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## The Relationship between Primary School Childrens’ Test Anxiety and Academic Performance

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### Abstract

The purpose of this study consisted in the analysis of possible correlations between test anxiety and academic performance in primary school and gender differences in test anxiety and academic performance levels. The research was conducted on a sample of 40 students, aged 11. Data was collected using the CTAS Test Anxiety Inventory (Cassady & Johnson, 2001) and the reported average grade for each student’s performance in previous school semester. Results highlight a statistically significant negative correlation between test anxiety and academic performance and statistically insignificant Student T Tests for both gender differences in anxiety levels or in academic performance.

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*Keywords:* test anxiety; academic performance; gender differences; school grades; working memory;

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### 1. Introduction

Test anxiety is “an emotional state present in the time of examinations that triggers states of tension, nervousness and worry associated with physiological arousal derived from the activation of autonomic nervous system” (Spierberger & Vagg, 1995). This state is considered to be a strong emotional response that students experiment

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before and during examination (Ashgari et al., 2012 apud Akca, 2011), a response to the cognition that their performance is being evaluated or compared to others. Even though anxiety has been considered to be a natural and necessary response to a functional adaptation in humans, it can become detrimental to other processes when it becomes excessive and uncontrollable leading to distress and interfering with everyday activities such as multiple evaluation situations. The concept has been introduced in literature in 1914 (Stober & Pekrun, 2004 apud. Folin, Demis & Smillie, 1914) and became intensively investigated since 1952 by Mandler and Sarason, the pioneers that were first to link the construct to students' academic performance. Since then, recent data confirms that there is a negative correlation between test anxiety and academic performance: the higher the level of anxiety, the lower performance becomes (Carlson, Goforth, von der Embse & Barterian, 2013; Birjandi & Alemi, 2010; Sena et al, 2007; McDonald, 2001; Raffety, Smith & Ptacek, 1997).

As a construct, test anxiety has been conceptualized as having two major components, worry and emotionality (Liebert & Morris, 1967). The cognitive component, worry is a “primarily cognitive concern about the consequences of failure (Liebert & Morris, 1967), whereas emotionality was defined in terms of “the psychological changes resulting from arousal of the autonomic nervous system” (Spielberger & Vagg, 1995). Taking this into consideration, it appears that the decrease in performance might be due to the interference of negative, dysfunctional thoughts in the time of examination with students' working memory. Eysenck and Calvo (1992) apud. Ashcraft and Kirk (2001) have proposed an interactional model of anxiety and performance: the processing efficiency theory that offers a frame for the phenomena. They suggest that irrational intrusive thoughts derived from test anxiety intercede and compete with ongoing cognitive tasks (such as processing test items). Since the working memory has a limited capacity involving a central executive and two storage systems: the phonological loop and the visuospatial sketchpad (Baddeley, 2003), a valid model proposed 30 years ago, the result of such a competition is “either a slowing of performance or a decline in accuracy—in other words, lower cognitive efficiency” (Ashcraft & Kirk, 2001). More detrimental, some research suggest that there is a gender difference in test anxiety levels, girls being more affected by the phenomena: theorists believe that females have more role expectancy conflicts than males, thus leading to differences in test anxiety (Farooqi, Ghani & Spielberger, 2012 apud Sharma & Sud, 1990). Farooqi, Ghani & Spielberger (2012) found that female students show a significantly higher level of test anxiety that might be associated with different social roles assigned to females versus males and with higher emotional vulnerability of females that have socially learnt to express feelings in ontogenesis whereas males suppressed them.

Regarding the academic performance that we measured, there is disagreement in literature over whether boys and girls have significantly different academic achievements: it may seem that girls outperform boys in school, particularly in stereotypically feminine subjects (Pomerantz, Altermatt & Saxon, 2002). The researchers found that elementary school girls outperformed boys across 4 subjects and were more vulnerable than boys were.

Taking this into consideration, we strongly agree that test anxiety is a major educational problem that also needs to be investigated during early stages of education such as primary school; the meta-analysis in the field show that children population is underrepresented, the majority of findings involve adolescents, academy students and adults (McDonald, 2001). Also, the paper rationale comes from the necessity to implement a program that aids children with high levels of test anxiety that leads to difficulty in learning new material (Bedell & Marlowe, 1995), have lower standardized scores and receive lower grades in school (Hembree, 1988). Moreover, test anxiety leads to distress – thus many children have low self-esteem, repeat some school years or quit school (Tobias, 1979).

## 2. Objective and hypothesis

### 2.1. The objectives of the research:

- To highlight possible correlations between Romanian primary childrens' test anxiety levels and their academic performance;
- To investigate if there are statistically significant gender differences in test anxiety levels and academic performance levels of children;
- To use the Cognitive Test Anxiety Scale in the evaluation of the cognitive component of childrens' anxiety in a pilot study;

## 2.2. *The hypotheses:*

- There is a negative correlation between fourth grade childrens' test anxiety and their academic performance;
- There are statistically significant gender differences in fourth grade childrens' test anxiety levels;
- There are statistically significant gender differences in fourth grade childrens' average academic performance;

## 3. **Methodology**

### 3.1. *The Participants:*

The study was conducted on a sample of 40 participants, 24 females and 16 males, with a mean age of 11 years, all enrolled in primary school in two different parallel fourth grades. Participation in the investigation was voluntary and anonymous. Participation agreements, data confidentiality and other ethical aspects were assured.

### 3.2. *The instruments:*

The variables of the current research (test anxiety level, academic performance level) were measured using the following instruments for data collection:

Test Anxiety was measured with Cognitive Test Anxiety Scale (Cassady & Johnson, 2001). The instrument evaluates the cognitive component of test anxiety containing 27 items on a Likert scale, with 8 items being inversed. Responses that indicated rational or irrational thoughts that occur in evaluative situations were scored on a 4 point Likert scale. The final score was divided into two major categories: low test anxiety (subclinical) and high (clinical) test anxiety.

The reported data for this instrument indicate a 5.86 internal consistency and a strong predictive validity (Cassady & Johnson, 2002). Other studies show a high correlation with similar anxiety evaluation instruments such as: Test Anxiety Inventory (Spielberger, 1980), Benson's Revised Test Anxiety scale (Benson, Moulin-Julian, Schwarzer, Seipp, & El-Zahhar, 1992) (Cassady & Johnson, 2002).

Data regarding the academic performance level was collected from each form tutor's official school records: we considered the average grade for each students' last school semester as an indicator of academic performance. The quantification of performance in the Romanian primary educational system is not numerical but literal, starting with FB (very well), B (well), S (sufficient), I (insufficient). The recoding system we used for this variable was: FB=3, B=2, S=1, having no I (insufficient) mean grade in the selected sample. The content sample that was graded by the form tutor included all the subjects prescribed by the Romanian National Curricula – Languages (Romanian & English), Mathematics, Science, History, Geography, Social Education, Religion, Music, Art, Physical Education, Technology, Tutoring. Each students' average grade was calculated by averaging all subject grades described earlier.

The data regarding the sex of the participants was also taken into consideration for the testing of the possible gender differences in test anxiety levels and academic performance levels. The sex variable was also coded: girls in the sample were coded 1, whereas the boys were coded 2.

### 3.3. *Research design*

Our purpose was to investigate the relationship between test anxiety and academic performance so we adopted a correlational design in order to establish the connection. For the gender differences in test anxiety levels and academic performance levels we used the Student's t-test.

### 3.4. *Procedure*

Firstly we informed the principle of the school, the parents and the participants about the purpose of the present investigation and about the instruments involved in data collection. After a signed consent from parents and principle, a short briefing was given to all participants in the study. In order to avoid any measuring error that might have been caused in the data collection stage, the questionnaire was administered question-by-question to each class of participants, adding additional term explanation if needed. After each question every participant completed the item in the paper-pencil format.

Table 1. The correlation between test anxiety and academic performance (N=40)

Measures	1	2
1. Test anxiety	-	
2. Academic performance	-.433**	-

## 4. Results

### 4.1. The association between test anxiety and academic performance

We found a significant negative Pearson correlation quotient of  $-.433$  ( $p < .01$ ) between test anxiety and students' academic performance, as shown in table 1. The results confirm the findings in literature.

### 4.2. The gender differences between students' test anxiety levels

There was no significant difference in the scores for girls' test anxiety levels ( $N=24$ ,  $M=61.75$ ,  $SD=21.33$ ) and boys' anxiety levels ( $N=16$ ,  $M=62.50$ ,  $SD=14.302$ ),  $t(38)=-.123$ ,  $p=.903$ . Due to the fact that the calculated t-statistic is far greater than alpha (.05), we fail to reject the null hypothesis and assume that there is no statistical significant difference in primary school girls' and boys' test anxiety levels.

### 4.3. The gender differences between students' academic performance

There was no significant difference between girls' academic performance ( $M=2.58$ ,  $SD=.58$ ) and boys' academic performance ( $M=2.56$ ,  $SD=.62$ ) levels;  $t(38)=.107$ ,  $p=.915$ . Due to the fact that the calculated t-statistic is greater than alpha (.05), we conclude that there is no gender difference in academic performance levels of boys and girls enrolled in primary school.

## 5. Discussion and conclusion

Our study did not confirm an existing gender difference between boys' and girls' test anxiety levels or academic performance levels, but showed a significant negative correlation between test anxiety and academic performance supporting the results obtained in most research regarding this issue (Cassady & Johnson, 2002; Hembree, 1988). Taking into consideration that the majority of test anxiety research focuses on adults or older students, we can conclude that the association between high test anxiety and lower grades also applies in the context of primary education, thus raising an alarm signal for primary form tutors and school counselors. The present data could serve as a starting point in developing prevention and intervention plans also for primary school students regarding the management or reduction of debilitating test anxiety.

The statistically insignificant gender difference in test anxiety findings from the present study are not congruous to other results in literature: this may be due to the fact that gender differentiation process is a continuous one; gender role development and functioning are not confined to childhood but are negotiated throughout the life course (Bussey & Bandura, 1999). Also, despite findings in literature we concluded that there is no gender differences between girls' and boys' academic achievement in primary school and this may be due to the continuing maturation of the prefrontal cortex that proceeds differently for boys and girls – now being at a closer level for both sexes,

whereas in adolescence, girls' prefrontal cortices are generally more active than boys' and continue to develop, allowing them to handle boredom better, have greater attention spans, and display greater emotional intelligence (Gurian & Stevens, 2004, apud. Magon, 2009).

After analyzing the current findings, we conclude that there is a necessity for implementing a test anxiety prevention program regarding students in primary school as well as their form tutors especially if there are no visible statistically significant gender differences yet due to the differentiation process being extended until adolescence. This may offer students equal learning opportunities and form tutors a new perspective in understanding the correlates of academic performance.

## 6. Limitations of the current research

The current research was conducted on a correlational, non-experimental design with the intention to disclose any possible associations between test anxiety and academic performance. Therefore, we cannot infer any cause and effect conclusions, only linear and correlational ones. Also, we are relying on self-reported data in measuring test anxiety which could contain several sources of bias. Although, the current findings could serve as a theoretical argument for future experimental interventions or for developing strategic prevention programs in schools.

## 7. Future directions of research

We conclude that this study should be extended to even early stages of institutionalized education and that auto efficacy, self-esteem, locus of control and perfectionism might show interesting results when paired with test anxiety. Also the implementation of a prevention program regarding test anxiety in primary schools might show interesting positive results in higher educational stages.

## References:

- Ashcraft, M. & Kirk, E. (2001). The Relationship Among Working Memory, Math Anxiety and Performance. *Journal of Experimental Psychology*, 130, 224-237.
- Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature Reviews in Neuroscience*, 4, 829-839.
- Bedell, J.R. & Marlowe, H. A. (1995). *An evaluation of test anxiety scales: Convergent, divergent and predictive validity*. In C.D. Spielberger & P.R. Vagg (Eds.) *Test Anxiety: Theory, assessment and treatment* (35-46). Washington, DC: Taylor and Francis.
- Benson, J., Moulin-Julian, M., Schwarzer, C., Seipp, B., & El-Zahhar, N. (1992). Cross-validation of a revised test anxiety scale using multi-national samples. *Advances in test anxiety research*, (7). Lisse, The Netherlands: Swets & Zeitlinger.
- Birjandi, P., Alemi, M., (2010). The Impact of Test Anxiety on Test Performance among Iranian EFL Learners. *"BRAIN. Broad Research in Artificial Intelligence and Neuroscience"*, 1(4).
- Bussey, K. & Bandura, A. (1999). Social Cognitive Theory of Gender Development and Differentiation. *Psychological Review*, 106(4), 676-713.
- Cassady, J. C. & Johnson, R. E. (2002). Cognitive Test Anxiety and Academic Performance. *Contemporary Educational Psychology*, 27, 279-295.
- Hembree, R. (1988). Correlates, causes, and treatment of test anxiety. *Review of Educational Research*, 58, 47-77.
- Liebert, R. M. & Morris, L. W. (1967). Cognitive and Emotional Components of Test Anxiety: A Distinction and some Initial Data. *Psychological Reports*, 20, 975-978.
- Magon, A. J. (2009). *Gender, the Brain and Education: Do Boys and Girls Learn Differently? A Project Report Supervisor*. University of Victoria.
- McDonald, A. S. (2001). The prevalence and effects of test anxiety in school children. *Educational Psychology*, 21, 89-101.
- Pomerantz, E., Altermatt, E. R. & Saxon, J. (2002). Making the grade but feeling distressed: Gender differences in academic performance and internal distress. *Journal of Educational Psychology*, 94(2), 396-404.
- Raffety, B. D., Smith, R. E., Ptacek, J. T. (1997). Facilitating and debilitating trait anxiety, situational anxiety, and coping with an anticipated stressor: A process analysis. *Journal of Personality & Social Psychology*, 72, 892-906.
- Sena, J. D.W., Lowe, P. A., & Lee, S.W. (2007). Significant predictors of test anxiety among students with and without learning disabilities. *Journal of Learning Disabilities*, 40, 360-376.

Spielberger, C. D. & Vagg, P. R. (1995). *Test Anxiety: Theory, Assessment and Treatment*. Washington, DC: Taylor & Francis Publishing.

Tobias, S. (1979) Anxiety and Cognitive Processing of Instruction. Self-Related Cognitions in Anxiety and Motivation. *Self- Related Cognitions in Anxiety and Motivation*, 19, 23.