2. Schedule several review sessions - not one long period.
3. The night before - briefly review main points and go to bed reasonably early. An appropriate amount of sleep is essential.
   a. Cramming is undesirable, but better than nothing if study has been neglected during the quarter.
   b. Do not study just before test time (anxiety and memory losses may occur).

B. Study Techniques.
1. Study with a purpose.
   a. Organize materials so that main points and relationships are clear.
   b. Study to remember - not just read over material (use SQ3R).
   c. Memorize certain materials and review frequently (e.g., diagrams, definitions).
2. Predict possible questions (either essay or completion type), then write out some answers.
3. Go over previous tests in course or former tests given by professors, if possible.
   c. Understand items you missed - what was wrong with your attack on the question? carelessness? organization of ideas? lack of completeness or clarity?
4. Cultivate an interest in the subject.
   a. Usually something about the course that is attractive.
   b. Relate subject to other interests.
   c. Develop involvement with your subject.
   d. Avoid making excuses for yourself (e.g., dull professor, uninteresting course, poor memory, just can't do well on objective tests).
5. Avoid distractions.
   a. Clear desk of unnecessary objects.
   b. Read the directions carefully.
   c. Set deadlines.
   d. Plan time schedule for study.
II. Taking Examinations.

A. Procedure or plan of action.
1. Start immediately.
2. Read the directions carefully.
3. Scan exam quickly to determine kinds of questions, how many points for each, whether choice of questions to answer.
4. Adopt a time budget for each type of question, allowing time for checking.
5. Answer easiest questions first (usually).
6. Try to base your answers on textbook and lectures first, not own experiences.
7. Check questions where unsure of answer.
8. Check essay questions for grammar, spelling, smoothness, clarity.
9. Check all questions if time available.
10. Try to be the last to leave, not the first. Use your extra time for checking answers.

B. Dealing with different types of questions.
1. Essay questions.
   a. Read all questions first, note if choice.
   b. Jot down key words and major ideas as you read.
   c. Begin with easiest question.
   d. Briefly outline answer for organization.
   e. Write legibly.
   f. Answer every required question. No answer is 0 credit.
   g. Leave space for corrections, if possible.
   h. Answer the question; note key word; Analyze, elaborate, compare, evaluate, explain, illustrate, outline, define, contrast.
   i. Be concise if time is at a premium.
   j. Use technical terminology, if appropriate.
   k. Watch spelling.
   l. Reread and polish.
2. Multiple choice questions.
   a. Don’t expect trick questions.
   b. Always guess, if no penalty for wrong answers.
      (1) Eliminate answers definitely wrong.
      (2) Make an educated guess among plausible answers.
II.

B.

2.  
   
   b.  
   (3) Use exam cues (unintentional mistakes of test-maker); Qualified answers more likely correct than absolute; unduly long answers more likely right; avoid choosing either of two synonyms; if opposites both used, one is probably correct; avoid bizarre or completely unfamiliar distractors; watch for consistent grammatical construction between stem and answer; clues to some answers may be found in other questions. (Use these suggestions only when guessing. They are no help with a sophisticated test, and no substitute for thorough preparation.

   c. Follow directions meticulously if special answer sheet used.
   (1) Is a special pencil required?
   (2) Put answer mark in proper space! Make mark just dark enough.
   (3) Avoid all extraneous marks; make careful erasures.
   (4) Check question number with answer number frequently.

   d. Mark questions where unsure of answer. Go on and return to these questions as soon as finished.

3. Problem Solving Questions
   a. Budget time.
   b. Is emphasis on computational accuracy or procedures?
      If pressed for time, jot down procedures or formulas.
   c. Check work carefully.

C. Test Anxiety.
   1. Arrive at exam on time. Allow sufficient time so that no need to hurry.
      a. If early, spend time in socializing, not frantic review and comparison of possible questions and answers.
   2. Be well prepared - know your material.
   3. Making up sample questions and going over previous exams should aid in feeling of familiarity with exam.
   4. Don't panic at questions you believe you cannot answer. Do your best on questions you know, then return to more difficult items. They may not seem so unanswerable by then.
   5. Remember: Do your best! Keep Kalm!
APPENDIX XIV

THE MODIFIED INVENTORY OF TEST-ANXIETY
After completing the information cited for below, please turn to the following page and read the directions carefully.

NAME: (Please Print) ________________________  Last  First  Middle  Initial

Your Psych. 100 Instructor's name: __________________________

Time your Psych. 100 Section met: ______________
Directions: Read each of the following statements carefully. In the space before each item, indicate how you actually did feel while you were taking your Psychology 100 final examination. Try to be as accurate as possible. Use the following scale:

1. The statement did not describe my feelings, condition, etc.
2. The feeling, condition, etc., was barely noticeable.
3. The feeling, condition, etc., was moderately intense.
4. The feeling, condition, etc., was strong.
5. The feeling, condition, etc., was very strong.

1. I felt panicky while taking my Psych. 100 final.
2. I felt, during my Psych. 100 final, that I wouldn't be able to finish the examination on time.
3. My mouth got dry during the Psych. 100 final.
4. Prior to taking my Psych. 100 final, I felt that other students were better prepared for the examination than was I.
5. My mind went blank at the beginning of my Psych. 100 final - it took me a few minutes to function.
6. I feel that I let myself and other persons down by my performance on my Psych. 100 final examination.
7. I felt my heart beating fast during my Psych. 100 final.
8. I found myself worrying about a low grade before the Psych. 100 final examination.
9. During my Psych. 100 final examination, I found myself thinking about the consequences of failure.
10. I got so tense during my Psych. 100 final examination that my stomach became upset.
11. After finishing my Psych. 100 final examination, I feel that I could have done better than I actually did.
12. I got a headache during my Psych. 100 final examination.
13. While taking my Psych. 100 final examination, I found myself thinking how much brighter the other students were than I am.
14. My hands perspired during the Psych. 100 final examination.

15. I didn't feel very confident about my performance before I took the Psych. 100 final examination.

16. I got so nervous during my Psych. 100 final examination that I forgot facts which I really knew.
APPENDIX IV

INSTRUCTIONS FOR OBSERVERS OF TEST-ANXIOUS STUDENTS
Instructions for Observers of Test-Anxious Students

The persons you observe during a final examination have indicated by their responses to a questionnaire that they are highly test-anxious. We are interested in obtaining a summary of test-taking behaviors which seem to characterize highly test-anxious students.

**Directions:**

A separate form has been provided for each person you are being asked to observe. For each person, please observe their behavior during ten random 30 second intervals during the testing period (a total of five minutes per person). During the initial five random thirty-second intervals, please concentrate on developing a list of physical movements and characteristics. Examples might be:

1. Rubs his shoulder.
2. Runs his fingers through his hair.
3. Crosses her legs.
5. Taps pencil on the desk.
7. Shuffles feet on floor.
8. Taps toes on rung of chair.

Note **All** physical movements during this initial period.

During the last five observation periods of 30 seconds each, note the frequency of each of the physical movements noted earlier. If any new behaviors are observed, add them to your list. The emphasis, however, should now be on the frequency with which behaviors occur.
APPENDIX XVI

INITIAL OBSERVATION SHEET FOR OBSERVERS OF TEST-ANXIOUS STUDENTS
Name of person to be observed: ________________
Observer: __________________

<table>
<thead>
<tr>
<th>First Five 30 Second Intervals</th>
<th>Last Five 30 Second Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note Behaviors:</strong></td>
<td><strong>Note frequency of behaviors</strong></td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
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<td>4.</td>
<td>4.</td>
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<td>5.</td>
<td>5.</td>
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<td>6.</td>
<td>6.</td>
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<tr>
<td>7.</td>
<td>7.</td>
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<td>8.</td>
<td>8.</td>
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<tr>
<td>9.</td>
<td>9.</td>
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<td>10.</td>
<td>10.</td>
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<tr>
<td>11.</td>
<td>11.</td>
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<tr>
<td>12.</td>
<td>12.</td>
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<td>13.</td>
<td>13.</td>
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<td>15.</td>
<td>15.</td>
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<tr>
<td>16.</td>
<td>16.</td>
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<tr>
<td>17.</td>
<td>17.</td>
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<tr>
<td>18.</td>
<td>18.</td>
</tr>
<tr>
<td>19.</td>
<td>19.</td>
</tr>
<tr>
<td>20.</td>
<td>20.</td>
</tr>
</tbody>
</table>
APPENDIX XVII

PHYSICAL ACTIVITY OBSERVATION SHEET
## PHYSICAL ACTIVITY OBSERVATION SHEET

**Name:** __________________________  **Observer:** __________________________

**Class Instructor:** __________________________  **Class Time:** __________

### I  MOVEMENTS OF THE HEAD:

<table>
<thead>
<tr>
<th>Movement Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Places head on hand (wrist). Removes head from hand (wrist).</td>
<td></td>
</tr>
<tr>
<td>B. Looks up from test paper. Glances around room.</td>
<td></td>
</tr>
<tr>
<td>C. Shakes head.</td>
<td></td>
</tr>
</tbody>
</table>

### II  MOVEMENTS OF NON-WRITING HAND:

<table>
<thead>
<tr>
<th>Movement Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. To the top of head (hair).</td>
<td></td>
</tr>
<tr>
<td>B. To the face (mouth, nose, ears, cheeks, glasses, etc.).</td>
<td></td>
</tr>
<tr>
<td>C. To some other part of the body (hip, knee, chest, leg, foot, etc.).</td>
<td></td>
</tr>
<tr>
<td>D. Drums fingers.</td>
<td></td>
</tr>
</tbody>
</table>

### III  MOVEMENTS OF WRITING HAND:

<table>
<thead>
<tr>
<th>Movement Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Taps pencil.</td>
<td></td>
</tr>
<tr>
<td>B. Places pen (pencil) to face (mouth, ears, nose, etc.)</td>
<td></td>
</tr>
<tr>
<td>C. Flexes, shakes fingers.</td>
<td></td>
</tr>
</tbody>
</table>

### IV  MOVEMENTS OF FEET, LEGS:

<table>
<thead>
<tr>
<th>Movement Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Shifts position of, or crosses legs (knees).</td>
<td></td>
</tr>
<tr>
<td>B. Taps feet (toes).</td>
<td></td>
</tr>
<tr>
<td>C. Shakes or vibrates feet (legs).</td>
<td></td>
</tr>
</tbody>
</table>

### V  GROSS BODY MOVEMENTS:

<table>
<thead>
<tr>
<th>Movement Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Straightens in Chair.</td>
<td></td>
</tr>
<tr>
<td>B. Stretches (uses arms).</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX XVIII

TABLES OF THE E SCORES AND THE W SCORES ON THE INVENTORY
OF TEST ANXIETY FOR TREATMENT SUBJECTS
### Table 15

Mean post-treatment E scores on "The Inventory of Test Anxiety" for treatment subjects in relationship to therapist, treatment condition, and type of subject.

<table>
<thead>
<tr>
<th>Type of Systematic Desensitization</th>
<th>Therapist A</th>
<th>Therapist B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Study-Skills Training</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>High M</td>
<td>15.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.8</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=5)</td>
<td></td>
</tr>
<tr>
<td>High E</td>
<td>15.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=4)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> All post-treatment means are adjusted to control for pre-treatment differences.

<sup>b</sup> The higher the score, the greater the intensity of reported anxiety during the final examination.
### TABLE 16

**MEAN POST-TREATMENT W SCORES** on "THE INVENTORY OF TEST ANXIETY" for treatment subjects in relationship to therapist, treatment condition, and type of subject

<table>
<thead>
<tr>
<th>Type of Subject</th>
<th>Therapist A</th>
<th>Therapist B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Systematic</td>
<td>Study-Skills</td>
</tr>
<tr>
<td></td>
<td>Desensitization</td>
<td>Training</td>
</tr>
<tr>
<td>Mean</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>High W</td>
<td>21.5⁹</td>
<td>7.4</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=5)</td>
<td>(N=5)</td>
</tr>
<tr>
<td>High E</td>
<td>19.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Subjects</td>
<td>(N=4)</td>
<td>(N=4)</td>
</tr>
</tbody>
</table>

*All post-treatment means are adjusted to control for pre-treatment differences.*

*The higher the score, the greater the intensity of reported anxiety during the final examination.*
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