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# Test Anxiety and Relaxation Training in Third-Grade Students

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Abstract

*As testing becomes an achievement marker for elementary school children, test anxiety would naturally follow for these children. This study looks at test anxiety in third grade students, as well as relaxation training as a treatment modality to deal with that anxiety. One hundred and four third grade students participated in this study. Those students that received relaxation training experienced less test anxiety after the treatment. Students in the control group showed no changes in test anxiety. The use of relaxation training among third grade students may be a beneficial method for teachers to reduce anxiety in their students.*

## Introduction

Test anxiety is conceptualized as a relatively stable trait triggered by threatening situations. It is a subtype of anxiety that is defined as a situation specific anxiety trait (Lowe et al., 2008). Test anxiety is a type of distress that is accompanied by physiological components; it can cause symptoms in children such as headache, upset stomach, loss of focus, irritability, and anger. These symptoms can lead to behavioral ramifications such as withdrawal, outbursts, overactive behaviors, fatigue, and avoidance of school. Furthermore, Libert & Morris construed test anxiety as comprised of cognitive (i.e. worry) and emotional (tension, bodily reactions, and perceived arousal) facets (as cited in Lowe et al., 2008). Test anxiety is a multidimensional construct. One theoretical perspective alone does not capture its complexity. When test anxiety occurs, an individual's behavior, cognitions, and physiology are affected. Therefore, test anxiety interventions should focus on the cognitive or emotional facets (Carter, Williams, & Silverman, 2008).

In the twenty-first century, utilizing high-stakes tests such as standardized tests has become a very prominent indicator of academic achievement, school performance, and ultimately, future tenure (Triplett & Barksdale, 2005). As a result, it is now known that high levels of stress can make it more difficult for students to concentrate and master information (Paul, Elam, & Verhulst, 2007). It is also widely researched that too much stress and test anxiety can hinder an individual's performance. In the United States, 31-41% of third through fifth graders are reported to experience test anxiety (Carter et al., 2008).

In a study conducted with elementary students, it was found that students have emotional and physiological effects during testing such as anxiety, panic, irritability, frustration, boredom, crying, headaches, and loss of sleep (Triplett & Barksdale, 2005). An interview-based study was conducted on children's thoughts and feelings in relation to test-taking, and the children reported feeling nervous, sweating, having stomachaches, and losing sleep. Due to the onset of such emotional and physiological effects, it is argued that high-stakes testing causes damage to a child's self-esteem, overall morale, and love for learning. Furthermore, Triplett and Barksdale (2005) collected drawing and writing samples from 225 third grade through sixth grade students from five schools, which was representative of diversity in race and socioeconomic status. Analysis of the students' work revealed that their perceptions of teaching include: worries of time constraints, not knowing answers, and the consequences of not passing. Thus, an abundance of research exists indicating that elementary and middle school students are negatively impacted by test anxiety (Triplett & Barksdale, 2005).

Relaxation is an emotion-focused strategy that decreases emotional and somatic reactions to stressful events. A study by Hiebert, Kirby, & Jaknavorian (1989) shows that there are positive effects of relaxation training in children in comparison to a control group that did not receive relaxation training (as cited in Lohaus & Klein-Hessling, 2003). It is found that progressive muscle relaxation, as well as systematic relaxation training, may reduce tension. Immediate relaxation effects were reflected at a physiological and subjective experience level. Several techniques seem to be useful to induce calmness in children from neutral stories to progressive muscle relaxation. For instance, according to Harris and Croy, students should use

diaphragmatic breathing during exams in attempts to calm or center them (as cited in Paul et al., 2007). Research has indicated that students that utilized diaphragmatic breathing showed significant increases in their academic learning and achievement. In a longitudinal study with sixty-four post baccalaureate premedical students, significant behavior changes occurred when the students were given a continuous opportunity to practice a five minute stress reduction technique that is intended to reduce both physiological and psychological effects that can be associated with academic stress (Paul et al., 2007).

Cheek, Bradley, Reynolds, and Coy (2002) taught the “Stop, Drop, and Roll” technique to students who demonstrated high anxiety reactions. The technique instructs students to “stop” by putting their pencils down and placing their hands on the table while focusing on the coolness of the surface each time they physically felt the “fire” of anxiety and stress. Next, while listening to classical music they were instructed to “drop” their heads forward and gently “roll” them around while taking deep breaths. The sixteen group members reported less stress and worries regarding future testing situations. Even further, the parents and teachers reported a reduction in stress-reaction behaviors. This study reveals that relaxation training is an important component of test anxiety reduction (Cheek et al., 2002).

Additionally, Lolak, Connors, Sheridan, & Wise (2008) examined the effects of progressive muscle relaxation training on anxiety and depression in patients with chronic breathing disorders. Progressive muscle relaxation was utilized as an adjunct to pulmonary rehabilitation, a multi-disciplinary program of care designed to optimize physical and social performance and autonomy. The findings of this study suggest that adding progressive relaxation training to a pulmonary rehabilitation program can reduce anxiety and depression.

Turner, Biedel, Hughes and Turner (1993) found that anxiety was highly prevalent among African American elementary school children from a sample of 168 students in grades three through six, (as cited in Carter et al., 2008). In another study, 36 students who identified as text-anxious were randomly assigned to an intervention group or a control group. The intervention group consisted of stretch-tense, deep breathing, release-relax, and positive suggestion sequences. The intervention group received five sessions, for 31 minutes each, over half the school year. It was found that the intervention group showed a significant decrease in test-anxiety over the control group (Miller, Morton, Driscoll, & Davis, 2006).

Grawe, Donati, & Bernauer (2001) conducted a meta-analysis, and documented that in sixty-six studies progressive muscle relaxation or another similar therapeutic intervention was utilized. They found that in 76% of the studies, muscle relaxation led to significantly positive changes (as cited in Conrad & Roth, 2007). Furthermore, research has shown that students experience high levels of stress at college. In a stress management pilot program (SMPP), relaxation, deep breathing, coping skills training, and guided imaginary techniques, among others, were utilized in managing such high levels of stress experienced by college students. The results suggest that one could appropriately use SMPP to deal with high levels of stress and improve students’ academic performance and health (Iglesias et al., 2005).

There are many research studies that indicate relaxation training is empirically found to reduce anxiety. In order to evaluate the effects of relaxation interventions on third grade students who perceive themselves as displaying characteristics of test anxiety, the present study utilized elevator breathing and guided muscle relaxation. Students increasingly exhibit test anxiety due to the growing emphasis on high-stakes testing. This particular type of anxiety is associated with a variety of negative impacts on the child's life and ability to perform in the classroom. The present study tested three hypotheses: 1) the pre-test and post-test differences for the experimental group will show a significant decrease in anxiety level, 2) the pre-and post-test differences for the control group will show no significant decrease in anxiety levels, and 3) there will be a significant post-test difference in anxiety levels between the experimental and control groups.

## Method

### *Participants*

The sample was made up of 104 third-grade students at a midwestern public elementary school, 58 males (55.8%) and 46 females. Ages ranged from 8 to 10 years with a median of 9 years. The greatest percentage of participants reported their race as Caucasian (82.7%), followed by African American (3.8%), Hispanic (2.9%), and Asian (1.9%). The remaining participants identified themselves as mixed (5.8%) or indicated "other" (2.9%).

### *Instrumentation*

*Westside Test Anxiety Scale.* The Westside Test Anxiety Scale (WTAS: Driscoll, 2007) was designed to identify participants with anxiety impairments who could benefit from anxiety – reduction and yields a general test anxiety score. The WTAS consists of 10 items, each using a Likert response scale where 1 = "never true" and 5 = "always true." The instrument was modified for the purpose of this study in an attempt to make the items easier to understand by the young participants. For example "exam" was replaced with "test," "fail" was replaced with "bad job" and "mind sometimes wanders" was replaced with "daydream."

The WTAS was constructed to measure anxiety impairments with six items assessing incapacity (i.e., memory loss and poor cognitive processing) and four items measuring worry and dread (i.e., catastrophizing) which interferes with concentration (Driscoll, 2007). Scores for the two subscales, incapacity (items 1, 4, 5, 6, 8, & 10) and worry (items 2, 3, 7, & 9), are obtained by summing the respective item responses; a total score is obtained by adding up the scores and dividing by 10 (Grimes & Murdock, 1989) where higher scores indicate a greater level of test anxiety. The present researchers used the total score to obtain a general level of test anxiety.

In a combined sample study of 25 students, a negative correlation of .49 was found between anxiety-reduction on the Westside Test Anxiety Scale and positive gains in test scores ( $df = 23, p < .01$ ) (Driscoll, 2007). In other words, as anxiety was reduced, test scores improved, suggesting a fairly strong connection between these two constructs. In a related study, test change scores for 34 fifth grade students were studied. Test scores for the intervention group

improved an average of 7 percentile points over test scores for the control group. A modest decline in anxiety levels for the treatment group was found. A correlation of  $r = .40$  was found between reduction of anxiety levels and positive gains on test scores ( $df = 32, p < .01$ ) (Miller, M., Morton, J., Driscoll, R., & Davis, K.A., 2006) . In a study looking at scale validity, Driscoll (2007) averaged the two attained correlations from Miller et al. (2006) and Driscoll (2007) and found the correlation to be  $r = .44$ .

### *Procedure*

Relaxation training and data collection took place at a Midwestern public elementary school. All third-grade students were invited to participate in the study. Those students who returned a signed parental consent form were included. All participants were given the WTAS (pre-test) and a short demographic questionnaire to complete.

Using the pre-test scores, a random matched-paired strategy was used to assign participants to the two experimental conditions. That is, pre-test scores were first rank-ordered. Next, participants with the two highest scores were randomly assigned to either the treatment group or control group. The procedure was repeated with subsequently lower scores until all participants were assigned. The initial size of the experimental and control groups were 50 and 54, respectively. Due to school absences, three participants of the treatment group did not complete the post-test measure.

Members of the treatment group were taught relaxation techniques by one of the investigators. Training took place at school, two days a week, over a five-week period. On training days, the participants were moved from their regular classrooms to a quiet, empty classroom. During training, relaxing music was played in the background. Members of the control group were given free time to read or complete homework assignments or went to recess. While in training, participants in the treatment group were taught both deep breathing exercises (i.e., elevator breathing) and progressive muscle relaxation (i.e., guided relaxation for children).

*Elevator Breathing.* Elevator breathing (Teel, 2005) was one of the interventions utilized in this study to help children relax quickly when facing stressful situations. Breathing techniques are very important for inducing relaxation. Through training, an individual's breathing will automatically slow down and deepen, bringing more oxygen into their bodies and helping them to relax. Diaphragmatic breathing, or "belly breathing," is a particularly helpful way to release mental and physical stress and tension. It calms the mind and induces a state of relaxation in one's body. Elevator breathing incorporates visualization for children. Participants practiced breathing exercises for five minutes at each of the 10 sessions.

*Guided Relaxation for Children.* Guided relaxation for children (Teel, 2005) was also utilized in this study to help manage levels of anxiety that children may be experiencing. Progressively relaxing each of the muscle groups along with deep breathing is intended to promote relaxation and counter the physiological components of arousal by first tensing the major muscle groups then relaxing those muscles. The investigator would instruct the students to get comfortable (i.e., lying down, closing eyes, or resting against a wall) and then begin reading

the relaxation script to the participants while incorporating the deep breathing. This portion of the experiment took approximately 8 to 10 minutes at each session. At the conclusion of the five weeks, participants in both the experimental and control groups completed the Westside Test Anxiety Scale (post-test).

## Results

Descriptive and inferential statistics for the present study are presented in Table 1. An independent-samples t-test was conducted to examine differences between the treatment and control groups. A significance value of .05 was utilized. Pre-test differences in mean scores between the experimental and control groups showed no significant difference ( $t(102) = 0.67$ , ns) indicating no real differences in anxiety levels between the groups prior to initiating the experimental treatment. A significant difference between pre- and post-test mean scores was found for the treatment group ( $t(49) = 2.39$ ,  $p < .05$ ). There was no significant difference found between pre- and post-test mean scores for the control group ( $t(53) = 1.62$ , ns). More specifically, the treatment of relaxation training had a significant effect on lowering overall test anxiety between pretest ( $M = 27.7$ ,  $SD = 8.9$ ) and post-test ( $M = 24.8$ ,  $SD = 10.2$ ) for the experimental group. Lastly, there was no significant difference in post-test anxiety levels between the experimental and control groups. Post-test coefficient alpha estimates for the 10-item test anxiety scale were .85, .72, and .79 for the experimental, control, and combined groups, respectively.

Table 1

Descriptive and inferential statistics.

Group	Mean / sd (pre-test)	Mean / sd (post-test)	t-value (pre – post)	df	alpha
Experimental	27.7 / 8.9	24.8 / 10.2	2.39 *	49	.85
Control	26.8 / 7.8	25.0 / 9.3	1.62	53	.72
Combined	27.2 / 8.3	24.9 / 9.7	–	–	.79

\*  $p < .05$ .

## Discussion

The present study investigated the effects of relaxation techniques on test anxiety in elementary school students. Third-graders were taught two relaxation techniques; after which the group reported a significant decrease in anxiety as compared to a group of their peers receiving no training. Participants in this study were from eight to ten years of age. The present results support earlier findings that relaxation techniques can be learned and utilized successfully by young children (Zaichkowsky & Zaichkowsky, 1984; Lohaus and Klein-Hessling, 2002). That is, the first two hypotheses presented above were supported. Students completing relaxation training reported a significant reduction in test anxiety scores, whereas students in the control group reported no significant change in levels of anxiety.

On the other hand, the third hypothesis presented in this study was not supported by the findings. A significant difference in post-test anxiety scores between the experimental and control groups was not found. One or more threats to internal validity may account for the lack of group differences in anxiety scores (see Heppner, Livlighan, & Wampold, 1999). Specifically, since students of the same class were randomly assigned to the two groups studied, a diffusion of the treatment may have taken place. Students receiving relaxation training may have shared their learning with peers assigned to the control group. Moreover, the sharing of training techniques may have created a competitive rivalry between some members of the two groups. Thus, by learning the relaxation techniques, some of the students in the control group may have outperformed students in the treatment group. A cluster sampling procedure could minimize these threats. Assigning classes of students, located at different schools, to the respective research groups could reduce or eliminate both the diffusion of treatment across the groups, as well as potential competition among group members.

Lack of parent and teacher reports of participant test anxiety could also explain the lack of significant differences in post-test anxiety scores between the experimental and control groups. Due to the cognitive skills required to reflect on one's experience, children at this developmental age are not always good reporters of their symptomology and may be influenced by other factors in terms of how they rate themselves. For example, the high face validity of the WTAS may have led some third-graders to believe their anxiety was supposed to decrease. In fact, 33.3% of the control group had post-test scores that decreased from 5 to 22 points. Many popular children's television shows now include programming on relaxation (e.g. Sid the Science Kid, ni hao, kai-lan). In addition, 32% of the control group reported having treatment for anxiety in the past. Developmentally, children in this age group, particularly anxious children, like to please others. Such treatment may have primed group members to believe that a decrease in scores was desirable, thereby activating previously learned coping skills. Asking about such exposure on the demographic questionnaire may prevent potential problems such as these in future studies.

Another limitation of the present study reflects a procedural issue. In other words, the participants were not faced with high-stakes testing when they were trained with the relaxation techniques. The fact that the pre-test anxiety scores of the WTAS for both groups fell in the high normal range could have influenced the results. It is recommended that the procedure be modified when used for future participants who are preparing for scheduled mandated testing. While the present findings of reduced anxiety were significant in the treatment group, results from an actual testing scenario could suggest alternative interpretations.

### Conclusions

The increase in test anxiety among children may be highly attributed to the increase in high-stakes testing in American public schools (No Child Left Behind Act, 2002; Black, 2005). This higher anxiety can result in students becoming overly concerned with the consequences of failure (Spielberger & Vagg, 1995), thus adversely affecting their ability and desire to learn (Cheek et al., 2002).

Parents, teachers, and counselors alike can take a more active role in becoming aware of the effects of test anxiety and providing opportunities for children to learn appropriate coping skills. High-stakes testing is causing elementary students to exhibit intensified physiological responses (Zeidner, 1998; Vandebos, 2007), negative emotional reactions (Triplett & Barksdale, 2005; Paul, Elam, & Verhulst, 2007), and inappropriate behaviors (Cheek et al., 2002). However, one cannot presume that all students experience test anxiety in the same manner or for the same reasons. In order to identify test anxiety as a problem for students, parents and teachers must first be aware and informed about the negative effects of high-stakes testing. It is only in this way that school officials and parents can provide effective interventions such as deep breathing and progressive muscle relaxation activities.

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