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A Comparison of the Effectiveness of Verbal vs. Nonverbal Cue-Controlled Relaxation in Reducing Test Anxiety

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A COMPARISON OF THE EFFECTIVENESS OF VERBAL VS. NONVERBAL CUE-CONTROLLED RELAXATION IN REDUCING TEST ANXIETY

by

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A COMPARISON OF THE EFFECTIVENESS OF VERBAL VS. NONVERBAL CUE-CONTROLLED RELAXATION IN REDUCING TEST ANXIETY

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Western Michigan University, 1990

This study compared the effectiveness of verbal vs. nonverbal cue-controlled relaxation in reducing test anxiety. Twenty-four subjects participated. Subjects received training in progressive muscle relaxation with one treatment group using a verbal cue and one treatment group using a nonverbal cue. The control group was offered relaxation training at the completion of the study. The Suinn Test Anxiety Behavior Scale (STABS) (Suinn, 1969) was administered at pre- and post-training in addition to a comparison of the subjects' quiz scores before and after relaxation training was completed.

The findings from this study indicated that: (a) the groups did not differ; however, subjects in the nonverbal cue-controlled group achieved a greater reduction in STABS scores than subjects in the verbal cue-controlled group and the control group; and (b) subjects in both treatment groups did not achieve an improvement on quiz scores.

ACKNOWLEDGEMENTS

I wish to express my gratitude and sincere appreciation to my advisor and committee chairperson, Dr. M. Michele Burnette, for her assistance, direction, and patience throughout this project.

Thanks also to Cheryl Knight for her advice and help.

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CHAPTER I

INTRODUCTION

Test anxiety is a term used to denote a group of behaviors that have a negative effect on academic performance (Pagano & Katahn, 1972). It is characterized as multifaceted and inclusive of task-irrelevant cognitions, heightened physiological arousal, and inefficient study behavior (Spielberger, Anton, & Bedell, 1976). Suinn (1968) states that in extreme cases test anxiety provokes a sensation of nausea in addition to the more common complaints of inability to think or remember and difficulty in reading and comprehending sentences or directions on an examination. Subjects also report feelings of tension.

Several cognitive and behavioral treatments have been employed in studies of test anxiety. These treatments are systematic desensitization, cognitive restructuring, progressive muscle relaxation, and study-skills training. In general these interventions have either been less effective when used independently or too cumbersome or distracting for subjects to fully utilize during test taking. In several studies it has been a common practice to use multicomponent treatment packages of various combinations of cognitive and behavioral interventions.

Russell and Sipich (1973) claim that some type of relaxation procedures should be employed in the treatment of test anxiety because it "allows the client to keep anxiety at a low enough level for more adaptive behavior to be learned" (p.49). Some studies have been conducted with cue-controlled relaxation training as a treatment for test anxiety. Experimenters have found that using a verbal cue ("calm," "relax," etc.) is effective in reducing test anxiety and beneficial for clients who have difficulty with imagery or visualizations (Russell & Sipich, 1973). However, Kirkland and Hollandsworth (1980) stated that this method was not practiced by their subjects once they were in the actual test setting. Subjects reported that the technique was too "unwieldy" to use. Perhaps having to repeat a word would prove too distracting while trying to recall answers for a test.

Siegel (1986) employed a nonverbal form of cue-controlled relaxation which he also claimed was especially beneficial because it is simple to learn and apply. This study used Pavlovian conditioning principles in pairing a glass marble with music chosen by the subjects as relaxing. He then paired the relaxation response with imagery of a testing situation. After the subjects were trained to perform the procedures correctly, the experimenter determined through interviews that the subjects were ready to be faded into the in vivo situation. Fading took place from a quiet

environment with dim lighting and a comfortable chair to a classroom-like environment. Next the subjects continued to practice the procedures in their homes until the experimenter determined that conditioning was complete. He then instructed the subjects to bring the marble into a testing situation and hold the marble in one hand. If the subjects felt anxious, the experimenter instructed them to look at the marble and count to four which was expected to elicit the conditioned relaxation response.

Although Siegel (1986) reported favorable results in reducing test anxiety, there were several weaknesses in this study. Siegel cautioned that due to a very small number of subjects in the study (a total of ten subjects: five in the treatment group and five in a no-treatment control group) the results may not be generalizable. Also, questions could be raised regarding the experimenter's contention that music is an unconditioned stimulus for a relaxation response. Third, there are no data to confirm that the training procedures did in fact generalize to an actual test setting. Perhaps the correlation of course grades would have lent support to the findings.

This study compared the effectiveness of verbal vs. nonverbal, cue-controlled relaxation in reducing test anxiety. It was expected that anxious subjects would experience a greater decrease in reported test anxiety from nonverbal cue-controlled relaxation procedures than from

verbal cue-controlled relaxation. This was expected to occur because of a greater tendency to use the simple nonverbal technique in vivo and thereby eliminate any distraction from the use of a verbal cue in the testing situation. Additionally, it was expected that subjects would show improved in-class test scores due to the reduction of anxiety.

CHAPTER II

METHOD

Subjects

A total of 24 subjects participated in the study. Subjects were recruited from the Psychology 100 classes at Western Michigan University, Kalamazoo, where course testing occurs weekly. Students who volunteered to participate in a program to reduce test anxiety were given the 50-item Suinn Test Anxiety Behavior Scale (STABS) (Suinn, 1969). Those students who scored 125 or above were included in the study. Subjects were matched on their initial STABS score and then randomly assigned to two treatment groups and one control group of eight subjects each. STABS scores ranged from 130 to 217. The mean STABS scores for Groups V, N, and C were 165.38, 169.88, and 166.38 respectively. Any subjects who were currently receiving another type of treatment for anxiety were excluded from the study.

Materials

The Suinn Test Anxiety Behavior Scale (Suinn, 1969) (Appendix A) is a 50-item, self-rating scale composed of statements describing testing situations. The subject indicates the level of anxiety aroused in him/her by each

situation described. Scores between 100 and 250 exhibit test anxiety. This scale was administered to subjects at the beginning of the study and again at the conclusion.

Subjects in the treatment group using nonverbal cue-controlled progressive muscle relaxation were given glass marbles to use as nonverbal cues.

At the beginning of the relaxation training, subjects were given audio cassettes containing relaxation instructions identical to the instructions utilized in the treatment sessions. They also received forms on which to record their daily relaxation practices.

An AT33 portable EMG monitor by Autogenics Systems was used to measure muscle tension levels.

Procedure and Design

An initial interview was conducted with the individual subjects. The experimenter briefly explained the study rationale, obtained a signed consent form (Appendix B) that included permission to collect quiz scores from quizzes taken in Psychology 100 classes three weeks prior to treatment and three weeks after treatment, and obtained schedules of the subject's free time. The interview also provided an indication of the subject's commitment to participate.

The treatment program utilized was progressive muscle relaxation as outlined by Bernstein and Borkovec (1973) (see Appendix C for a summary of the procedure). The

training dealt with 16 muscle groups. The subjects were randomly assigned to three groups. Subjects in Group V were trained to relax in response to a verbal cue: saying the word "calm" each time they exhaled. Work with the verbal cue occurred immediately after the subjects were guided through progressive muscle relaxation. After three trials of saying "calm," the subjects were instructed to begin saying the word silently. Subjects in Group N were trained to relax in response to a nonverbal cue by rolling a glass marble in one hand while exhaling. This procedure also occurred immediately after progressive muscle relaxation instruction (Siegel, 1986). Through repeated pairings it was anticipated that the subjects would be able to achieve the relaxation response by rolling the glass marble in one hand. Subjects in Group C were control subjects. These subjects were told that the treatment groups were full but that more groups would be run later and that they would be given an opportunity to participate at that time. All treatment group subjects were instructed in the use of the Subjective Units of Disturbance Scale (SUDS) (Walker, Hedberg, Clement, & Wright, 1981). Using the SUDS self-report technique each subject reported the amount of disturbance he/she experienced on a scale ranging from 0 (most calm) to 100 (most anxious). These ratings were taken twice during each training session: before training began and immediately after training. The SUDS ratings

were compared at the completion of the study.

Group relaxation training was used as a cost-effective procedure; consequently, subjects were trained in groups of two, three or four. During training sessions subjects were seated in reclining chairs. All treatment groups met in the Clinical Research Laboratory in Wood Hall on the campus of Western Michigan University for six sessions of approximately forty-five minutes twice weekly for three consecutive weeks. If a subject missed his/her group session, he/she was given an individual make-up session.

When training began, subjects were given an audio cassette containing relaxation instructions identical to the instructions in the treatment sessions. Subjects were asked to practice relaxation at home using this tape recording twice daily for two weeks. Additionally they were given a form for recording these practice sessions and instructed in the use of the form (Appendix D).

To determine if the subjects achieved a relaxation response, EMG recordings were taken during initial training sessions and again at the end of the two-week home practice sessions. A comparison was made of these recordings.

Following the two weeks of home practice sessions, the subjects' in-class quiz scores were monitored for three weeks. These scores were compared to the subjects' quiz scores of three weeks prior to training. After each of the three post-training in-class testing situations, subjects

were asked to record whether or not they used the relaxation techniques during testing (see Appendix E for recording form). Additionally, at the conclusion of this three week period subjects were asked to again complete the Suinn Test Anxiety Behavior Scale.

CHAPTER III

RESULTS

Measures of Tension Reduction Within Training Sessions

A comparison was made of the group means of the EMG recordings taken during treatment sessions and at the conclusion of the home practice period (See Table 1). Group V attained a 22% reduction in EMG recordings and Group N achieved a 33% reduction.

A one-way analysis of variance conducted on the EMG recordings of treatment Group V revealed no significant differences across time, $F(1,7)=4.30$, $p=.05$. The one-way analysis of variance for EMG recordings of treatment Group N across time revealed no significant differences, $F(1,7)=1.09$, $p=.05$.

A comparison was made of the group means of the SUDS ratings taken at the beginning and ending of each training session (See Table 2). Treatment Group V achieved a 54% reduction in self-reported disturbance and treatment Group N achieved a 49% reduction in self-reported disturbance.

A one-way analysis of variance for SUDS ratings of Group V across time showed a significant effect, $F(1,7)=147.52$, $p<.001$. A significant effect was also found when

Table 1

Mean Scores of Treatment Groups of EMG Recordings

Group	Pre Relaxation Training	Post Relaxation Training	Percent Change
V	2.97	2.33	22%
N	5.52	3.68	33%

V = Verbal cue-controlled relaxation
N = Nonverbal cue-controlled relaxation

Table 2

Mean Scores of Treatment Groups for Subjective Units of Disturbance Scale (SUDS)

Group	Pre Relaxation Training	Post Relaxation Training	Percent Change
V	52.98	24.63	54%
N	55.00	28.31	49%

V = Verbal cue-controlled relaxation
N - Nonverbal cue-controlled relaxation

a one-way analysis of variance was conducted on the SUDS ratings of Group N, $F(1,7)=60.42$, $p<.001$.

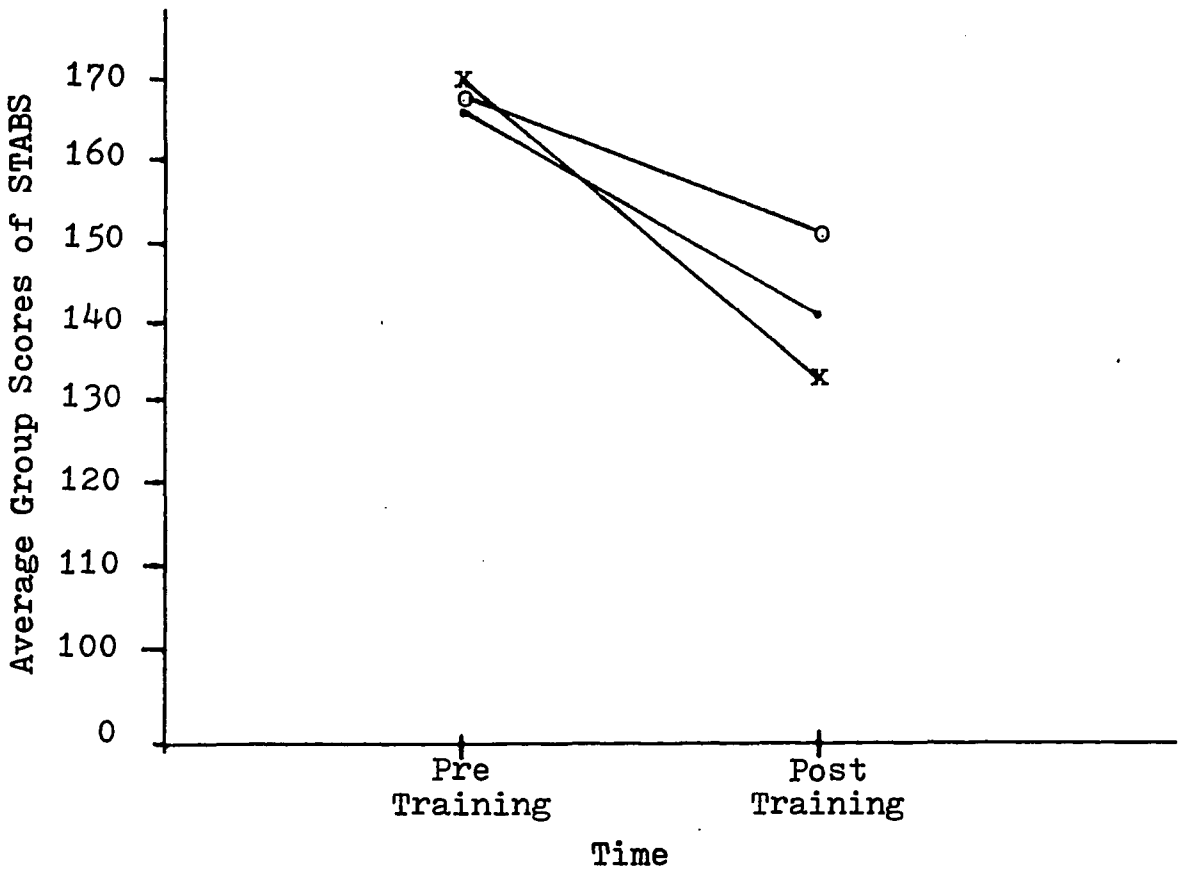
Suinn Test Anxiety Behavior Scale (STABS) Scores

Figure 1 is a graph of a two-way analysis of variance with one fixed (group) and one repeated (time) factor which was conducted for the STABS scores. This analysis revealed no significant group differences, $F(2,21)=0.26$, $p=.05$. There was also no significant interaction between treatment groups and trials, $F(2,21)=1.65$, $p=.05$. However, there was a significant time effect for STABS scores, $F(1,21)=24.20$, $p<.001$.

Quiz Scores

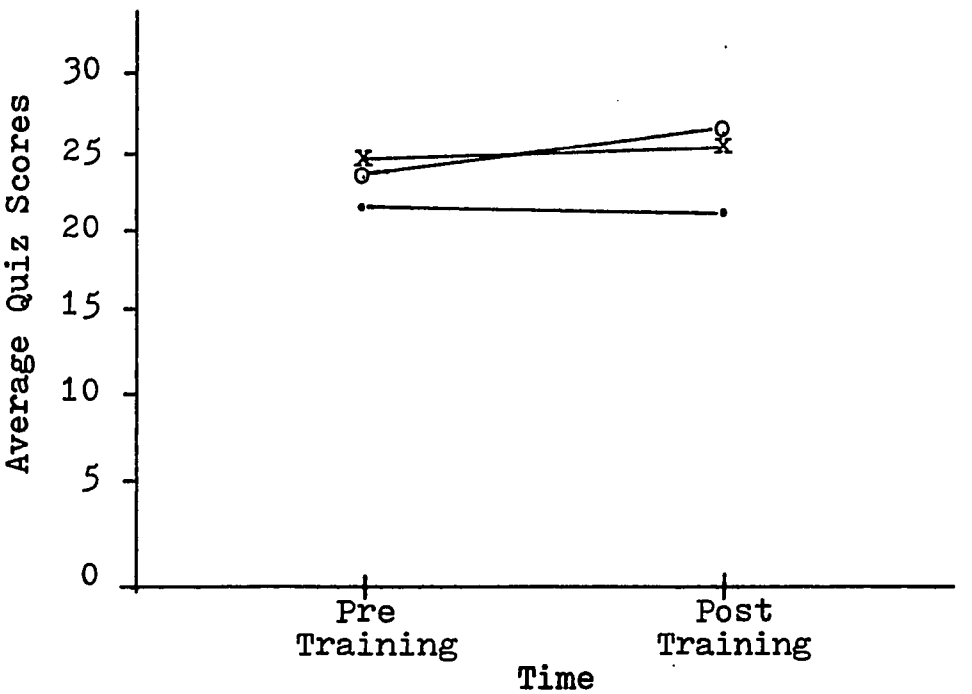
Data obtained on the quiz scores was reduced by obtaining the average of the three quiz scores before treatment and the average of the three quiz scores after treatment.

Figure 2 is a graph of the two-way analysis of variance with one fixed (group) and one repeated (time) factor which was conducted for the quiz scores. This analysis revealed no significant group differences, $F(2,21)=1.90$, $p=.05$. There was also no significant interaction between groups and trials, $F(2,21)=2.47$, $p=.05$.



Legend. . = Group V
x = Group N
o = Group C

Figure 1. Average Group Scores of the Suinn Test Anxiety Behavior Scale Prior to Relaxation Training and at Completion of Relaxation Training.



Legend. . = Group V
x = Group N
o = Group C

Figure 2. Average Quiz Scores by Group Prior to Relaxation Training and After Completion of Relaxation Training.

CHAPTER IV

DISCUSSION

This study was conducted to determine whether test anxious subjects could benefit more from nonverbal cue-controlled relaxation procedures than verbal cue-controlled relaxation due to less interference of a nonverbal cue during testing situations. It was expected that subjects in the nonverbal cue-controlled relaxation group (Group N) would show a greater decrease in STABS scores and a greater increase in quiz scores than subjects in the verbal cue-controlled relaxation group (Group V) and the control group (Group C).

A statistical analysis only indicated a significant time effect for STABS scores when the groups were combined. As shown in Figure 1, treatment Group N achieved a greater decrease in STABS scores than treatment Group V and control Group C, although the groups were not significantly different. According to Suinn (1969), it is expected that a reduction of approximately ten points in STABS scores will occur without intervention. The control group achieved an average reduction of 14.5 points while the verbal cue-controlled group achieved an average reduction of 25 points and the nonverbal cue-controlled group attained an average

reduction of 37.75 points. While there was a decrease in STABS scores, other factors could have influenced this change. Most of the subjects were first-year college students, and the lowered STABS scores could have been a result of repeated exposure to test taking (desensitization) and assimilation into the intensity of college work. Also, post-testing was conducted near the end of the semester before summer break and much of the originally reported anxiety could have been alleviated merely by the approach of the semester end.

Regarding the quiz scores, Group C, the control group, had an average increase of 2.27 points on quizzes whereas Group V lost an average of .50 points and Group N gained only an average of .64 points. Eight of the subjects reported that they used relaxation techniques during actual testing situations while six subjects reported not using relaxation during testing. Of the eight subjects reporting relaxation use, five were from the nonverbal cue-controlled group. One subject from each treatment group failed to return his/her tally sheet and could not be counted.

A possible explanation for why the control subjects' quiz scores showed greater improvement than either treatment group might be a change in study habits. All subjects were asked to keep their study habits at the same level throughout the study; however, they were not questioned on

this topic at the conclusion of the study. Perhaps the control group revised their study habits and the treatment groups did not because they were relying on the relaxation training to aid them.

Future research in this area may be aided by focusing on the following suggestions:

1. A larger sample size is important to improve the generalizability of the results. Recruitment on a university-wide basis could possibly yield a larger, more representative subject pool.

2. A longer time period for the study would allow for more practice of relaxation skills and more opportunities for the subjects to use their skills in testing situations.

3. Recruitment of third- or fourth-year college students may allow for a more accurate report of test anxiety since they will have adapted to the rigors of studying and testing thereby eliminating a possible variable of the high school-to-college transition period.

4. Varying the point of introduction of the nonverbal cue in the relaxation process, may indicate a difference in the strength of conditioning that occurs and; consequently, suggest the most effective place for conditioning to happen.

Appendix A

Suinn Test Anxiety Behavior Scale

NAME_____ Total Score _____

SUINN TEST ANXIETY BEHAVIOR SCALE

The items in the questionnaire refer to experiences that may cause fear or apprehension. For each item, place a check (✓) in the box under the column that describes how much you are frightened by it nowadays. Work quickly but be sure to consider each item individually.

	Not at all	A little	A fair amount	Much	Very much
1. Going into a regularly scheduled class period in which the instructor asks the students to participate.	☐	☐	☐	☐	☐
2. Re-reading the answers I gave on the test before turning it in.	☐	☐	☐	☐	☐
3. Sitting down to study before a regularly scheduled class.	☐	☐	☐	☐	☐
4. Turning my completed test paper in.	☐	☐	☐	☐	☐
5. Hearing the announcement of a coming test.	☐	☐	☐	☐	☐
6. Having a test returned.	☐	☐	☐	☐	☐
7. Reading the first question on a final exam.	☐	☐	☐	☐	☐
8. Studying for a class in which I am scared of the instructor.	☐	☐	☐	☐	☐
9. Being in class waiting for my corrected test to be returned.	☐	☐	☐	☐	☐
10. Seeing a test question and not being sure of the answer.	☐	☐	☐	☐	☐
11. Studying for a test the night before.	☐	☐	☐	☐	☐
12. Waiting to enter the room where a test is to be given.	☐	☐	☐	☐	☐
13. Waiting for a test to be handed out.	☐	☐	☐	☐	☐

	Not at all	A little	A fair amount	Much	Very much
14. Being called on to answer a question in class by an instructor who scares me.	☐	☐	☐	☐	☐
15. Waiting for the day my corrected test will be returned.	☐	☐	☐	☐	☐
16. Discussing with the instructor an answer I believed to be right but which was marked wrong.	☐	☐	☐	☐	☐
17. Seeing my standing on the exam relative to other people's standing.	☐	☐	☐	☐	☐
18. Waiting to see my letter grade on the test.	☐	☐	☐	☐	☐
19. Studying for a quiz.	☐	☐	☐	☐	☐
20. Studying for a midterm.	☐	☐	☐	☐	☐
21. Studying for a final.	☐	☐	☐	☐	☐
22. Discussing my approaching test with friends a few weeks before the test is due.	☐	☐	☐	☐	☐
23. After the test, listening to the answers which my friends selected.	☐	☐	☐	☐	☐
24. Looking at the clock to see how much time remains during an exam.	☐	☐	☐	☐	☐
25. Seeing the number of questions that need to be answered in the test.	☐	☐	☐	☐	☐
26. On an essay exam, seeing a question I cannot answer.	☐	☐	☐	☐	☐
27. On a multiple choice test, seeing a question I cannot answer.	☐	☐	☐	☐	☐
28. Being asked by someone if I am ready for a forthcoming exam.	☐	☐	☐	☐	☐
29. Being the first one to finish an exam and turn it in.	☐	☐	☐	☐	☐
30. Being asked by a friend concerning my standing in a class.	☐	☐	☐	☐	☐

	Not at all	A little	A fair amount	Much	Very much
31. Being asked by a friend concerning results of a test on which I did poorly.	☐	☐	☐	☐	☐
32. Discovering I need an A or B on the next exam in order to pass the course.	☐	☐	☐	☐	☐
33. Discovering I need an A or B on the final exam to maintain the grade point average necessary to remain in school.	☐	☐	☐	☐	☐
34. Thinking about "warning slips" from the Dean's office.	☐	☐	☐	☐	☐
35. Reading a "warning slip" from the Dean's office.	☐	☐	☐	☐	☐
36. Remembering my past reactions while preparing for another test.	☐	☐	☐	☐	☐
37. Seeking out the teaching assistant or instructor for advice or help.	☐	☐	☐	☐	☐
38. Being told to see the instructor concerning some aspect of my class work.	☐	☐	☐	☐	☐
39. Asking for a make-up exam after missing the scheduled exam.	☐	☐	☐	☐	☐
40. Discussing the course content with fellow students just before entering the classroom the day of the exam.	☐	☐	☐	☐	☐
41. Being the last one to finish an exam and turn it in.	☐	☐	☐	☐	☐
42. Reviewing study materials the night before an exam.	☐	☐	☐	☐	☐
43. On the first day of the course, hearing the instructor announce the dates of the midterm and final examinations.	☐	☐	☐	☐	☐
44. Having the instructor ask a question of the class which deals with course material, and then look in my direction.	☐	☐	☐	☐	☐
45. Making an appointment to see the instructor regarding some course problem.	☐	☐	☐	☐	☐

	Not at all	A little	A few amount	Much	Very much
46. Thinking about a coming exam three weeks before its scheduled date.	☐	☐	☐	☐	☐
47. Thinking about a coming exam one week before its scheduled date.	☐	☐	☐	☐	☐
48. Thinking about a coming exam the weekend before its scheduled date.	☐	☐	☐	☐	☐
49. Thinking about a coming exam the night before its scheduled date.	☐	☐	☐	☐	☐
50. Thinking about a coming exam the hour before its scheduled time.	☐	☐	☐	☐	☐

Source: Suinn, R. M. (1969. The STABS, a measure of test anxiety for behavior therapy: Normative data. Behavior Research & Therapy, 7, 335-339. Used with permission of Rocky Mountain Behavioral Science Institute, Inc., Fort Collins, Colorado, Publishers. Copyright 1971.

Appendix B

Informed Consent

You are invited to participate in a research study. We are investigating the effectiveness of progressive muscle relaxation on test anxiety.

As a participant you will be asked to permit the measurement of muscle tension levels (EMG). The equipment used to perform these measurements is non-invasive and painless. You will then be requested to attend six relaxation-training sessions of approximately one hour twice weekly for three consecutive weeks. At the beginning of these sessions you will be given an audio cassette tape containing recorded relaxation instructions identical to the instructions in the treatment sessions. You will be asked to practice relaxation at home using this tape recording twice daily for two weeks. The potential benefit of this study to you is the acquisition of relaxation skills that can aid you not only in reducing test anxiety but also any other type of anxiety and tension that may occur in everyday life. Also, it is expected that your in-class test scores will improve, assuming that your study skills remain at the current level or increase.

Any information obtained in this study will be confidential to the experimenter. By signing this Informed Consent document, you give permission for the data to be used in scientific presentations and publications. All identifying information will be removed.

Participation is voluntary; your decision will not in any way prejudice relations with Western Michigan University. Although we strongly recommend that your commitment be for the full length of the study, you are free to discontinue participation at any time without prejudice.

Questions or complaints regarding this research or your rights may be directed to: Dr. M. Michele Burnette, Dept. of Psychology, 387-4472; or Marilyn Christensen, 423-8455.

Your signature below indicates that you understand the above information and have decided to participate. You will be given a copy of this form to keep. Additionally, your signature grants us permission to obtain your test scores from your Psychology 100 instructor for the period of Winter Semester, 1990.

_____ _____ _____

Signature Date Time

_____

Signature of Investigator

Appendix C

Progressive Muscle Relaxation

Guidelines from Psychology 664
Behavior Therapy

Rationale:

Progressive muscle relaxation is a technique that can be used to aid an individual in feeling less anxious and nervous. It can be used to control tension in a variety of situations.

Progressive muscle relaxation is a skill to be learned and to do so it must be practiced as any other skill is practiced.

Physical setting:

1. low or constant noise level
2. lights dim, or at least at a constant intensity
3. assume a reclining position

Preparation activities:

1. If you have any injuries or disabilities that might result in pain or discomfort, avoid those muscle groups, or limit the degree of tension applied, as needed.
2. Remember that relaxing is a skill which can be learned with practice. People learn to be tense, and they can also learn to relax.
3. When you begin to relax, you may experience some unusual sensations. Such things as tingling fingertips or a floating sensation should be taken as a signal of increasing relaxation.
4. Be sure to go with the relaxation process. Let relaxation occur rather than struggling to make it occur or fighting to keep a sense of control.
5. If you are comfortable closing your eyes during relaxation training, do so. For some people, closing their eyes really helps.
6. During the relaxation process, you should tense the indicated muscle group to about 3/4 of the maximum tension you can. Tense only the indicated muscle group as suddenly as possible to throw off the tension.
7. Pick out a word such as "calm," that you can say during the relaxation process. Often a relaxed state will become paired with this word, and the word can be used to help you relax in everyday activities.
8. Estimate the subjective degree of relaxation on a simple 0 to 100 scale before and after the relaxation process. Use this scale before and after to gauge the effects of the relaxation exercise.

Relaxation process:

Tense various body parts for a short period of time (approximately 5-10 seconds) and study the feeling of tension. Then relax (suddenly) and study the contrast between tension and relaxation. Try to relax a bit more with every breath for 10-15 seconds.

Example: "Direct your attention to your left arm. You will clench your left fist--clench it tightly and study the tension in the hand and in the forearm. Study those sensations of tension. And now, let go. You'll relax the left hand and let it rest on the arm of the chair (sofa, bed, etc.). Let your fingers spread gently while you study the differences between the sensations of tension and relaxation." Repeat this with other muscle groups.

Sequence of exercises:

1. Hands. Tense and relax the fists. The fingers are extended; relaxed.

2. Biceps and triceps: The biceps are tensed, relaxed. Triceps tensed; relaxed.

3. Shoulders. Shrug shoulders up towards ear; relax.

4. Neck. With shoulders straight, turn head slowly to right, relax. Repeat to the left.

5. Neck. Bring head forward and dig chin into chest, relax.

6. Mouth. Open mouth as wide as possible, relax. Purse lips in pout, relax.

7. Tongue. Dig tongue into roof of mouth, relax. Repeat into floor of mouth.

8. Eyes. Open eyes as wide as possible wrinkling forehead, relax. Squint eyes (make sure client doesn't wear contacts), relax.

9. Breathing. Take as deep a breath as possible, hold it and relax. Exhale as much as possible, relax.

10. Back. With shoulders against chair or mat, arch back slowly so that trunk of body is pushed forward, relax.

11. Midsection. Raise midsection by tensing buttocks, relax. Lower midsection by digging buttocks into seat of chair, relax.

12. Thighs. Extend legs and raise heels a bit, relax by letting legs "fall." Dig heels into chair, relax.

13. Stomach. Pull in stomach "as if to touch the backbone," relax. Extend stomach, relax.

14. Calves and feet. Bend feet so that toes point towards head, relax. Point toes in opposite direction, relax. (Hold tension for short duration to avoid cramping of calf.)

15. Toes. Dig toes into bottom of shoe, relax.

Estimate level of tension.

If there is remaining tension, focus on major muscle groups (e.g. head and shoulder, upper torso, legs). Relax the remaining tension with each and every breath. You might count to ten with the breaths.

Estimate level of tension.

To bring you out of an induced relaxation I will tell you that "I'm going to count slowly from 5 to 1. When I reach 3 you should open your eyes. When I reach 1, you will take a deep breath, stretch and sit up."

Appendix D

Daily Relaxation Practice Record

CODE #:__________

DATE:____________
Relaxation:
0 = Most relaxed ever
100 = Most tense ever

RELAXATION PRACTICE
When..............__________
For how long......__________
Score before......__________
Score after.......__________

DATE:____________
Relaxation:
0 = Most relaxed ever
100 = Most tense ever

RELAXATION PRACTICE
When..............__________
For how long......__________
Score before......__________
Score after.......__________

DATE:____________
Relaxation:
0 = Most relaxed ever
100 = Most tense ever

RELAXATION PRACTICE
When..............__________
For how long......__________
Score before......__________
Score after.......__________

DATE:____________
Relaxation:
0 = Most relaxed ever
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RELAXATION PRACTICE
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DATE:____________
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DATE:____________
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RELAXATION PRACTICE
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For how long......__________
Score before......__________
Score after.......__________

DATE:____________
Relaxation:
0 = Most relaxed ever
100 = Most tense ever

RELAXATION PRACTICE
When..............__________
For how long......__________
Score before......__________
Score after.......__________

Appendix E

Record of Relaxation Practiced During Testing

CODE #:_____

Date of in-class test:_____

Relaxation practiced: Yes____ No____

Date of in-class test:_____

Relaxation practiced: Yes____ No____

Date of in-class test:_____

Relaxation practiced: Yes____ No____

Appendix F

Human Subjects Institutional Review Board Letter of Approval

WESTERN MICHIGAN UNIVERSITY

Date: January 10, 1990

To: Marilyn Christensen

From: Mary Anne Bunde, Chair Mary Anne Bunda

This letter will serve as confirmation that your research protocol, "A Comparison of the Effectiveness of Verbal vs. Nonverbal Cue-Controlled Relaxation in Reducing Test Anxiety", has been approved as expedited by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application. You must seek reapproval for any change in this design.

The Board wishes you success in the pursuit of your research goals.

xc: M. Burnette, Psychology

HSIRB Project Number 89-11-25

End Date of Approval January 10, 1991

Appendix G

Summaries of Statistical Data

Summary of Repeated Measures ANOVA on Pre and Post Suinn Test Anxiety Behavior Scale

Source	SS	df	ms	F	F_{crit}	p
Total	38604.70	47	---	---	---	---
Between subjects	23658.70	23	---	---	---	---
Conditions	579.20	2	289.60	.26	3.49	.05
$Error_b$	23079.50	21	1099.00	---	---	---
Within subjects	15946.00	24	---	---	---	---
Trials	7956.80	1	7956.80	24.20	14.80	.001
Trials x Conditions	1084.45	2	542.23	1.65	3.49	.05
$Error_w$	6904.75	21	328.80	---	---	---

Summary of Repeated Measures ANOVA on Pre and Post Quiz Scores

Source	SS	df	ms	F	F_{crit}	p
Total	762.95	47	---	---	---	---
Between subjects	673.63	23	---	---	---	---
Conditions	103.31	2	51.66	1.90	3.49	.05
$Error_b$	570.32	21	27.16	---	---	---
Within subjects	89.32	24	---	---	---	---
Trials	7.78	1	7.78	2.48	4.35	.05
Trials x Conditions	15.50	2	7.75	2.47	3.49	.05
$Error_w$	66.04	21	3.14	---	---	---

Summary of Treatment By Subjects for Each Group on Pre and Post EMG Recordings

Group V - Verbal Cue-controlled Relaxation

Source	SS	df	ms	F	F_{crit}	p
Total	24.03	15	---	---	---	---
Subjects	14.18	7	---	---	---	---
Treatments	3.74	1	3.74	4.30	5.59	.05
Error	6.11	7	.87	---	---	---

Group N - Nonverbal Cue-controlled Relaxation

Source	SS	df	ms	F	F_{crit}	p
Total	124.45	15	---	---	---	---
Subjects	98.55	7	---	---	---	---
Treatments	3.48	1	3.48	1.09	5.59	.05
Error	22.42	7	3.20	---	---	---

Summary of Treatment by Subjects for Each Group on Pre and Post Subjective Units of Disturbance Scale

Group V - Verbal Cue-controlled Relaxation

Source	SS	df	ms	F	F_{crit}	p
Total	3826.37	15	---	---	---	---
Subjects	414.12	7	---	---	---	---
Treatments	3216.03	1	3216.03	147.52	29.3	.001
Error	196.22	7	28.03	---	---	---

Group N - Nonverbal Cue-controlled Relaxation

Source	SS	df	ms	F	F_{crit}	p
Total	4369.94	15	---	---	---	---
Subjects	1191.25	7	---	---	---	---
Treatments	2848.62	1	2848.62	60.42	29.3	.001
Error	330.07	7	47.15	---	---	---

Mean Scores of the Suinn Test Anxiety Behavior Scale for Treated and Untreated Subjects

Group	Pre Relaxation Training	Post Relaxation Training	Percent Change
V	165.38	140.38	15%
N	169.88	132.13	22%
C	166.38	151.88	9%

V = Verbal cue-controlled relaxation
N = Nonverbal cue-controlled relaxation
C = Control (Untreated)

Mean Scores of Quizzes for Treated and Untreated Subjects

Group	Pre Relaxation Training	Post Relaxation Training	Percent Change
V	21.96	21.46	2%
N	24.13	24.77	3%
C	23.96	26.23	9%

V = Verbal cue-controlled relaxation
N = Nonverbal cue-controlled relaxation
C = Control (Untreated)

BIBLIOGRAPHY

Allen, G. J. (1972). The behavioral treatment of test anxiety: Recent research and future trends. Behavior Therapy, 3, 253-262.

Bernstein, D. A., & Borkovec, T. D. (1973). Progressive relaxation training: A manual for the helping professions. Champaign, IL: Research Press.

Borkovec, T. D., Grayson, J. B., & Cooper, K. M. (1978). Treatment of general tension: Subjective and physiological effects of progressive relaxation. Journal of Consulting and Clinical Psychology, 46(3), 518-528.

Bronzaft, A. L., & Epstein, G. F. (1973). Is test anxiety rising? The Journal of Psychology, 85, 17-19.

Covington, M. V., & Omelich, C. L. (1987). "I knew it cold before the exam": A test of the anxiety-blockage hypothesis. Journal of Educational Psychology, 79 (4), 393-400.

Dawley, H. H., Jr., & Wenrich, W. W. (1973). Massed group desensitization in reduction of test-anxiety. Psychological Reports, 33, 359-363.

Decker, T. W. (1987). Multi-component treatment for academic underachievers. Journal of College Student Psychotherapy, 1(3), 29-35.

Decker, T. W., & Russell, R. K. (1981). Comparison of cue-controlled relaxation and cognitive restructuring versus study skills counseling in treatment of test-anxious college underachievers. Psychological Reports, 49, 459-469.

Deffenbacher, J. D. (1986). Cognitive and physiological components of test anxiety in real-life exams. Cognitive Therapy and Research, 10(6), 635-644.

Glazeski, R. C., Hollandsworth, J. G., & Jones, G. E. (1986). An investigation of the role of physiological arousal in test anxiety. Educational and Psychological Research, 6(2), 67-81.

Hillenberg, J. B., & Collins, F. L., Jr. (1983). The importance of home practice for progressive relaxation training. Behaviour Research and Therapy, 21(6), 633-642.

Holroyd, K. A., Westbrook, T., Wolf, M., & Badhorn, E. (1978). Performance, cognition, and physiological responding in test anxiety. Journal of Abnormal Psychology, 87(4), 442-451.

Hurwitz, L., Kahane, J., & Mathieson, C. (1986). The effect of EMG biofeedback and progressive muscle relaxation on the reduction of test anxiety. Educational and Psychological Research, 6(4), 291-298.

Kaplan, R. M., McCordick, S. M., & Twitchell, M. (1979). Is it the cognitive or the behavioral component which makes cognitive-behavior modification effective in test anxiety? Journal of Counseling Psychology, 26(5), 371-377.

Kirkland, K., & Hollandsworth, J. G., Jr. (1980). Effective test taking: Skills-acquisition versus anxiety-reduction techniques. Journal of Consulting and Clinical Psychology, 48(4), 431-439.

Lent, R. W., & Russell, R. K. (1978). Treatment of test anxiety by cue-controlled desensitization and study-skills training. Journal of Counseling Psychology, 25, 217-224.

Pagano, D. R., & Katahn, M. (1972). Construct validity, disconfirming evidence and test anxious students. Journal of Personality, 40, 137-148.

Ricketts, M. S., & Galloway, R. E. (1984). Effects of three different one-hour single-session treatments for test anxiety. Psychological Reports, 54, 115-120.

Russell, R. K., & Sipich, J. F. (1973). Cue-controlled relaxation in the treatment of test anxiety. Journal of Behavior Therapy and Experimental Psychiatry, 4, 47-49.

Siegel, S. F. (1986). Reduction of test anxiety using Pavlovian conditioning principles: A preliminary note. Psychological Reports, 59, 48-50.

Spiegler, M. D., Cooley, E. J., Marshall, G. J., Prince, H. T., II, Puckett, S. P., & Skenazy, J. A. (1976). A self-control versus a counterconditioning paradigm for

systematic desensitization: An experimental comparison. Journal of Counseling Psychology, 23(1), 83-86.

Spielberger, C. D., Anton, W. D., & Bedell, J. (1976). The nature and treatment of test anxiety. In M. Zuckerman & C. D. Spielberger (Eds.), Emotions and anxiety: New concepts, methods, and applications. New York: Wiley.

Stanton, H. E. (1973). The effect of music on test anxiety. Australian Psychologist, 8(3), 220-228.

Suinn, R. M. (1968). The desensitization of test-anxiety by group and individual treatment. Behaviour Research and Therapy, 6, 385-387.

Suinn, R. M. (1969). The STABS, a measure of test anxiety for behavior therapy: Normative data. Behaviour Research and Therapy, 7, 335-339.

Tryon, G. S. (1980). The measurement and treatment of test anxiety. Review of Educational Research, 50(2), 343-372.

Van Der Ploeg-Stapert, J. D., & Van Der Ploeg, H. M. (1986). Behavioral group treatment of test anxiety: An evaluation study. Journal of Behavior Therapy and Experimental Psychiatry, 17(4), 255-259.

Walker, C. E., Hedberg, A. G., Clement, P. W., & Wright, L. (1981). Clinical procedures for behavior therapy. Englewood Cliffs, NJ: Prentice-Hall.

Zimpfer, D. G. (1986). Group work in the treatment of test anxiety. Journal for Specialists in Group Work, 11(4), 233-239.