

EFFECTS OF PROGRESSIVE MUSCLE RELAX-  
ATION AND DEEP BREATHING EXERCISES  
ON FOURTH-GRADE AND FIFTH-GRADE  
STUDENTS' PERFORMANCE AND  
ANXIETY LEVELS

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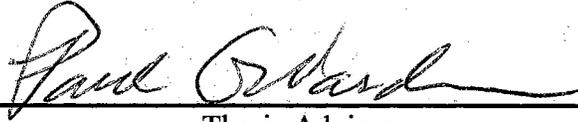
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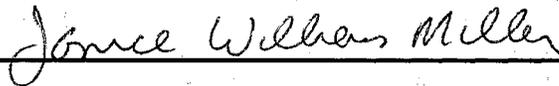
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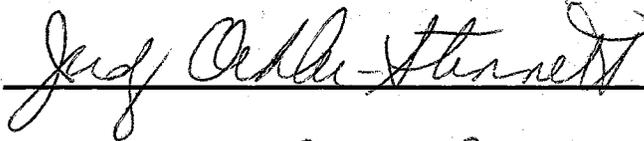
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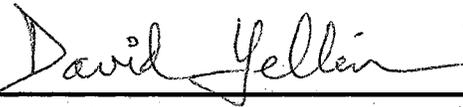


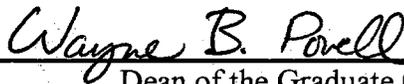
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## CHAPTER ONE

### INTRODUCTION AND LITERATURE REVIEW

One of the most common interventions recommended by school psychologists and other professionals for test anxiety is relaxation (Harvey, 1995). It has been this author's personal experience and her observation of other school psychologists that individual testing situations often provoke anxiety in students. It is of great importance to establish rapport with students before testing begins. A brief exercise in relaxation could be used as a rapport building technique, especially since these testing situations are usually single, direct encounters with students. Building rapport helps illicit better performance. It is hypothesized that relaxation training will help improve performance and lower test anxiety. Most individualized testing in the school setting is for special education placement. The decision as to whether to place a student in special education or not to place them is of great importance. Therefore, the accurate measurement of their capabilities is crucial. If a brief individual treatment in relaxation helps a student to perform to their potential, it would be an easy technique for school psychologists to implement with students before performance measures are given.

Many studies, summarized by Hill and Wigfield (1984), have shown that test anxiety in children is a problem in both genders and in various economic and ethnic groups. As children move through the elementary school years, evaluative situations become more frequent, and levels of test anxiety increase. It has been shown that relaxation training decreases anxiety, impulsivity, hyperactivity, distractibility, and emotional lability in exceptional learners, while it increases self-concept, achievement, and positive classroom behaviors (Margolis, 1990). Margolis contends that besides being an

effective method for treating the above mentioned concerns, relaxation training is a practical intervention because it is not time intensive, requires minimal professional training, and is cost efficient. It has been shown that children with learning disabilities have greater rates of test anxiety than other children (Bryan, Sonnefeld & Grabowski, 1983), and since children with emotional and behavioral problems have learning disabilities (Kauffman, 1989), they may also have test anxiety. Thus, both regular education and special education students are likely to experience anxiety during standardized testing. It is theorized that high levels of test anxiety contribute to decrements in performance.

This study uses a three-factor design with repeated measures, specifically a 2 X 2 X 2 design with repeated measures. There are four independent variables. Three are between variables (relaxation treatment, trait anxiety, and gender) and one is a within variable (state anxiety). The two levels of treatment are a relaxation and deep breathing group, and a control group. The two levels of trait anxiety are high anxiety and low anxiety. The two levels of gender are males and females. State anxiety is measured pre to post test. There are three dependent variables (reading achievement, math achievement, and state anxiety). The subjects in this study were fourth-grade and fifth-grade students. The relaxation training was a brief, individual exercise in progressive muscle relaxation and deep breathing exercises done immediately prior to individual testing. The literature review will cover the area of test anxiety concerning its definitions, historical information, research trends, theories, mathematics and reading content areas, and gender differences. Also, it will cover the area of relaxation concerning its historical information, techniques and treatments, and effects of relaxation on anxiety and achievement.

## Literature Review

### Test Anxiety

#### Definitions

How would one describe someone who is test anxious? Sarason, Davidson, Lighthall, Waite, and Ruebush (1960) describe...” the test anxious child as one who has self-deprecatory attitudes, anticipates failure in the test situation in the sense that he will not meet the standards of performance of others or himself, and experiences the situation as unpleasant---an affective state which signifies conflict between tendencies which are conscious as well as between conscious and unconscious tendencies” (p. 20). Dusek (1980) gives the following definition of test anxiety, “An unpleasant feeling or emotional state that has physiological and behavioral concomitants, and that is experienced in formal testing or other evaluative situation” (p.88).

#### Historical Information: Theories and Research Findings

In 1988 Hembree (p.49) conducted a meta-analysis trying... “to integrate the findings of the research on test anxiety, regarding its nature, effects, and treatment.... Focus was supplied by the pursuit of a second objective: the use of results to reduce or resolve theoretical issues surrounding the construct.” The findings of Hembree’s meta-analysis indicate that test anxiety is associated with: low IQ in grades three through postsecondary; low performance (aptitude and achievement) in grades 4 through postsecondary in the areas of reading/English, math, natural and social sciences, and psychology; and other anxiety measures (general anxiety, A-trait, A-state, worry, emotionality, worry vs. emotionality/state, and worry vs. emotionality/trait, and debilitating vs. facilitating anxiety). The following causes were addressed: ability, sex,

adjacent grades, ethnicity, birth order, school environment, the components of worry and emotionality, and facilitating and debilitating anxiety. Test anxiety was greater for average students than high ability students and was greater for low ability students than average ability students. Females had higher levels of test anxiety than males, especially in grades five through ten. Test anxiety levels stabilized near grade five. In fifth through eighth grades there were marginally higher levels of test anxiety for blacks than whites. Later borns had higher levels of test anxiety than firstborns. At-risk students possessed higher anxiety levels than other students. Females had higher levels of worry and emotionality than males. Males had higher levels of facilitating test anxiety than females. The analysis concerning test anxiety treatments indicated that behavioral treatments, cognitive-behavioral treatments, combined study skills and behavioral treatments, and test-wisness training all lowered levels of test anxiety. Behavioral treatments and cognitive-behavioral treatments reduced levels of worry and emotionality. Also, behavioral treatments and cognitive-behavioral treatments reduced the levels of general, trait, and state anxiety during testing.

The discussion of test anxiety theories begins with the interference models. These models or theories view test anxiety as interfering with the recall of previously learned information and thus reducing performance (drive theory, facilitating/debilitating anxiety theory, worry-emotionality theory, state-trait theory). The last model is the cognitive deficits model which views poor performance in high test anxiety individuals as a result of poor study skills and/or test taking skills.

## Drive Theory

The earliest studies of test anxiety began in the 1950's. The first theory of test anxiety, as proposed by Mandler and Sarason (1952), describes performance differences as being based upon task-directed drives and anxiety drives. The task-directed drives allow one to attend to the test and anxiety drives focus on self-directed, task-irrelevant behaviors that cause one not to be able to focus on the evaluative situation. Later studies by Sarason and his colleagues further examined this area of research. The conclusion was that individuals with high test anxiety have many self-critical thoughts that direct their attention away from the test (Sarason, 1958; Sarason & Ganzer, 1962; Sarason & Ganzer, 1963; Sarason & Harmatz, 1965; Sarason & Koenig, 1965).

## Facilitating/Debilitating Anxiety Theory

Alpert and Haber (1960) developed a bidimensional theory that built upon Mandler and Sarason's work. The task-directed behaviors were considered facilitating anxiety and the task-irrelevant behaviors as debilitating anxiety. Contrary to the theory proposed by Mandler and Sarason, Alpert and Haber considered the two forms of anxiety to be independent. Debilitating anxiety is now known as "test anxiety."

## Worry/Emotionality Theory

Liebert and Morris (1967; Morris & Liebert, 1969, 1970; Spiegler, Morris, & Liebert, 1968), through their factor analysis of the Test Anxiety Questionnaire (Sarason & Mandler, 1952), broke test anxiety into two components, worry and emotionality. Emotionality is the physiological-affective component of test anxiety, the feeling of nervousness or tension. Worry is the cognitive component of test anxiety. Self-occupational thoughts consisting of negative statements about oneself and one's

performance and being concerned with negative outcomes of testing are aspects of worry. The worry component of test anxiety is more associated with performance than the emotionality component and worry triggers emotionality (Morris, Franklin, & Ponath, 1983). Because of the nature of the differences between worry and emotionality it is likely that relaxation training would be more effective in alleviating the emotionality components of test anxiety, whereas cognitive restructuring treatments would be more effective in alleviating the worry components of test anxiety (Denney, 1980). However, according to Deffenbacher (1980), "...cognitively oriented and relaxation oriented treatments do not reliably reduce worry and emotionality respectively as they theoretically should" (p.126). Goldfried, Linehan, and Smith's (1978) study support the differential prediction hypothesis. Studies by Osterhouse (1972), Finger and Galassi (1977), Deffenbacher and Parks (1979), Snyder and Deffenbacher (1977), and Deffenbacher, Mathis and Michaels (1979) do not support the differential prediction hypothesis.

#### State/Trait Theory

Spielberger (1972) discerns between chronic anxiety (trait anxiety) and transitory anxiety (state anxiety). There are two separate constructs that comprise the general term known as anxiety. State anxiety is the transitory or fluctuating anxiety that occurs when an individual perceives a situation to be threatening. Trait anxiety is a personality variable. Individuals who are high in trait anxiety have the propensity to judge many situations as threatening and in turn experience state anxiety more frequently than do those who are low in trait anxiety. State anxiety is experienced when internal or external stimuli are perceived to be threatening. A person's level of trait anxiety, as well as their aptitude, abilities, and past experiences, affect whether they perceive a specific stimulus as

threatening. Individuals with high levels of trait anxiety view circumstances that threaten their concepts of personal adequacy as more threatening than individuals with low levels of trait anxiety, resulting in performance differences (Denny, 1966; Hodges, 1968; Spielberger, O'Neil, & Hansen, 1972; Spielberger & Smith, 1966). However, there is no difference between these groups of individuals in physically threatening situations (Hodges & Spielberger, 1966; Katkin, 1965, Lamb, 1972). Thus, high levels of state anxiety associated with testing situations would occur in individuals who had high levels of trait anxiety. Thus, test anxiety can be considered a situation specific personality trait (Spielberger, Anton, & Bedell, 1976). Emotionality and worry components promote poor performance. State anxiety is akin to emotionality. Worry follows when a person who is high in state anxiety experiences an evaluative situation (Spielberger, Anton, & Bedell).

#### Deficits Model

The deficits model (Tobias, 1985) contends that poor performance, due to poor study habits and/or test-taking skills, leads to test anxiety. Naveh-Benjamin, McKeachie, and Lin (1987) and Bruch, Pearl and Giordano (1986) contend that test anxiety is the result of information processing problems that become apparent during performance situations. They describe two types of information processing problems. The first is a problem in encoding or organizing information into long-term memory. The second problem is in retrieving information from long-term memory.

#### Summary and Discussion

Test anxiety is a multifaceted construct. Theories have built upon one another and been refined as new information has come to light in the literature. Thus, theories share similarities and differences. In Hembree's (1988) meta-analysis test anxiety was reduced

by behavioral and cognitive behavioral treatments. These treatments are aimed at reducing interference. Study skills by itself was ineffective. Study skills is aimed at reducing cognitive deficits. Therefore, Hembree concludes that interference models of test anxiety are more appropriate than a deficits model. Yet, Obrien (1991), in discussing Hembree's findings and synthesis, argues that, "The two orientations are not necessarily at odds"(p. 277).

Most researchers conclude from the research base that test anxiety causes poor performance. This conclusion is based upon studies that optimize and change testing procedures (Hill, 1984) and studies showing that performance is improved when test anxiety is reduced (Hembree, 1988).

All of the major theorists discuss cognitive aspects of test anxiety. The concepts are very similar. Sarason (1975) discusses self-preoccupied thoughts. Wine (1971) discusses the cognitive-attentional view of performance decrements. Liebert and Morris (1967) discuss worry and Spielberger (1967) acknowledges there are worry components both in state and trait anxiety. They all share the view that high test anxious persons have thoughts that prevent them from attending to the task (taking the test). Most of the support for this concept has come from research with older students, but research with younger children is also supportive (Dusek, Kermis, & Mergler, 1975; and Dusek, Mergler, & Kermis, 1976; NoHelmann & Hill, 1977). A physiological component of test anxiety is discussed in drive theory (Sarason), worry-emotionality theory (Liebert & Morris) and state-trait theory (Spielberger). Liebert and Morris, Spielberger, and Hembree all conclude that worry is more strongly correlated with performance than

emotionality. However, Spielberger and Hembree conclude that emotionality triggers worry, whereas Liebert and Morris conclude that worry triggers emotionality.

The state-trait theory of test anxiety provides the framework for the current study for two reasons. First, a predisposition (trait) to experience anxiety in a testing situation (state) is a main variable in this study. Secondly, the State-Trait Anxiety Inventory for Children (Spielberger, 1972) is one of the few adequately constructed instruments that can be used with the population in the current study. Instruments that measure worry and emotionality components of state and trait anxiety are desperately needed for children in the elementary grades.

#### Academic Performance Anxiety

The following section discusses the relationship between anxiety and performance in the areas of mathematics and reading. Mathematics and reading are main variables in the present study. These variables were chosen because they are core subjects taught in school. Also, gender differences in the areas of anxiety and performance will be discussed. Again, they are main variables in the present study.

#### Mathematics and Reading Content Areas

Much greater attention has been given to research in the area of mathematics and its relationship with anxiety than the area of reading. However, the findings are similar when mathematics and reading measures have been used in achievement assessment batteries (Crocker, Schmitt & Tang, 1988; Zeidner, 1990). This is consistent with Hembree's (1988) meta-analytic findings that test anxiety is associated with performance measures in the content areas of reading, mathematics, natural and social sciences, and psychology.

Mathematics test anxiety and general test anxiety are related, but they are not equivalent (Gierl & Bisanz, 1995; Harris Dew, Galassi & Galassi, 1984). In a sample of college females mathematics anxiety levels were slightly higher than general test anxiety levels (Rounds & Hendel, 1980). Mathematics anxiety has only a moderate relationship to mathematics performance (Harris Dew, Galassi & Galassi). According to Rounds and Hendel, mathematics anxiety is more a response to the evaluation of mathematics skills than a response to mathematics in general. This would help explain why students report lower levels of math anxiety when they have had more math preparation in the past (Betz, 1978). Also, this would help explain why mathematics test anxiety increases with grade compared to math problem solving anxiety (Gierl & Bisanz). Ganz and Ganz (1988) found similar findings in the area of reading. The better students perceived their ability to read and study from text, the lower their test anxiety levels. Also, those students who were confident of their success had lower test anxiety scores than those who either were not confident about their success or thought they had a reasonable chance at success. In general, students with high levels of anxiety have lower school achievement and aptitude (Hill & Sarason, 1966; Kirkland, 1971; Phillips, 1978; Tyron, 1980).

Across grade levels students with low test and math anxiety perform better than students with high levels of test and math anxiety (Betz, 1978; Cotler & Palmer, 1970; Plass & Hill, 1986). Lower achieving students and students in lower level math classes report higher levels of test anxiety and math anxiety respectively (Betz, 1978; Birenbaum & Gutvirtz, 1983). In addition, Sepie and Keeling (1978) found that measures of math-specific anxiety, more than general anxiety or test anxiety measures, distinguished students

who were underachieving in math than those who were achieving and overachieving in math.

### Gender

Zeidner (1990) found that test anxiety was higher for females than males, especially the emotionality component. There were similar findings by Birenbaum and Gutvitz, (1993), Bronzaft & Epstein (1972), and Morris, Finkelstein and Fisher (1976). The test anxiety scores did not differentially increase for gender as performance scores decreased in Zeidner's study. These last findings were also found in a study by Crocker, Schmitt, and Tang (1988). When test anxiety was statistically controlled, there was no sex effect on performance, but there was a main effect of sex on test anxiety with girls having higher levels. Also, these findings occurred in a study where only mathematics performance was used as a dependent variable (Cotler & Palmer, 1970). Thus, when test anxiety is controlled, performance differences should not occur, but girls will have higher levels of test anxiety than boys will.

### Summary and Discussion

This section of the literature review discussed the areas of mathematics and reading and their relationship to anxiety and performance. It appears from the limited research in these specific content areas that test anxiety may be subject specific for certain individuals. However, studies that have examined the conceptualization of state-trait anxiety theory indicate that individuals who are high in trait anxiety are more prone to experience high state anxiety across testing situations. Thus, research is still needed in this area. In the present study the pre-treatment state anxiety measure is given before students are aware of the specific types of achievement tests that will be given and at post-test they

will be reporting on the combined experience of taking both a mathematics and reading test. However, the effects of trait anxiety on mathematics and reading will be assessed.

Also, in this section of the literature review, it was shown that individuals with high levels of anxiety have lower scores on measures of aptitude and achievement than individuals with low levels of anxiety. The present study is not able to control for achievement due to school policies. This is a limitation of this study. Prior achievement levels might confound possible changes in the dependent variables, mathematics achievement and reading achievement, attributable to trait anxiety level.

It was shown that females have higher levels of anxiety than males. This study controls for gender differences.

### Relaxation

Relaxation, cognitive treatments, and study skills are the most common interventions for test anxiety. The three main cognitive treatments are rational-emotive therapy, attention training, and self-instructional training (Forman & O'Malley, 1984). Cognitive treatments and study-skills treatments will not be used in this study for two reasons. First, there is some evidence that relaxation treatments alone reduce anxiety and improve performance (to be discussed later in this section). Second, neither cognitive treatments nor study-skills treatments would be feasible for a one-time, brief intervention immediately preceding an individual testing session with a school psychologist.

The following section discusses the historical foundations of relaxation training, specific techniques and treatments, and the effects of relaxation on anxiety and achievement.

## Historical Information

Bernstein and Borkovec (1973) discuss the background and history of relaxation training. In 1908, at Harvard University, Edmund Jacobson began his work. He believed through his investigations that when a person reported being anxious, tension occurred. Thus, if one eliminates tension, anxiety will be removed. Jacobson, "...discovered that by systematically tensing and releasing various muscle groups and by learning to attend to and discriminate the resulting sensations of tension and relaxation, a person may almost completely eliminate muscle contractions and experience a feeling of deep relaxation" (p. 3). From 1936 until the 1960's, Jacobson continued his work at the Laboratory for Clinical Psychology in Chicago. His relaxation training consisted of 56 one hour daily sessions of one to nine days using one muscle group per day. His procedure involved 15 muscle groups.

The next major investigator of relaxation was Joseph Wolpe. His work began in 1948 with studies of counterconditioning of fear responses. Earlier in studies with cats, he discovered that, "A conditioned fear reaction could be eliminated by evoking an incompatible response while gradually presenting the feared stimulus. The incompatible response will inhibit the fear response as long as the former is of greater intensity than the latter" (Bernstein & Borkovec, 1972, p. 3). Wolpe discovered Jacobson's work on progressive muscle relaxation when he was trying to find incompatible responses that could be easily administered. Wolpe developed a similar progressive muscle relaxation technique and additionally had his therapists use hypnotic and direct suggestion techniques to help clients be aware of bodily sensations. Wolpe's program included six 20-minute sessions with two 15-minute daily home practice sessions. Wolpe used both real and

imagined exposure to the anxiety producing events. Wolpe put emphasis, “ On the circumstances surrounding the occurrence of anxiety rather than on the anxiety response itself” (p. 3). Relaxation was one component to a larger treatment called systematic desensitization, in which reconditioning was used to alleviate anxiety.

This section described the evolution of relaxation training. The following section describes the relaxation techniques that are currently being used as treatments.

### Techniques and Treatments

There are basically four types of self-induced relaxation used with children in the schools: progressive muscle relaxation, visual imagery, autogenics, and meditation, and all forms have been shown to be effective in various circumstances (Margolis, 1990).

Progressive muscle relaxation is the oldest form of relaxation training and was discussed previously. Visual imagery involves a person envisioning in their mind a relaxing scene. Often music or environmental sounds accompany the exercise(s). Visual imagery can be done individually or in a group. A person can instruct himself or herself to do visual imagery; teachers, counselors, and others also can use commercial or self-made scripts or audiotapes. Autogenics uses verbal cues to alert one to physiological sensations and thus has one's body respond by becoming relaxed. For example: My heart is beating slowly and rhythmically. The final form of self-induced relaxation is meditation. The relaxation response occurs when the five basic elements of meditation are used (Benson, 1984; as cited in Margolis): 1.) Quiet environment; 2.) Mental repetition or word of phrase; 3.) Eliminating the mind from conscious thought; 4.) Focus on breathing; 5.) Sitting.

Progressive muscle relaxation and deep breathing exercises are being used in this study. It is the experience of the researcher that parents for religious reasons often oppose

visual imagery and meditation. The researcher is trying to generalize the findings of this study to psychoeducational evaluations done by school psychologists. Thus, the relaxation in this study will be a brief, single treatment. The goal is have an intervention that can be easily implemented and is time efficient to increase the likelihood that school psychologists would adopt it. Progressive muscle relaxation and deep breathing exercises easily fit these requirements.

### Effects of Relaxation on Anxiety and Academic Achievement

This section of the literature review presents findings of research relating to the relationship between relaxation training, and anxiety and achievement. Some studies addressed either anxiety or achievement, but most studies examined both.

#### Studies Examining the Effects of Relaxation on Anxiety

The following paragraphs highlight research investigating the relationship between relaxation training and anxiety in children. Generally it has been found that relaxation training reduces test anxiety levels with a wide range of students (Hiebert & Eby, 1985; Russell & Lent, 1982; Russell, Miller, & June, 1974; Russell, Wise, & Stratoudakis, 1976; Zaichkowsky & Zaichkowsky, 1984).

Hiebert and Eby (1985) conducted a five-week study using twelvth grade regular English students at a Canadian secondary school. Nineteen students successfully completed the project and their data were used for analysis. All subjects were assigned readings from Self-Relaxation: Learn It, Use It (Hiebert, 1980; as cited in Hiebert & Eby, 1985). This manual contained information on:

The physiological relationship between stress and relaxation, the steps involved in relaxation training, a procedure for self-monitoring heart rate,

respiration rate, and skin temperature as indices of relaxation, a procedure for making an audiocassette recording as a training aid, and four sample relaxation scripts (progressive relaxation, self-hypnosis, autogenic relaxation, and guided imagery). (p. 206)

Also, the students were given a tape containing progressive muscle relaxation and autosuggestive relaxation exercises. They were assigned readings from the manual, and given in class training and lectures on the topic. Students had 30 minutes of at home relaxation exercises daily. Before and after the relaxation exercises they completed a physiological data log. At the end of the unit they were required to write a self-report essay. Students were pre- and post-tested using the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1968) and the Symptoms of Stress Inventory (Leckie & Thompson, 1979). There were significant reductions in both state and trait anxiety scores, and significant reductions on all subscales of the Symptoms of Stress Inventory except the neural scale. The neural scale measured symptoms such as seizures, fainting spell, dizziness, etc. There were low mean pre- and post-test scores on this subscale. There are several methodological issues concerning this study. There was no control group and no randomization. One of the researchers was the teacher whose students were invited to participate in the study. The treatment in this study incorporated many techniques and the techniques were analyzed as a whole. Thus, it is impossible to determine if all of the techniques in combination or if particular techniques contributed to changes in the dependent variables. It is interesting that both state and trait scores were reduced pre- to post-test. This would call into question the basic foundation of State-Trait Anxiety Theory (Spielberger, 1972). State-Trait Anxiety Theory would expect trait

anxiety levels to stay fairly constant across situations and state anxiety levels would fluctuate across situations and be effected by relaxation. Again, this study has many methodological issues. The present study attempts to overcome these issues by using randomization, a control group, and a simple form of relaxation.

Contrary to the previous study Zaichkowsky and Zaichkowsky (1984) used an experimental design. Specifically, a pre-test, post-test control group design was used. Forty-three fourth grade students participated. The students included two classes that were randomly selected from a group of fourth grade teachers who volunteered to participate in the study. The experimental group received a 20-minute theoretical lesson on relaxation and seventeen, 10-minute group relaxation lessons. The relaxation lessons included progressive muscle relaxation, mental imagery, and breathing techniques. The study was conducted over a six-week period with three lessons per week. Two of the lessons were taught in the gymnasium on mats and one was taught in the classroom in chairs. A self-practice tape for home use was given to the students after the third week of treatment. However, there was no data collected on its use. There were five dependent variables: heart rate, skin temperature, respiration rate, state anxiety, and trait anxiety. The state and trait anxiety were measured by the Spielberger's Scale for Children (Spielberger, 1973). Within the experimental group there were significant differences pre- to post-test in heart rate, respiration rate, skin temperature, and state anxiety. For the control group there were significant increases in their ability to raise skin temperature. Also, there were differences between the experimental and control groups. The experimental group had lower adjusted post-test means on heart rate, respiration rate, and temperature. The authors of this study do discuss limitations. They acknowledge that

they acted as experimenters in the study and only short-term effects were assessed. This study lends support for the State-Trait Theory of anxiety. Only differences in pre- to post-test state anxiety were observed, not trait anxiety scores. Also, these findings provide concurrent validity between the state anxiety measure and physiological measures.

#### Studies Examining the Effects of Relaxation on Academic Achievement

Research indicates that relaxation training improves academic performance in children (Carter & Russell, 1985; Deffenbacher & Kemper, 1974; Gerler & Danielson, 1984; Moltane, 1987/1988; Prichard & Taylor, 1981; and Zenker & Frey, 1985). In a study by Moltane (1987/1988) fifty-four learning disabled students in a resource classroom participated in a relaxation program during group counseling. The students, in grades one through six, were either in a treatment, attention, or control group. After adjusting for preexisting individual differences, multiple classification analysis of covariance was used to determine if there were differences among the treatment groups from pre-to post-test. The treatment consisted of a six-week, twelve-session program using a variety of relaxation techniques on audiotape. Students were taught to identify tension and how to relax. Also, photographs depicting relaxing scenes were used with the some of the audiotapes. Students were given the Peabody Individual Achievement Test (Dunn & Markevadt, 1970). The treatment group's scores were higher than those of the attention group or the control group on the Mathematics Subtest, Reading Comprehension Subtest, and the Spelling Subtest. There were no differences on the Reading Recognition Subtest. The author speculates this is because reading recognition tasks are one of the areas of greatest weakness for learning disabled students, and thus a difficult area for them to show improvement.

Another study (Zenker & Frey, 1985), also using a variety of relaxation techniques, was conducted using tenth grade regular education students who fell below the average on ability and achievement measures. Eight students received relaxation treatment and eight were in a control group. The ten-day relaxation program was instituted using ten-minute audiotapes. The audiotapes taught the students relaxation using slow breathing techniques, muscle relaxation of the hand, plus visual imagery. After the ten days of treatment the students were read a story at the fourth grade level. The students were then asked ten comprehension questions. The mean scores for the experimental and control groups were significantly different with the experimental group showing greater reading comprehension. However, the authors do not explain how the experimental and control groups were formed. Nor do they use a standardized measure of reading comprehension. The current study overcomes this limitation by using standardized academic achievement measures.

#### Studies Examining the Effects of Relaxation on Both Anxiety and Achievement

The following is a detailed description of current research investigating the relationship of relaxation training on both test anxiety and achievement. The studies discussed in the previous subsections have examined the effects of relaxation on anxiety or achievement, but not both. The current study examines both. Thus, the studies in this subsection are most closely related to the current study. The consensus is that relaxation lowers test anxiety levels and increases performance (Abendroth & Friedman, 1983; Bander, Russell & Zamostny, 1982; Barabasz, 1973; Frey, 1980; Himle, Thyer, Papsdorf & Caldwell, 1984; Kelley, 1982; Matthews, 1986; Saigh & Antoun, 1984; Watson & Hall, 1977; Wilson & Rotter, 1986).

Reading achievement was significantly improved in a group of third to sixth grade German students who participated in an after school remedial reading program (Frey, 1980). The grade levels in the Frey study include fourth-grade and fifth-grade, which are used in the current study. Additionally, both studies share some of the same independent and dependent variables. Both studies used relaxation by itself as the only treatment. In the Frey study thirty pairs of students were matched on age, sex, test anxiety level, intelligence, and reading and spelling performance. The pairs were randomly assigned to a treatment group, which include the reading program plus autogenic relaxation and progressive muscle relaxation, or a control group, which consisted of only the reading program. The program met once a week for an entire school year. Students in the treatment group received 15 minutes of group relaxation training at the beginning of the class period. The treatment group did significantly better on measures of reading and spelling than the control group, and they had significantly lower test anxiety scores than the control group.

Saigh and Antoun (1984) pre-tested 275 high school students on the trait form of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1968) and the Suinn Test Anxiety Behavior Scale (STABS; Suinn, 1971). This is similar to the screening that will be done with fourth-grade and fifth-graders in the current study using the sibling State-Trait Anxiety Inventory for Children Trait Form (STAIC; Spielberger, 1973). In Saigh and Antoun's study twenty-eight females and twenty males had scores one standard deviation above the mean on the STABS and trait-anxiety estimates below the 70th percentile on the STAI. These subjects were randomly assigned to one of three treatment groups [endemic images (visual imagery), systematic desensitization,

control/chamber music]. Each treatment group received seven 50-minute group-based treatment sessions and all groups received three 50-minute study-skills training sessions. Pretherapy GPA (achievement measured over a three-month term) and STABS scores were not significantly different for the three treatment groups. However, pretherapy STAI trait scores were significantly different for the groups.

There was a significant difference between post-therapy STABS scores for the three treatment groups, when a one-way ANOVA was calculated. Also, a significant difference was noted between post-therapy GPA's for the three treatment groups. Scheffe multiple comparison tests were conducted. The endemic image group had lower STABS scores than the control group, and the systemic desensitization group had lower STABS scores than the control group. Concerning GPA, both the endemic image and systematic desensitization groups had significantly higher averages than the control group.

Before participating in the study, all subjects were told that the anxiety management training would lower test anxiety and improve achievement. There is a possibility this information confounded the results of this study. It would have been more appropriate for the researchers not to divulge to the subjects their hypotheses concerning the study. In the current study hypotheses are not divulged to the subjects. Another difficulty in comparing Saigh and Antoun's study to the current study is that study skills were combined with all of the treatments. The next study explores the differences between study skills, relaxation, and a control group.

A study by Wilson and Rotter (1986) attempted to show the effects of three experimental treatments (focus relaxation, study skills counseling, and combined relaxation and study skills counseling), an attention-placebo, and a control group on test

anxiety, test performance, and self-esteem. All treatment groups met twice a week for 45 minutes for three weeks. All treatments were in a group format. Also, they examined the effects of treatment versus attention only and intervention versus no intervention. Thus, a randomized groups pre-test, post-test, follow-up design was used. The subjects were 60 sixth- and seventh-grade students at a southern, metropolitan, public middle school. The subjects were all in regular education classes and none were identified as having a serious emotional disorder. Eighty-nine percent were black and eleven percent were white. They all had test anxiety scores, as measured by the Test Anxiety Scale for Children (TASC; Sarason, Davidson, Lighthall, Waite & Ruebush, 1960) in the upper third of all sixth- and seventh-grade students, and had reading stanine scores, as measured by the Comprehensive Tests of Basic Skills (CTBS) between three and nine. The dependent variable of self-esteem was measured by the Coopersmith Self-Esteem Inventory (SEI; Coopersmith, 1967) and test performance was measured by an adaptation of the coding subtest of the Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechsler, 1974). Concerning analysis of pre-test to post-test scores, test anxiety scores were significantly reduced in all three treatment conditions. The combined study-skills/relaxation treatment and the attention placebo groups had significant differences in test performance scores. In the post-test to follow-up analysis, the relaxation, combined study-skills/relaxation, and attention-placebo groups had significantly reduced test anxiety scores; and the relaxation group had significant increases in test performance. The relaxation, study skills, and combined relaxation/study skills treatments had significant reductions in test-anxiety scores in the pre-test to follow-up analysis. Also, the relaxation and combined study-skills/relaxation groups had significant increases in test performance.

It is of interest that pre-test to post-test the relaxation group had lower anxiety scores but not higher performance scores. Yet, pre-test to follow-up the relaxation group had both lower anxiety scores and higher performance scores. The combined study skills/relaxation group had both lower anxiety scores and higher performance scores at both of these time points. However, in the current study a combined study-skills/relaxation program would not be practical. Again, when school psychologists give psychoeducational batteries they are working with students one time. The intervention must be developed for that one-time experience and must not take long to administer. The subjects in the Wilson and Rotter study were slightly older than those in the current study.

A similar study, both in design and independent variables, examined the effects of relaxation and study skills counseling on the treatment of math anxiety and performance (Bander, Russell & Zamostny, 1982). Thirty-six subjects participated in one of four treatment conditions. The treatments were study skills training, relaxation, combined study skills/relaxation, and a control group. All treatments were group-based and met once a week for five weeks. The participants were freshman college students who scored one standard deviation below the mean on the Mathematics Anxiety Scale (Fennema & Sherman, 1976). Low scores designate high anxiety. Four measures of anxiety served as dependent variables. The measures were the Mathematics Anxiety Scale, Anxiety Differential (Husek & Alexander, 1963), Test Anxiety Scale (Sarason & Mandler, 1952), and State-Trait Anxiety Inventory-Trait Form (Spielberger, Gorsuch, & Lushene, 1969). Two measures of performance served as dependent variables. They were the Digit Symbol Test (Brown, 1969) and Differential Aptitude Test (Bennett, Seashore &

Wesman, 1959). Subjects were post-tested one week after treatment ceased and received follow-up assessment three weeks after treatment ceased.

Multivariate analyses of variance were performed and post-hoc analyses were performed when there was a significant Group X Time interaction. Findings from the pre- to post-test analyses were that (1.) study skills training was best at reducing math anxiety; (2.) relaxation and combined study skills/relaxation reduced general test anxiety better than study skills and no treatment; (3.) study skills and combined study skills/relaxation produced significantly higher math performance scores; and (4.) combined study skills/relaxation was the best method for increasing digit symbol task performance. Analyses from post-treatment to follow-up showed that training in relaxation was better than the other treatment condition in both decreasing math anxiety and improving math performance.

The authors were very clear in describing the weaknesses of their study. They suggest that the sample size was relatively small, the instruments used were possibly transparent, the specific instruments used lacked adequate normative data, and finally, the control group was excluded from the follow-up. The two most critical pieces of information gleaned from this study are that relaxation reduced general test anxiety pre- to post-test and that relaxation treatment was better than all of the other treatments improving math performance. This finding is similar to the Wilson and Rotter (1986) study. Both indicate relaxation was the best treatment to decrease anxiety and improve performance pre-test to follow-up. A major difference between the Bander, Russell, and Zamostny (1982) study and the current study is that only general state anxiety will be measured even though a math performance measure will be administered. At the time the

subjects fill out the pre-test state anxiety questionnaire, they do not know what specific tests will be administered. Also, the subjects were college freshman in the Bander, Russell and Zamostny study where they are elementary school students in the current study.

As with the previous study, the following study involved adults whose average age was 24 instead of elementary school students. However, the research questions are similar to the current study and are worth examining. Nine males and ten females volunteered to participate in a research project because they all reported having severe test anxiety (Himle, Thyer, Papsdorf & Caldwell, 1984). The researchers were trying to determine if training individuals to be less distracted during testing situations along with relaxation training and cognitive behavior therapy would lower their test anxiety scores and increase their performance better than relaxation training and cognitive behavior therapy alone. The Test Attitude Inventory (Spielberger, 1980), State and Trait Anxiety Inventories (Spielberger, Gorsuch & Lushene, 1970), Rational Behavior Inventory (Shorkey & Whiteman, 1977), Autonomic Perception Questionnaire (Borkovec, 1976), an anagram task, and the Annette Test of Manual Dexterity (Annett, 1972) were administered pre- and post-treatment. There were significant reductions in scores on all test anxiety measures pre- to post-treatment. Also, there were significant improvements on the performance measures pre- to post-treatment. However, there was not a significant difference between the treatments.

When examining the previous studies, it is still unclear as to whether or when relaxation alone or in combination with cognitive treatments is more effective at reducing test anxiety and improving performance. Because it is not clear and cognitive treatments

are not practical interventions for use before a psychoeducational battery, a study using relaxation as the only treatment is still warranted.

The previously discussed studies have shown that relaxation training helps to lower test anxiety and improve performance. However, there are studies that show a decrease in test anxiety, but fail to show improvements in performance, when relaxation training is used. There are several possible explanations for differences in outcomes among the studies. Portes, Best, Andhu, and Cuentas (1992) and Bacharz (1990) used a measure of general anxiety instead of a specific test anxiety or state anxiety measure. When measuring achievement, one may encounter ceiling effects. Students may be so close to their academic potential that there is little room for improvement in performance even if test anxiety is decreased (Kiselica, Baker, Thomas & Reedy, 1994). Also, these authors note that treatments may not be sufficiently long enough to show improvements in performance. The number of sessions as opposed to length may be the issue. Laxer and Walker (1970) also discuss this issue. Additionally, Laxer and Walker add that achievement testing for a research purpose only creates a testing situation that is of no consequence to the student. However, this researcher would speculate that many students want to do well to please the examiner. There have been mixed findings, but a combination of relaxation training with either test taking skills or study skills training may be needed to show an improvement in performance (Dendato & Diener, 1986; Kiselica, Baker, Thomas & Reedy, 1994; Swanson & Howell, 1996). Another possible explanation is that some students with low levels of test anxiety get too relaxed and do not perform as well as they would have without the relaxation training (Matthews, 1988). This finding is

important when group relaxation is used in the schools for non-research purposes and anxiety level is not being measured.

### Summary and Discussion

This literature review has discussed the prevalence of recommendations of relaxation training to lower test anxiety and improve performance. The purpose has been to show that in some instances relaxation training does lower test anxiety and improve performance. Questions remain as to which specific relaxation methods reduce test anxiety and improve performance. Results from previous research have been conflicting. In some instances relaxation techniques needed to be used in conjunction with other treatments to improve performance and/or reduce test anxiety, and in other instances the relaxation techniques were sufficient when used alone. Also, there were differences in this area dependent on time (pre-test vs. post-test vs. follow-up). However, when studies are grouped and analyzed, behavioral (relaxation), cognitive-behavioral, combined study skills and behavioral treatment, and test-wisness training treatments reduce test anxiety (Hembree, 1988).

Relaxation training has proved beneficial with many different age groups in lowering test anxiety and improving performance. Yet, there are few studies with young children. Only three of the studies reviewed, examining the effects of relaxation on anxiety and/or achievement, were in the same age group as the current study. Few studies have individually administered relaxation treatment. It is almost always group administered. In most studies relaxation treatment is not done immediately prior to the administration of anxiety and achievement measures or the researchers do not inform the readers as to when the dependent measures were administered. Past research has shown

that using relaxation techniques prior to test taking is more beneficial than having learned relaxation techniques, but not used them immediately before testing (Fiebert & Mead, 1981).

Methodological issues have plagued many studies making it difficult to discern whether specific subjects benefit more from relaxation training than others do. Measurement devices of test anxiety are based on different theories. Thus, it is difficult to compare outcomes of studies. Often non-standardized measures of achievement are used instead of standardized measures. The length of treatment, both the number of sessions and the length of sessions, varies greatly across studies. In some studies subjects knew the hypotheses. Sample sizes have been grossly inadequate. The sample sizes ranged from 19 to 60 in the reviewed studies on the effects of relaxation on anxiety and/or achievement. Not enough studies have used true experimental designs with randomization and control groups. Relaxation treatments often contain too many techniques. Thus, making it difficult to ascertain what specifically is having an effect on the dependent measures. New research is needed to address the previously mentioned issues.

#### Purpose of the Study

School is a setting in which children experience continual evaluation. Many children experience anxiety during evaluative situations. When children are anxious they may not perform up to their capability. Thus, performance measures, especially standardized performance measures, may underestimate children's true achievement levels.

This study will address some of the methodological issues in the field and add new information to the literature. Few studies have been conducted on children, especially in

the elementary grades. This study will examine this population. This study controls for both trait anxiety level and gender. Also, it is unique because the relaxation treatment is done individually and immediately preceding testing. This will help maximize treatment effects and help alleviate awkwardness that might be associated with doing relaxation exercises in a group setting. Standardized measures of achievement will be used, hypotheses will be unknown to subjects, sample size will be sufficient to meet statistical assumptions, an experimental design will be used, and the relaxation treatment will be simple. If effective, relaxation training would be an easily implemented technique to use during individual testing situations.

#### Statement of the Problem

Will a seven-minute individual treatment in relaxation training effect math achievement, reading achievement, and post-treatment state anxiety, and will it have an effect on state anxiety pre- to post-test?

#### Research Questions

1. Is there a difference between groups of children who are given relaxation training and those who are in a control group on measures of reading achievement, math achievement, and post-treatment state anxiety?
2. Is there a difference between low and high trait anxious groups on reading achievement, math achievement, and post-treatment state anxiety?
3. Is there a difference between boys and girls on reading achievement, math achievement, and post-treatment state anxiety?

4. Is the effect of trait anxiety on the measures of reading achievement, math achievement, and post-treatment state anxiety the same for boys and girls depending on whether they receive relaxation treatment or are in a control group?
5. Is there a difference between pre- and post-state anxiety scores depending on gender, trait anxiety level, and whether they receive relaxation treatment or are in a control group?

### Research Hypotheses

#### Hypothesis 1:

There will be no differences between groups of fourth and fifth-graders who are given relaxation training immediately prior to individual testing than those who do not receive relaxation training immediately prior to individual testing on measures of reading achievement, math achievement, and post-treatment state anxiety.

#### Hypothesis 2:

There will be no differences between low and high trait anxious groups of fourth and fifth-graders on reading achievement, math achievement, and post-treatment state anxiety.

#### Hypothesis 3:

There will be no differences between fourth and fifth-grade boys and girls on reading achievement, math achievement, and post-treatment state anxiety.

#### Hypothesis 4:

There will be no effect of trait anxiety on the measures of reading achievement, math achievement, and post-treatment state anxiety for fourth and fifth-grade boys and girls under the treatments.

Hypothesis 5:

There will be no difference in fourth and fifth-graders between pre- and post- state anxiety depending on gender, trait anxiety levels, and treatments.

## CHAPTER TWO

### METHOD

#### Participants

Ninety-six fourth-grade and fifth-grade students participated fully in this study. They came from Riverfield Country Day School, Tulsa, Oklahoma, and Garfield Elementary School, Sand Springs, Oklahoma. A sample size of at least 30 for experimental and control groups is needed to be able to detect performance differences between those receiving treatment and those not receiving treatment (Hembree, 1988). This study exceeds the minimum group size by 18.

Demographic information was collected on a Student Information Form (Appendix A). This paragraph describes subject information. Forty-eight males and 48 females participated in the study. Thirty-eight were nine years old, 45 were ten years old, and 13 were eleven years old. Ninety students were white, one was Asian, two were black, and three were Hispanic. Sixty-three subjects were from Garfield Elementary School and 33 were from Riverfield Country Day School. Of the total group of students whose parents gave permission for them to participate in the study 114 were available for the initial group testing procedure. Two subjects who participated in the data collection process were not added to the data analysis due to the inability to score all of their measures.

#### Instruments

##### State Trait Anxiety Inventory for Children

The State Trait Anxiety Inventory for Children (STAIC; Spielberger, Gorsuch, & Luschene, 1970) measures anxiety in children in grades four through six. Three reviews of the STAIC were used in writing this section (Endler, 1978; Kendall & Ronan, 1990;

and Walker & Kaufman, 1984) along with the test manual (Spielberger, Gorsuch, & Luschene, 1970). The STAIC measures both transitory (state anxiety) and enduring (trait anxiety) anxiety. Both state anxiety and trait anxiety scores are calculated. There are a total of 40 items, 20 on each subscale. The State and Trait subscales were administered in this study. There are three response options per item. The instructions ask the child to answer the item based upon how they feel “right now” (State form) or how they “usually feel” (Trait form). Raw scores are calculated for the two scales. Each item is weighted 1, 2, and 3 indicating the level of anxiety present. Templates are placed over each protocol and the item weights are summed. The higher the raw score the more anxiety present. Then the raw scores are converted to normalized T-scores based upon sex and grade norms. The T-scores were used in this study. The norms are based upon 1, 554 fourth through six grade students from six schools in Florida.

Test-retest reliabilities for the Trait subscale are from .65 to .71 (Spielberger, Gorsuch, & Luschene, 1970). They are from .31 to .47 for the State subscale. However, the State test-retest reliability coefficients should be lower due to the situational factors at different test administrations. Internal consistency reliability coefficients were .82 (males) and .87 (females) on the State subscale, and .78 (males) and .81 (females) on the Trait subscale.

Concurrent validity has been established by correlating the STAIC with other anxiety instruments (Spielberger, Gorsuch, & Luschene, 1970). These correlations range from .27 to .85. Construct validity for two separate subscales has been established through factor analytic methods. Also, the normative sample was given the state scale using standard directions on the first administration and on a second administration was

asked to answer as if they were about to take an important final examination. There were significant differences in the scores.

This is the only scale, designed for use with upper elementary age students, that was adequately constructed and gives information on both anxiety as a stable personality trait and transitory anxiety due to situational factors.

### Woodcock-Johnson Psychoeducational Battery-Revised

For purposes of this study the standard scores on the Reading Vocabulary and Quantitative Concepts supplementary tests of the Woodcock-Johnson Psychoeducational Battery-Revised (Woodcock & Johnson, 1990) measure achievement. The grade norms were used in calculating the standard scores.

The tests are described in the WJ-R Manual (Woodcock & Mather, 1990, pp. 13-14) as follows:

#### Reading Vocabulary

Reading Vocabulary measures the subject's skill in reading words and supplying appropriate meaning. In Part A: Synonyms, the subject must state a word similar in meaning to the word presented. In Part B: Antonyms, the subject must state a word that is opposite in meaning to the word presented. Only one-word responses are acceptable.

#### Quantitative Concepts

Quantitative Concepts measures the subject's knowledge of mathematical concepts and vocabulary. This test does not require the subject to perform any calculations or make any application decisions.

The two tests being used in this study are scored the same. For each test a basal and a ceiling are determined. The reader is referred to the WJ-R Manual (Woodcock & Mather, 1990) for specific instructions on determining the basal and ceiling. For each item the examinee can receive either a 1 for a correct response or a 0 for an incorrect response. The total number of correct responses plus the number of items below the basal are added together to obtain a raw score. Raw scores are then entered into the WJ-R computer-scoring program or standard scores are calculated by hand. For the purposes of this study Standard Scores were calculated by hand based upon the grade-level norms. The Standard Scores have a mean of 100 and a standard deviation of 15.

The WJ-R Manual (Woodcock & Mather, 1990) indicates that 3,245 subjects in kindergarten through 12<sup>th</sup> grade were included in the norming sample. A randomized stratified sampling technique was used. Ten community and subject variables were controlled. These ten variables approximated the distribution in the United States population as determined by the 1980 United States Census. Those variables that would apply to the age group in this study include census region, community size, socioeconomic status, sex, and race.

Woodcock and Mather (1990) provide descriptive data, reliability data, and validity data based upon different age groups. The age group that best fits the ages of subjects in this study is age 9. Therefore, information on the age 9 group will be reported. Two-hundred-sixty-three subjects were included in the age 9 group. W scores were reported. W scores are transformed scores with a center value of 500 which is an approximation of average beginning fifth-grade students performance. On the Reading

Vocabulary test the mean was 491.8 and the standard deviation was 13.7. On the Quantitative Concepts test the mean was 486.1 and the standard deviation was 15.2.

When discussing reliability, Woodcock and Mather (1990) have combined Form A and Form B and reported the average reliabilities and standard errors of measurement. They contend that the forms are parallel and that the reliability estimates of the two forms vary only slightly. Internal consistency reliability for the subtests was determined by the split-half procedure and corrected for length by the Spearman-Brown formula. All subjects in the norming sample for each age/grade level were used in determining these estimates. For the Reading Vocabulary test (age 9)  $r = .928$  and  $SEM(w) = 3.7$ . For the Quantitative Concepts test (age 9)  $r = .861$  and  $SEM(w) = 5.7$ .

Content validity was determined by item validity studies and expert opinion (Woodcock & Mather, 1990). A concurrent validity study was done with nine-year-olds. The WJ-R was correlated with five other achievement tests. Correlations between the Broad Reading Cluster and the reading subtests of the other achievement tests ranged from .633 to .857. Correlations between the Broad Mathematics Cluster and the mathematics subtests of the other achievement tests ranged from .413 to .834. Construct validity was determined by cluster intercorrelations. The cluster intercorrelations ranged from .441 to .910.

Primarily, the WJ-R was chosen for this study because of its sound construction. Secondly, it was chosen because it is one of the most frequently used achievement batteries in the field of school psychology.

## Procedures

For Riverfield Country Day School, Parental Permission Letters (Appendix B) and Parental Consent Forms (Appendix C) were mailed to parents whose children were in participating teachers' classrooms. Those students whose parents returned the Parental Consent Forms, giving permission for their children to participate in this study, became part of the pool of subjects. For Garfield Elementary School the researcher visited participating teachers' classrooms to distribute Parental Permission Letters (Appendix D) and Parental Consent Forms (Appendix E). The researcher followed the script titled Classroom Visit (Appendix F). Those students, whose parents returned the Parental Consent forms, giving permission for their children to participate in this study, were added to the pool of subjects. Each school's administrator determined the method of dissemination for the Parental Permission Letters and Parental Consent Forms. The pool of subjects were pre-tested on the Trait Form of the State-Trait Anxiety Inventory (Spielberger, 1973), in a group setting within a room designated solely for this project's use, before individual treatment and testing sessions were completed. The Trait Scores for the pool of subjects were normally distributed. Students who scored at or above the median (T-score = 45) for the pool of subjects were considered as having high trait anxiety and students who scored below the median were considered as having low trait anxiety. This allowed for the pool of subjects to be separated into two equal groups based upon Trait Anxiety Scores. When the pool of subjects came to the experimenter's room, the experimenter read them the Student Assent Script (Appendix G). Those students who agreed to participate became subjects in this research study.

Subjects received their treatment and testing in vacated classrooms and offices located in each school. The study was conducted during the school day at school sites. The times during the school day varied. School district approval was gained.

Subjects were individually summoned by the experimenter to come to the research room. The experimenter followed the Research Instructions listed in Appendix H. The state form of the State Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) was administered first (pre-test) to all subjects followed by the relaxation treatment if applicable. Then the Quantitative Concepts and Reading Vocabulary subtests of the Woodcock-Johnson Psychoeducational Battery-Revised (Woodcock & Johnson, 1990) were administered to all subjects in counterbalanced order. Finally, the state form of the STAIC was administered post-test. The researcher implemented the treatments and collected the data.

Subjects in the treatment group individually listened to a seven-minute tape that guided them through progressive muscle relaxation and deep breathing exercises. The tape was adapted from exercises discussed in Relaxation: A Comprehensive Manual for Adults, Children, and Children with Special Needs (Cautela & Groden, 1978, pp. 22-31). A transcript of the tape is produced in Appendix I. A taped format was used to insure that each subject in the treatment group received exactly the same treatment as the other subjects. The control group received no treatment before their individual testing session. The order subjects were administered the achievement subtests was counterbalanced. The researcher served as the experimenter. Thus, she knew the hypotheses of the study. The experimenter followed the directions outlined in the Woodcock-Johnson Psychoeducational Battery-Revised Examiner's Manual when administering the subtests in

this battery (Woodcock & Mather, 1990), and followed the directions outlined in the State-Trait Anxiety Inventory for Children manual when administering those subtests (Spielberger, 1973).

#### Design/Analysis

This study used a three-factor design with repeated measures, specifically a 2 X 2 X 2 ANOVA design with repeated measures. There were four independent variables. Three were between variables (treatment, trait anxiety, and gender) and one was a within variable (state anxiety). The two levels of treatment were a relaxation and deep breathing group, and a control group. The two levels of trait anxiety were a high trait anxiety group and a low trait anxiety group. The two levels of gender were males and females. State anxiety was measured pre to post test. There were three dependent variables (reading achievement, math achievement, and post-treatment state anxiety). A Treatment X Trait Anxiety X Gender ANOVA was conducted for each dependent variable. Also, a Treatment X Trait Anxiety X Gender ANOVA with repeated measures was conducted for state anxiety.

## CHAPTER THREE

### RESULTS

The results for each hypothesis are presented in this chapter. A Treatment X Trait Anxiety X Gender ANOVA was conducted for each dependent variable (reading achievement, math achievement, and post-treatment state anxiety) to analyze hypotheses one through four. There were two levels of treatment (relaxation and deep breathing group, and control group), two levels of trait anxiety (high trait anxiety group, and low trait anxiety group), and two levels of gender (males and females). A Treatment X Trait Anxiety X Gender ANOVA with repeated measures was conducted for state anxiety (pre- to post-test) to analyze hypothesis five.

Assumptions for mixed models ANOVA were assessed. The independence assumption was assumed. Subjects were randomly assigned to treatment conditions, and subjects were tested individually. The normality assumption was assumed because there were at least 12 subjects in each treatment group and the design was an equal number design (Keppel, 1991). Homogeneity of variance was assessed using the Levene test. The Levene test, "is obtained by computing a one-way analysis of variance on the absolute deviations of each case from its group mean" (SPSS, 1999, p.108). The Levene test was significant for the dependent variable reading achievement. The hypothesis of equal variances was rejected. Thus, an adjustment from a significance level of  $p < .05$  to a significance level of  $p < .01$  for the F-values was made. The Levene test was not significant for the dependent variables math achievement and post-test state anxiety. Therefore, a significance level of  $p < .05$  was used for the F-values. Based on the results of the Box and Bartlett Tests homogeneity of covariance was assumed in this study.

Results for each hypothesis are listed in numerical order. The results for each dependent variable within a hypothesis are listed separately. The means, standard deviations, and sample sizes for the three dependent variables are given in Table 1.

**Table 1**

**Means, Standard Deviations, and Sample Sizes for the Dependent Variables**

<b>Dependent Variable</b>	<b>M</b>	<b>SD</b>
Reading Achievement	107.81	17.18
Math Achievement	100.77	15.28
Post-test State Anxiety	53.05	12.32

*Note:* n = 96 per group.

**Hypothesis 1**

There will be no differences between groups of fourth-graders and fifth-graders who are given relaxation training immediately prior to individual testing than those who do not receive relaxation training immediately prior to individual testing on measures of reading achievement, math achievement, and post-treatment state anxiety.

**Reading Achievement**

There was no significant difference between groups of fourth-graders and fifth-graders who were given relaxation training immediately prior to individual testing than those who did not receive relaxation training immediately prior to individual testing on measures of reading achievement,  $F(1,88) = 2.378, p = .127$ .

**Math Achievement**

There was no significant difference between groups of fourth-graders and fifth-graders who were given relaxation training immediately prior to individual testing than those who did not receive relaxation training immediately prior to individual testing on measures of math achievement,  $F(1,88) = .000, p = .989$ .

### Post-treatment State Anxiety

There was a significant difference between groups of fourth-graders and fifth-graders who were given relaxation training immediately prior to individual testing than those who did not receive relaxation training immediately prior to individual testing on measures of post-treatment state anxiety,  $F(1, 88) = 5.675, p = .019$ . Six percent of the variability in post-treatment state anxiety scores can be attributed to whether the subjects received relaxation training or not (eta squared .061). This is a “medium” effect (Keppel, 1991). Means and standard deviations of the treatment groups on post-test state anxiety are given in Table 2.

**Table 2**

#### **Means, Standard Deviations, and Sample Sizes of the Treatment Groups on Post-test State Anxiety**

<b>Treatment Group</b>	<b>M</b>	<b>SD</b>
Relaxation	50.08	11.76
Control	56.02	12.27

*Note:* n = 48 per group.

### Hypothesis 2

There will be no differences between low and high trait anxious groups of fourth-graders and fifth-graders on reading achievement, math achievement, and post-treatment state anxiety.

### Reading Achievement

There was no significant difference between low and high trait anxious groups of fourth-graders and fifth-graders on reading achievement,  $F = 4.884(1,88), p = .030$ .

### Math Achievement

There was no significant difference between low and high trait anxious groups of fourth-graders and fifth-graders on math achievement,  $F = .325 (1,88), p = .570$ .

### Post-test State Anxiety

There was no significant difference between low and high trait anxious groups of fourth-graders and fifth-graders on post-test state anxiety,  $F = 1.163 (1,88), p = .284$ .

### Hypothesis 3

There will be no differences between fourth-grade and fifth-grade boys and girls on reading achievement, math achievement, and post-treatment state anxiety.

### Reading Achievement

There was no difference between fourth-grade and fifth-grade boys and girls on reading achievement,  $F = .549 (1,88), p = .461$ .

### Math Achievement

There was no difference between fourth-grade and fifth-grade boys and girls on math achievement,  $F = 2.619 (1,88), p = .109$ .

### Post-treatment State Anxiety

There was no difference between fourth-grade and fifth-grade boys and girls on post-treatment state anxiety,  $F = .770 (1,88), p = .383$ .

### Hypothesis 4

There will be no effect of trait anxiety on the measures of reading achievement, math achievement, and post-treatment state anxiety for boys and girls under the treatments.

There were no significant interactions. The F-values for the three-way interaction terms are given below.

#### Reading Achievement

There was no effect of trait anxiety on the measures of reading achievement for boys and girls under the treatments,  $F = 1.040 (1,88), p = .311$ .

#### Math Achievement

There was no effect of trait anxiety on the measures of math achievement for boys and girls under the treatments,  $F = .085 (1,88), p = .771$ .

#### Post-treatment State Anxiety

There was no effect of trait anxiety on the measures of post-treatment state anxiety for boys and girls under the treatments,  $F = .861 (1,88), p = .356$ .

#### Hypothesis 5

There will be no difference between pre- and post-state anxiety depending on gender, trait anxiety levels, and treatment.

There was a significant main effect for state anxiety, measured pre- to post-test,  $F = 30.67 (1,88), p = .000$ . Thus, there was a significant increase from pre- to post-test state anxiety for all of the groups. However, there was also a significant interaction between state anxiety and the treatments,  $F = 4.046 (1,88), p = .047$ . Disregarding trait anxiety grouping and gender, the increase from pre- to post-test state anxiety was significantly less for those who received the relaxation treatment than for those who did not receive the relaxation treatment. Four percent ( $\eta^2 = .044$ ) of the variability in pre- to post-test state anxiety scores can be attributed to whether the subjects received relaxation training or not. Means and standard deviations for the treatment groups from

pre- to post-test on state anxiety are given in Table 3. This was the only significant interaction.

**Table 3**

**Means, Standard Deviations, and Sample Sizes of the Treatment Groups  
Pre-to Post-test on State Anxiety**

<b>Treatment</b>	<b>Pre-test</b>		<b>Post-test</b>	
	<b>M</b>	<b>SD</b>	<b>M</b>	<b>SD</b>
Relaxation	46.15	8.13	50.08	11.76
Control	47.52	9.25	56.02	12.27
Total	46.83	8.69	53.05	12.32

*Note:* n = 48 per group.

## CHAPTER FOUR

### DISCUSSION

This chapter presents a summary and discussion of the findings of this study, integration of findings with past literature, the implications of the findings, the limitations of the study, and recommendations for future research.

#### Summary and Discussion of Findings

This section summarizes the results of each hypothesis. In addition, possible methodological problems are discussed in light of non-significant findings.

#### Hypothesis 1

There will be no differences between groups of fourth-graders and fifth-graders who are given relaxation training immediately prior to individual testing than those who do not receive relaxation training immediately prior to individual testing on measures of reading achievement, math achievement, and post-treatment state anxiety.

There were no differences between groups of fourth-graders and fifth-graders who were given relaxation training immediately prior to individual testing than those who did not receive relaxation training immediately prior to individual testing on measures of reading achievement or math achievement, but there was a difference between these groups on a measure of post-test state anxiety.

There are several possible explanations why there were no performance differences between the groups who received relaxation training and those who did not. The sample size may have been too small; thus, not lending enough power to detect performance differences. The relaxation training was a one time, extraordinarily brief treatment. It is likely that most of the subjects had never had any type of relaxation

training before. If this is the case, more practice with the technique might be needed before performance changes would be evident. This might prove beneficial in the classroom, but it is not practical for the school psychologist conducting individual evaluations. At most, a school psychologist might be willing to spend 15 minutes engaging in relaxation training before an individual evaluation. However, if teachers were using relaxation training in their classrooms on a regular basis and a student received an individual evaluation by a school psychologist with relaxation training immediately prior to the evaluation, would there be performance improvements? This would certainly be an interesting area for further investigation.

### Hypothesis 2

There will be no differences between low and high trait anxious groups of fourth-graders and fifth-graders on reading achievement, math achievement, and post-treatment state anxiety.

There were no differences between low and high trait anxious groups of fourth-graders and fifth-graders on reading achievement, math achievement, and post-treatment state anxiety.

There are several possible explanations why there were no differences between these two groups of subjects on either performance or state anxiety measures. The sample size was small; thus, possibly not lending enough power to detect differences between the groups. High and low trait anxiety groups were formed by a median split of the trait anxiety scores for the pool of subjects. Trait anxiety scores were normally distributed. Thus, there would not have been enough subjects if only the extremely high

or extremely low scoring subjects had been used in the study. Therefore, the groups may not have been distinct enough from each other.

### Hypothesis 3

There will be no differences between fourth-grade and fifth-grade boys and girls on reading achievement, math achievement, and post-treatment state anxiety.

There were no differences between fourth-grade and fifth-grade boys and girls on reading achievement, math achievement, and post-treatment state anxiety.

One explanation why there were no gender differences on performance and state anxiety measures is small sample size; thus, possibly not lending enough power to detect differences between these groups.

### Hypothesis 4

There will be no effect of trait anxiety on measures of reading achievement, math achievement, and post-treatment state anxiety for boys and girls under the treatments.

There was no effect of trait anxiety on measures of reading achievement, math achievement, and post-treatment state anxiety for boys and girls under the treatments.

The previously mentioned, possible explanations for non-significant findings, in hypotheses one through three would also apply to the interaction of treatment, trait anxiety, and gender on measures of reading achievement, math achievement, and post-treatment state anxiety.

### Hypothesis 5

There will be no difference between pre- and post-state anxiety depending on gender, trait anxiety levels, and treatments.

There was an increase from pre- to post-test state anxiety across the treatment groups. However, the increase from pre-to post-test state anxiety was significantly less for those who received the relaxation treatment than for those who did not receive the relaxation treatment.

#### Integration of Findings with Past Literature and Implications of Findings

This section puts the findings of this study in context with previous literature and from this context discusses the theoretical, research, and applied implications.

Past research has indicated that, in general, students with high levels of anxiety have lower school achievement and aptitude (Betz, 1978; Cotler & Palmer, 1970; Crocker, Schmitt & Tang, 1988; Hill & Sarason, 1966; Kirkland, 1971; Phillips, 1978; Plass & Hill, 1986; Tyron, 1980; Zeidner, 1990). The current study did not find a differentiation between high and low trait anxiety groups on measures of reading and math achievement. This may be due in part to how the high and low trait anxiety groups were formed and/or small sample size, as mentioned earlier. These same methodological issues might apply to there being no differences between the high and low anxiety groups on measures of post-treatment state anxiety. Clearly, state-trait anxiety theory would expect those with high trait anxiety to have higher state anxiety scores than those with low trait anxiety in situations where personal adequacy was challenged (Denney, 1966; Hodges, 1968; Spielberger, O'Neil, & Hansen, 1972; Spielberger & Smith, 1966; Zaichkowsky & Zaichkowsky, 1984). Yet, there has been some conflict in this relationship between state and trait anxiety (Hiebert & Eby, 1985). Most of the examination between state and trait anxiety has been conducted on post-elementary age students. Even though the State-Trait Anxiety Inventory for Children (Spielberger, 1973)

is a relative of the State-Trait Anxiety Inventory (Spielberger, 1968), the more current measures of state and trait anxiety that include subscales for worry and emotionality components of state and trait anxiety are not available for children. Test construction, that incorporates more current and detailed views of the state-trait theory, has focused on an older population of students. The construction of new, sound state-trait and other test anxiety measures that reflect the most current theories of test anxiety are desperately needed for young children.

Gender differences in the area of test anxiety have been noted in the literature with girls having higher levels than boys, and when test anxiety was statistically controlled, there were no performance differences between boys and girls (Cotler & Palmer, 1970; Crocker, Schmitt, & Tang, 1988; Zeidner, 1990). However, Gierl and Bisanz (1995) found no gender differences in a study of third to sixth graders. Thus, the gender differences may emerge after the elementary school years. It often becomes difficult to examine the issue of gender differences on anxiety measures because the instruments used to measure the construct are vastly different. The various measures include general anxiety, test anxiety, test anxiety for specific subjects, state and trait anxiety, facilitating and debilitating anxiety, worry and emotionality, and combinations of the above. Two studies, one with junior high students (Birenbaum & Gutvirth, 1993) and one with elementary and junior high students (Morris, Finkelstein, & Fisher, 1976) found that emotionality components of test anxiety were higher for girls than boys, but there were no differences in worry components. Spielberger, Gorsuch, and Lushene (1976), discuss that there are both worry and emotionality components to state and trait anxiety. As discussed earlier, more current measures of state and trait anxiety have worry

and emotionality subscales, but these measures are not available for elementary age students. Thus, the instrument used in the current study was not ideal. If finer state/trait differentiation had been measured, there might have been apparent gender differences in the current study.

Research on the relationship between relaxation and performance and anxiety has had mixed findings. Several studies have had similar findings to the current study, where groups who received relaxation training had reduced levels of anxiety but not improved performance (Portes, Best, Andhu, & Cuentas, 1992; Bacharz, 1990; Kiselica, Baker, Thomas & Reedy, 1994; Laxer & Walker, 1970). Yet, many other studies have shown that groups who received relaxation training had both lowered test anxiety and improved performance (Abendroth & Friedman, 1983; Barabasz, 1973; Bander, Russell & Zamostny, 1982; Frey, 1980; Himle, Thyer, Papsdorf & Caldwell, 1984; Kelley, 1982; Matthews, 1986; Saigh & Antoun, 1984; Watson & Hall, 1977; Wilson & Rotter, 1986).

Three studies reviewed in the literature review examine students in the same grade(s) as the current study (Zaichkowsky & Zaichowsky, 1984; Moltane 1987/1988; and Frey, 1980). All three of these studies had either progressive muscle relaxation or breathing techniques, or both, as part of the relaxation training, like the current study. All three had a pre-test to post-test control group design. The Zaichkowsky and Zaichkowsky study only measured state anxiety and not achievement, but the relaxation group had lower state anxiety scores than the control group. The Moltane study only measured achievement. Reading, math, and spelling scores were higher for the relaxation group, and the Frey study examined both test anxiety and reading achievement with the relaxation group having better performance and lower anxiety than the control group.

Thus, for this population, relaxation is related to improved performance and lowered anxiety levels. Yet, the minimum treatment length for these studies was 12 weeks. This may be part of the reason why performance differences were not detected in the current study. The treatment may simply have been too brief.

In the current study both the relaxation and control groups had higher state anxiety scores post-test, but the group receiving the relaxation treatment showed a much lower increase than the control group. The relaxation training was beneficial. At least it made the experience more pleasant. The Woodcock-Johnson Psychoeducational Battery-Revised (Woodcock & Johnson, 1990), as well as most individual achievement tests, subject the examinee to repeated failure during the assessment. Examinees must fail so many test items before a subtest is ceased. This is a likely reason why both relaxation and control groups both showed increases in post-test state anxiety. Repeated failure probably increased anxiety for the students. It is important to assess achievement, but does the method have to be so anxiety provoking for students; probably not. School psychology professionals need further examination of this issue. The current study could be replicated and additionally measure state anxiety immediately following the relaxation treatment, but preceding the administration of the achievement measures.

If a brief exercise in relaxation will lower anxiety levels when a school psychologist is individually evaluating a student, even if performance is not improved, it is worth the effort. The individual assessment process should be as pleasant as possible. It will benefit the student and the school psychologist. It is much easier to work with a student who views the situation as non-threatening. Most often academic assessments are not done in isolation. They are part of a larger assessment process that addresses social,

emotional, and behavioral issues. Accurate measurement in all of these areas, in addition to aptitude and achievement, is important. Research involving relaxation and its relationship to the accurate assessment of social, emotional, and behavioral areas in assessment is needed.

Research in the area of relaxation and its effects on anxiety and performance has focused on specific classroom implications. Until this study, the implications of its use by a school psychologist during individual evaluations has not been assessed. The fact that a one-time seven-minute exercise in relaxation lowered the increase in state anxiety during an anxiety provoking individual evaluation is exciting. The examination of such a brief treatment is unique and promising.

#### Limitations

Internal validity, external validity, measurement, and statistical issues are discussed in this section.

This study used a mixed design where the only true experimental variable was the treatment. However, the only significant results were related to the treatment variable. Thus, relaxation can be said to have an effect on state anxiety. If there had been differences between high and low trait anxiety groups on the dependent measures, the results might have been confounded with differences in prior achievement levels. Ideally, this variable should be controlled.

The current study was with fourth and fifth-grade students who were primarily white. Thus, the findings generalize to this group of students.

There are several measurement issues. Anxiety was measured only by a self-report measure. However, there has been some study of the concurrent validity of self-

reported anxiety with physiological measures (Zaichkowsky & Zaichkowsky, 1984). There is the issue of social desirability. Some of the students may not have wanted the researcher to know that they were experiencing anxiety. The State-Trait Anxiety Scale for Children (Spielberger, 1973) was less than a perfect instrument for the current study. As was previously discussed worry and emotionality components of state and trait anxiety were not measured. The reliability and validity of the measure was adequate, but not high. Finally, only specific areas (reading vocabulary and quantitative concepts) of the larger domains of reading and math achievement were measured.

There were several areas of concern in the statistical analysis. Only the minimum sample size to meet the ANOVA normality assumption was used. However, this small sample size possibly limited the power of the statistics to detect anything but the strongest effects. Also, a more stringent alpha level was used when analyzing the effects of the independent variables on reading achievement because of a violation of the homogeneity of variance assumption. Thus, there was an increased probability of committing a Type II error.

#### Future Directions

Areas for further research have been mentioned throughout this chapter, where they tied to a discussion of specific topics. This section will be a brief summary of these areas with additional comments.

Studies should be conducted with other populations in this area of research. However, more studies are needed with elementary school students. This population has been the least explored group of students in this area. Concerning independent variables, future studies should ideally control for prior achievement level when examining anxiety.

Anxiety groups should ideally be divided into high and low groups based upon extreme scores. Concerning dependent variables, future studies should examine the worry and emotionality components of either test anxiety or state and trait anxiety. Reading and math achievement are broad domains and their multiple components should be measured. Examination of other ethnic groups should be conducted, as well as specific school populations (learning disabled, emotionally disturbed, etc.) Few studies in this area have used planned comparisons. This type of analysis would lend more power to detecting effects and the body of literature allows for some directional hypotheses to be made. There is need for better anxiety measures to be constructed for use with children.

There were a couple of important findings in the current study. First, individually administered achievement tests are anxiety provoking across groups of students. This is probably a result of the built-in failure that is experienced with these tests. Is this a correct assumption, and do these types of tests have to be designed in this fashion? These are certainly important questions for the school psychology community to examine. Second, a one-time, brief exercise in relaxation can be a beneficial technique for school psychologist to use before administering individual achievement tests. It is quick, easy, and cost-effective. This is an exciting finding! However, if relaxation is being used before individual achievement tests in a non-research setting current norms may not be appropriate. Further research is needed in this area, but this initial study shows promise for this area of research.

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**APPENDIXES**

APPENDIX A

STUDENT INFORMATION FORM

Age \_\_\_\_\_

Grade \_\_\_\_\_

Gender \_\_\_\_\_

Ethnicity \_\_\_\_\_

STAIC Trait Form T-Score \_\_\_\_\_

STAIC State Form T-Score (Pretest) \_\_\_\_\_

WJ-R Scores

Reading Vocabulary Standard Score (grade norms) \_\_\_\_\_

Quantitative Concepts Standard Score (grade norms) \_\_\_\_\_

STAIC State Form T-Score (Posttest) \_\_\_\_\_

## APPENDIX B

### PARENTAL PERMISSION LETTER (RIVERFIELD)

Dear Parent or Guardian:

We would like to ask your permission for your child to participate in a study. This study will help us determine if engaging in progressive muscle relaxation (tensing and relaxing specific muscle groups) and deep breathing exercises before an individual testing situation has an effect on performance. This will help the school determine how best to work with students during the assessment process. Students who participate will be asked to fill out part of the State-Trait Anxiety Inventory for Children in a group setting. The questionnaire will take about 10 minutes to complete. Also, students may be asked to spend about 10 minutes engaging in progressive muscle relaxation and deep breathing exercises immediately before an individual testing session, which will take about 15 minutes. During the individual testing session the students will be given the Reading Vocabulary and Quantitative Concepts subtests from the Woodcock Johnson Psychoeducational Battery-Revised. Immediately before and after their individual testing session they will be asked to fill out part of the State-Trait Anxiety Inventory for Children, which takes about 10 minutes to complete.

Participation in this study is completely voluntary. There will be no penalty if you do not wish your child to participate in this study, and he or she may withdraw at any time during the study. This project has been approved by Riverfield and the Institutional Review Board of Oklahoma State University. After all the data has been collected on your child all identifying information will be destroyed including your child's name. The results of this study will **NOT** be a part of the student's school record.

We would appreciate it if you would return the form on the following page by Friday, October 16<sup>th</sup>, telling us whether or not you would like your child to participate, so that we know that this information has reached you. You may keep the first page of this letter for your records. If you have any questions, please feel free to call Elise Page (446-3553), Researcher; Marty Clark, Director of Riverfield (446-3553); or Dr. Paul Warden (405-744-9436), Professor and Research Director. The Institutional Review Board at Oklahoma State University (Gay Clarkson; 305 Whitehurst, Stillwater, OK; 405-744-5700) can also answer questions about the rights of participants in research.

Sincerely,

Elise Page, M.S., NCSP  
Doctoral Candidate  
Oklahoma State University,  
School of Applied Health and Educational Psychology

APPENDIX C

PARENTAL CONSENT FORM (RIVERFIELD)

**Please check the appropriate box and return this form in the enclosed envelope.**

I have read and understand the permission letter, and I give my consent for my child to participate in this study.

We would like to ask your permission for your child to participate in a study. This study will help us determine if engaging in progressive muscle relaxation (tensing and relaxing specific muscle groups) and deep breathing exercises before an individual testing situation has an effect on performance. This will help the school determine how best to work with students during the assessment process. Students who participate will be asked to fill out part of the State-Trait Anxiety Inventory for Children in a group setting. The questionnaire will take about 10 minutes to complete. Also, students may be asked to spend about 10 minutes engaging in progressive muscle relaxation and deep breathing exercises immediately before an individual testing session, which will take about 15 minutes. During the individual testing session the students will be given the Reading Vocabulary and Quantitative Concepts subtests from the Woodcock Johnson Psychoeducational Battery-Revised. Immediately before and after their individual testing session they will be asked to fill out part of the State-Trait Anxiety Inventory for Children, which takes about 10 minutes to complete.

Participation in this study is completely voluntary. There will be no penalty if you do not wish your child to participate in this study, and he or she may withdraw at any time during the study. This project has been approved by Riverfield and the Institutional Review Board of Oklahoma State University. After all the data has been collected on your child all identifying information will be destroyed including your child's name. The results of this study will **NOT** be a part of the student's school record.

I do not wish my child to participate in this study.

Parent/Guardian Signature:

Date:

\_\_\_\_\_

Child's Name:

\_\_\_\_\_

If you would like to receive a summary of the results of this study, please print your name and address below.

**Thanks!!!**

## APPENDIX D

### PARENTAL PERMISSION LETTER (GARFIELD)

Dear Parent or Guardian:

We would like to ask your permission for your child to participate in a study. This study will help us determine if engaging in progressive muscle relaxation (tensing and relaxing specific muscle groups) and deep breathing exercises before an individual testing situation has an effect on performance. This will help the school determine how best to work with students during the assessment process. Students who participate will be asked to fill out part of the State-Trait Anxiety Inventory for Children in a group setting. The questionnaire will take about 10 minutes to complete. Also, students may be asked to spend about 10 minutes engaging in progressive muscle relaxation and deep breathing exercises immediately before an individual testing session, which will take about 15 minutes. During the individual testing session the students will be given the Reading Vocabulary and Quantitative Concepts subtests from the Woodcock Johnson Psychoeducational Battery-Revised. Immediately before and after their individual testing session they will be asked to fill out part of the State-Trait Anxiety Inventory for Children, which takes about 10 minutes to complete.

Participation in this study is completely voluntary. There will be no penalty if you do not wish your child to participate in this study, and he or she may withdraw at any time during the study. This project has been approved by Garfield Elementary School and the Institutional Review Board of Oklahoma State University. After all the data has been collected on your child all identifying information will be destroyed including your child's name. The results of this study will **NOT** be a part of the student's school record.

We would appreciate it if you would return the form on the following page by Friday, October 23rd, telling us whether or not you would like your child to participate, so that we know that this information has reached you. You may keep the first page of this letter for your records. If you have any questions, please feel free to call Elise Page (245-4622), Researcher; Marjorie Williams, Counselor, Garfield Elementary (245-4622); or Dr. Paul Warden (405-744-9436), Professor and Research Director. The Institutional Review Board at Oklahoma State University (Gay Clarkson; 305 Whitehurst, Stillwater, OK; 405-744-5700) can also answer questions about the rights of participants in research.

Sincerely,

Elise Page, M.S., NCSP  
Doctoral Candidate  
Oklahoma State University,  
School of Applied Health and Educational Psychology

APPENDIX E

PARENTAL CONSENT FORM (GARFIELD)

**Please check the appropriate box and have your child return this form to their homeroom teacher by Friday, October 23<sup>rd</sup>.**

I have read and understand the permission letter, and I give my consent for my child to participate in this study.

We would like to ask your permission for your child to participate in a study. This study will help us determine if engaging in progressive muscle relaxation (tensing and relaxing specific muscle groups) and deep breathing exercises before an individual testing situation has an effect on performance. This will help the school determine how best to work with students during the assessment process. Students who participate will be asked to fill out part of the State-Trait Anxiety Inventory for Children in a group setting. The questionnaire will take about 10 minutes to complete. Also, students may be asked to spend about 10 minutes engaging in progressive muscle relaxation and deep breathing exercises immediately before an individual testing session, which will take about 15 minutes. During the individual testing session the students will be given the Reading Vocabulary and Quantitative Concepts subtests from the Woodcock Johnson Psychoeducational Battery-Revised. Immediately before and after their individual testing session they will be asked to fill out part of the State-Trait Anxiety Inventory for Children, which takes about 10 minutes to complete.

Participation in this study is completely voluntary. There will be no penalty if you do not wish your child to participate in this study, and he or she may withdraw at any time during the study. This project has been approved by Garfield Elementary School and the Institutional Review Board of Oklahoma State University. After all the data has been collected on your child all identifying information will be destroyed including your child's name. The results of this study will **NOT** be a part of the student's school record.

I do not wish my child to participate in this study.

Parent/Guardian Signature:

Date:

---

Child's Name:

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If you would like to receive a summary of the results of this study, please print your name and address below.

**Thanks!!!**

## APPENDIX F

### CLASSROOM VISIT

Good Morning/Afternoon. My name is Mrs. Page. I am working on a project. I am trying to better understand how relaxation exercises affect performance with fourth and fifth grade students, and I could use your help with my project.

Before you can help with my project, I have to get your parents' permission. I am going to send home with you a letter for your parents to read. This letter will tell them about my project. They will need to sign the letter and send it back to school with you by this Friday. You need to give the letter to (Teacher's Name).

After I have permission from your parents I will be coming back to work with some of you in groups and individually.

Do you have any questions?

Thank you for letting me talk with you about my project. I look forward to seeing you soon.

## APPENDIX G

### STUDENT ASSENT SCRIPT

#### **Group Situation**

Good Morning/Afternoon. My name is Mrs. Page. I am working on a project. I am trying to better understand how relaxation exercises affect performance with fourth-grade and fifth-grade students, and I could use your help.

Today I am asking students to fill out a questionnaire that will take about 10 minutes to complete. In a week or so I will be working with students individually. At that time you may be asked to come to a special room where I will ask you to do some relaxation exercises, fill out some questionnaires, and take a short test.

You do not have to participate in this project if you don't want to.

Are there any questions?

Raise your hand if you don't want to participate.

#### **Individual Situation**

Hi. I am Mrs. Page and I was in (teacher's name) classroom (when) and explained to you that I was working on a project that would help me better understand how relaxation exercises affect performance with fourth-grade and fifth-grade students. You filled out a questionnaire for me that day. Today I will be asking you to (do some relaxation exercises, fill out some questionnaires, and take a short test). Do you have any questions that you would like to ask me? Do you agree to continue your participation in this project?

## APPENDIX H

### RESEARCHER'S INSTRUCTIONS

#### Group Testing

1. Make sure the students participating are on the parental consent list.
2. Read the Student Assent Script.
3. Administer the Trait Form of the STAIC.

#### Individual Testing

1. Students are placed in each group based upon the following pre-gathered information: sex, and Trait subtest scores. Flip a coin to determine whether they are placed in the treatment or control group. Equal number groups are being used.
2. Read the Individual Situation on the Student Assent Script.
3. Administer the STAIC State Form.
4. Play the relaxation tape to those in the treatment groups.
5. Administer the Quantitative Concepts and Reading Comprehension subtests of the WJ-R. Counterbalance the order.
6. Administer the STAIC State Form.
7. Thank the student for participating in the project.

## APPENDIX I

### RELAXATION TAPE SCRIPT

When you feel tense, upset, or nervous, certain muscles in your body tighten. The following exercises will help you loosen those muscles....

Sit in the chair and keep your head squarely on your shoulders, not bending it forward or backward, with your back touching the chair. Keep your legs uncrossed and feet flat on the floor. Put your hands in your lap. Now just generally try to relax. This is the relaxing position....

Wrinkle up your forehead. Slowly relax your forehead and pay special attention to those areas that are particularly tense. Spend a few seconds to notice how it feels to have those muscles loosen, switch off, and relax. When we use the term switch off, we are referring to the change in sensation from relaxation to tension. The idea is to tense a certain part of your body, notice where it is tense, and relax that part slowly so that you can identify the muscles that are relaxing.

Close your eyes very tightly. They should feel tense above and below each eyelid and on the inner and outer edges of the eye. Pay special attention to those areas that are particularly tense. Gradually relax your eyes as you open them slowly. Notice the difference in the way they feel.

Wrinkle your nose. Pay special attention to those areas that are particularly tense. Gradually relax your nose slowly, letting all the tension out. Notice how it feels to have those muscles loosen, switch off, and then fully relax. Notice the difference in the way it feels.

Put your mouth and face in a forced smile. Your lips should be hard against your cheeks. Gradually relax your face. Notice how it feels to have those muscles loosen, switch off and relax.

Put your tongue hard against the roof of your mouth. Slowly relax those muscles by letting your tongue gradually fall to the floor of your mouth. Pay special attention to those areas that are particularly tense. Notice how it feels to have those muscles loosen, switch off, and relax, and notice the difference in the way it feels.

Clench your teeth. Gradually relax your jaw and feel the sensation of letting go. Notice how it feels to have those muscles loosen, switch off, and relax. Notice the difference in the way it feels.

Pucker your lips. Pay special attention to those areas that are particularly tense. Gradually relax your lips. Note how it feels to have those muscles loosen, switch off, and relax. Notice the difference in the way it feels.

Tighten your neck. Pay special attention to those areas that are particularly tense. Gradually relax your neck. Notice how it feels to have those muscles loosen, switch off, and relax, and notice the difference in the way they feel....

Take a deep breath, hold it, and then exhale slowly. While you are exhaling, try to get your whole body relaxed from head to toes. Try to imagine you can see your muscles relaxing as you focus on your body. It's like somebody waving a magic wand in front of you, starting at your head and going down toward your toes. The muscles in your body relax as the wand passes each part.... **Do this exercise five times.**

I want you to breathe the same way again, except this time, as you start to exhale, say the word "R-E-L-A-X" to yourself. Drag it out slowly so that as you reach the "X" you are down to your toes.... **Do this exercise five times. When you have completed the exercise raise your hand.**

**You have now reached the end of this tape.**

*Note:* Bold print indicates original material.

APPENDIX J

OKLAHOMA STATE UNIVERSITY  
INSTITUTIONAL REVIEW BOARD

DATE: 06-01-98

IRB #: ED-98-116

**Proposal Title: EFFECTS OF PROGRESSIVE MUSCLE RELAXATION AND DEEP BREATHING EXERCISES ON FOURTH-GRADE AND FIFTH-GRADE STUDENTS' PERFORMANCE AND ANXIETY LEVELS**

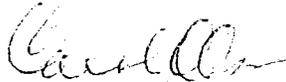
**Principal Investigator(s): Paul Warden, Elise Page**

**Reviewed and Processed as: Expedited with Special Population**

**Approval Status Recommended by Reviewer(s): Approved**

---

Signature:



Date: October 8, 1998

---

Carol Olson, Director of University Research Compliance  
cc: Elise Page

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Elise Ingram Page

Candidate for the Degree of

Doctor of Philosophy

**Thesis:** EFFECTS OF PROGRESSIVE MUSCLE RELAXATION AND DEEP BREATHING EXERCISES ON FOURTH-GRADE AND FIFTH-GRADE STUDENTS' PERFORMANCE AND ANXIETY LEVELS

**Major Field:** Applied Behavioral Studies

**Biographical:**

**Education:** Graduated from Edison High School, Tulsa, Oklahoma in June 1987; received Bachelor of Arts degree in Psychology from the University of Tulsa, Tulsa, Oklahoma in August 1991; received Master of Science degree in School Psychometry from Oklahoma State University, Stillwater, Oklahoma in May 1993. Completed the requirements for the Doctor of Philosophy degree with a major in School Psychology at Oklahoma State University in May 1999.

**Professional Memberships:** Kappa Delta Pi, National Association of School Psychologists, Oklahoma School Psychological Association, Psi Chi, Dallas-Fort Worth Regional Association of School Psychologists, Texas Association of School Psychologists.