Test Anxiety as A Predictor of Mathematics Achievement: A Study of Some Selected Senior Secondary Schools in Jalingo Metropolis, Taraba State

Mistaban Benson
Department of General Studies
School of Business and Management Technology
Federal Polytechnic, Bali Taraba State, Nigeria.
E-mail: mistabanbenson20@gmail.com
DOI: 10.56201/ijasmt.vol.11.no2.2025.pg89.99

Abstract

This research examines the influence of test anxiety on students' achievement in mathematics in selected senior secondary schools in Jalingo Metropolis. The study was guided by three research questions: To determine the influence of test anxiety on students' academic achievement in senior secondary school mathematics examinations in Jalingo, Taraba State, To examine the gender effect of test anxiety on students' academic achievement in mathematics, and To assess the impact of gender-based interest in test anxiety on students' academic achievement in mathematics. A descriptive survey research design was adopted, involving a total population of 120 respondents. Data collected from the field were analyzed using mean and standard deviation, while t-test statistics were used to test the study's hypotheses. The findings revealed that mathematics significantly influences students' performance in examinations. Many students, regardless of gender, experience mathematics anxiety, which negatively affects their academic performance and reduces their interest in learning the subject. The study recommends strengthening guidance and counseling services to help students manage anxiety effectively. Additionally, adopting specialized teaching methods and psychological interventions within pedagogical practices can reduce mathematics anxiety. Enhancing curriculum design and emphasizing the importance of mathematics for students' future careers can also help stimulate their interest in the subject.

Keywords: *Test Anxiety, Mathematics Achievement, Gender Effect, Secondary Schools, Descriptive Survey.*

Introduction

Mathematics is a core subject in secondary school and plays a crucial role in academic and professional development. The study of mathematics aims to equip individuals with the necessary skills to apply mathematical knowledge effectively and responsibly in everyday life, problem-solving, and decision-making (Zakaria, Zain, & Erlina, 2012). Mathematics is also fundamental in various disciplines, including arts, language, social sciences, vocational studies, and natural and physical sciences. It is integrated into both formal and informal education, contributing to infrastructure development and daily domestic activities (Ugodulunwa & Okolo, 2015).

Mathematics anxiety is generally described as feelings of fear, avoidance, and apprehension associated with mathematical tasks. Tobias (1995, as cited in Zakaria et al., 2012) defines mathematics anxiety as a sense of tension and worry that arises when an individual is required to manipulate numbers or solve mathematical problems in academic or real-life situations. In everyday life, individuals set goals and evaluate their success or failure based on their performance, including academic achievements (Ogbu, 2007).

Students frequently experience test anxiety, particularly in mathematics, which affects their academic performance. Anxiety is characterized by feelings of apprehension and nervousness, often accompanied by physiological responses such as increased heart rate, elevated blood pressure, sweating, and trembling (Ogbu, 2007). Test anxiety, a specific type of performance anxiety, refers to the distress experienced when facing an assessment where performance is crucial (Anderson, 2002). Mathematics test anxiety stems from fear and negative emotional reactions, leading to panic, nervousness, restlessness, helplessness, and confusion, especially among students with limited understanding of mathematical concepts (Bai, Wangpan, & Frey, 2009).

Objectives of the Study

This study aims to:

1. Examine the influence of test anxiety on students' academic achievement in senior secondary school mathematics examinations in Jalingo, Taraba State.
2. Analyze gender-based differences in the effect of test anxiety on students' academic achievement in senior secondary school mathematics in Jalingo educational zone.
3. Investigate the relationship between gender interest and test anxiety in students' academic achievement in senior secondary school mathematics examinations in Jalingo educational zone.

Statement of the Problem

Mathematics is often perceived by students as an evaluative subject where they are continually assessed through class exercises, assignments, and examinations. For highly test-anxious students, mathematics-related situations may appear threatening, leading to heightened levels of anxiety.

There is growing concern among educators regarding the impact of anxiety on students' learning, as it inhibits cognitive functioning and limits academic potential.

The competitive nature of the education system, where students are ranked based on test performance, may contribute to increased anxiety levels. This, in turn, affects students' performance in standardized examinations such as SSCE, WAEC, NECO, and NABTEB, raising concerns among educational planners and policymakers. Many senior secondary school students struggle with mathematics assessments due to high anxiety levels, which prevent them from achieving their full academic potential.

Mathematics anxiety not only affects students' academic performance but also influences their subject preferences. Many students opt for arts and social sciences over science-related courses due to the perceived difficulty of mathematics. This trend could result in a shortage of professionals in fields such as engineering, physics, and other technical disciplines, ultimately impacting national development. In some cases, students resort to examination malpractice or hiring others to take mathematics exams on their behalf.

Given these concerns, this study seeks to investigate the influence of test anxiety on students' academic achievement in senior secondary school mathematics examinations in Jalingo, Taraba State.

Literature Review

Sigismund (later changed to Sigmund) Freud was born on 6th may, 1856 in Freiberg, Moravia (now pribor in the Czech Republic). His father was a merchant. The family moved to Leipzig and they settled in Vienna, where Freud was educated. Freud family were Jewish but he was himself non-practicing.

In 1873 Freud began to study medicine at university of Vienna. After graduating, he worked at the Vienna General hospital. He collaborated with Joseph Breuer in treating hysteria by the recall of painful experience under hypnosis. In 1885, Freud went to Paris as a student of the neurologist Jean Charcot. On his return to Vienna the following year, Freud set up in private practice, specializing in nervous and brain disorders. The same year he married Martha Bernays, with whom he had six children. Freudian theory according to Gerow in Mkpaoro, (2006) stated that our behaviors, thoughts and feelings are governed largely by innate biological drives, commonly referred to as instincts in this context. These are in born impulses or forces that rule our personalities. Freud believed that the mind operates on three levels of awareness: conscious, precocious, and unconscious. Freud also proposed that human personality is composed of three separate thoughts – interacting, structure or system, je the id, ego and superego. The id is the instinctive aspects of personality that seeks immediate gratification of impulses, operates on the pressure principle. The ego is the aspect of personality that encompasses the sense of contact with the real world operates on the reality principle. Superego is the aspect of personality that refers to ethical or moral considerations operates on the idealistic principles.

In this theoretical formulation, Freud conceptualized anxiety as resulting from discharge of repressed sexual energy called Libido. According to Nwachukwu, (1999), Freud believe that all behavior eminent from two groups of instincts; the life and growth and the death instincts (Tanatos) that push towards destruction. The energy of the life instincts is libido, which involves mainly sex related activities. To Freud when libidiant energy is blocked from normal expression it accumulates and is automatically transformed into anxiety. He later modified this view to formulate the danger signal.

When the source of threat is from external stimulus (world), it gives rise to objective anxiety, but when the source is from the individual's own repressed impulses or instincts, it generates neurotic anxiety. To him objectives anxiety is an internal emotional reaction to anticipated real external danger or threat. Thus whenever a real danger in the external environment is perceived as threatening, this results in objective anxiety reactions. He thus sketched the development of objective anxiety as:

i. External danger, threat or stimulus
ii. Perception of stimulus, threat danger
iii. Objective anxiety.

Furthermore, Freud proposed that anxiety may be produced by conflicts between the id and ego and superego. According to him a child in a store, for example whose parents have said they will not buy a much desired toy may suffer anxiety in the struggle between the desire to steal the toy and awareness that it is wrong to take things without paying for them. Similarly, Freud asserted that any form of anxiety has two basic components which include the physiological and emotional. The physiological symptoms of any anxiety include changes in heart beat rate, sweating, trembling, restlessness and accelerated breathing. Emotional symptoms includes cognitions and expectations about self and others apprehensions, tense and trouble emotional feeling (Nwachukwu, 1999).

Finally, to Freud, there are five Subtypes of anxiety disorders

1. **Phobic Disorder:** An intense, persistent irrational fear that leads a person to avoid the fear objects, activity or situation.
2. **Panic Disorder:** A disorder in which anxiety attacks suddenly and unpredictably incapacitated there may be period of fear from anxiety. For person suffering from panic disorder, the major symptoms is recurrent unpredictable, unprovoked attacks of sudden, intense anxiety.
3. **General Anxiety Disorder:** Persistent, chronic and distressing high levels of unattributed anxiety.
4. **Obsessive Compulsive Disorder:**This involves, three disorders an Obsessive disorder a compulsive disorder and combination of an Obsessive Compulsive Disorder. Obsessive – Ideas or thoughts that involuntarily and persistently intrude into awareness. Compulsions – consistency intruding stereo typed and essentially involuntary acts or behavior.

5. **Post-traumatic Stress Disorder (PTSD):** This involves several distressing symptoms that arises at (sometimes will be after usually six months) the experiencing of a traumatic highly stressful event that is outside the range or normal human experience.

It is obvious that mathematics is very important in everyday life in spite of this importance of mathematics the review literatures in this study reveals that student's achievement is still very low. More importantly among the factors that inhibits students achievement in mathematics is test anxiety. Many students have fear and also loathe mathematics. In this chapter a serious effort was made to review a lot of related literature to the study. Some theoretical constracts of anxiety such as Freud's theory of anxiety (psychoanalytic theory of anxiety), Taylor's theory of anxiety and Hidi and Rennmgerstheory interest were reviewed. From the reviewed literature, the researcher observed that the theories helped to clarify the conflicting views on anxiety and serve as theoretical framework for the study. The theories made it explicit that not all anxiety is damaging to the child's personality. Some anxieties are natural and rational in aiding the individual cope with learning. This clarification helped the researcher to sharpen the focus of this work.

Furthermore, the researcher observed from the literature reviewed that any stimulates that causes an individual to think about dangerous and frightening situation may evoke high level of anxiety. It was also noted from the literature reviewed that anxiety often carries with it feeling of lack of confidence, irritability reduction of self-seeking interest and guilt. These negative tendencies, it was revealed could lower the academic achievement as well as interest of students.

The literature shows that high anxiety children accompany lower interest and poor academic achievement in schools. But researchers under review failed to measure whether there is any relationship among test anxiety, academic achievement and interest of students in senior secondary school mathematics. Secondary, relationship between test anxiety and interest of the students in geometry thirdly, established whether there is relationship between academic achievement and interest of the student in mathematics and finally the relationship between anxiety and academic achievement of male and female students as it is these gaps therefore, that the present study seeks to find out.

Also the studies revealed so far in the literature indicate some inconclusive results on the influence of gender on anxiety, academic achievement and interest. It is against this backdrop that the present study gains its relevance. This study therefore seeks to find out whether there exist any relationship among test anxiety, academic achievement and interest of students in mathematics in senior secondary school. It also seeks to find out the relationship between anxiety and academic achievement of male and female students. This will serve as advancement to both the theoretical and empirical literature reviewed.

Methodology

This study employs a descriptive survey research design to examine the impact of test anxiety on students' mathematics achievement in selected senior secondary schools within Jalingo metropolis. A stratified random sampling technique was used to ensure fair representation based on school, grade level, and gender.

Data was collected using a structured questionnaire divided into three sections: demographic details, a test anxiety scale, and students' mathematics achievement. A 5-point Likert scale was used for anxiety-related statements. The questionnaire's validity was confirmed through expert review, while reliability was tested using Cronbach's Alpha coefficient (≥0.7) through a pilot study.

Data collection was conducted in collaboration with school authorities, ensuring ethical considerations such as confidentiality and voluntary participation. Descriptive statistics (mean, standard deviation, frequency, and percentages) were used to summarize data, while inferential statistics (Pearson's correlation, t-test, and regression analysis) examined relationships between test anxiety and academic performance.

Result and Discussion

The demographic data shows that 50% of the respondents are male and 50% are female as shown in the table 1. The demographic data also shows that 25% are within the ages of 15 – 25 years, 40% are between 26 – 30 years, 35% between 31 – 45 years. This result also shows that 11% of the respondents are adult 58% are male while 31% are female.

Data Presentation, Analysis and Interpretation

The data collected using the instruments developed for the study are presented and analyzed using mean and standard deviation to answer the research questions, while t-test statistic was used to test the hypothesis of the study at .05 level of significance.

Research question one: What is the influence of test anxiety on students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area, of Taraba State?

Table 1: mean and standard deviation of test anxiety on students' academic achievement.

S/NO	Items	$\bar{x}$	ɗ	Remark
1.	Test anxiety limit the educational or vocational	3.61	0.49	Agreed
2.	Test anxiety makes learning, reading, remembering, and writing difficult and affecting academic performance	3.60	0.49	Agreed
3.	It results to poor academic performance by the students	3.60	0.49	Agreed

4.	Test anxiety makes students to fear mathematics as subjects	3.70	0.49	Agreed
	Grand mean/standard deviation	**3.62**	**0.48**	**Agreed**

Criterion mean $\overline{X} \geq 2.50 \rightarrow$ agree

$\overline{X} < 2.50 \rightarrow$ disagree

Result of table 1 shows the mean and standard deviation scores the achievement in senior secondary schools mathematics examination.

All the items have mean rating scale above 2.50 including ground mean. This shows that there is influence of test anxiety on students' academic achievement in senior secondary school mathematics examination (grand mean = 3.58) in Jalingo Local Government.

Research question 2: What are the mean scores of male and female on test anxiety on students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area of Taraba state?

Table 2: mean and standard deviation of mean score of male and female test anxiety on students' academic achievement.

S/NO	Items	$\bar{x}$	ɗ	Remark
1.	Female students perform worst in mathematics than male	3.30	0.49	Agreed
2.	Female students are gifted in mathematics	3.00	0.49	Agreed
3.	There is high level of mathematic anxiety among both male and female students	3.10	0.49	Agreed
4.	Mathematics anxiety is one psychological factor that affects students achievement and there general practices	3.10	0.49	Agreed
5.	Teacher had the greatest influence on students mathematics anxiety	3.30	0.64	Agreed
	Grand mean/standard deviation	**3.16**	**0.54**	**Agreed**

Criterion mean $\overline{X} \geq 2.50 \rightarrow$ agree

$\overline{X} < 2.50 \rightarrow$ disagree

Result of table 2 show the mean and standard deviation scores the rating items scores of male and female on test anxiety on students' academic achievement in senior secondary schools mathematics examination. All the items have mean rating scale above 2.50, including grand mean. This shows that there is anxiety among secondary school students mathematics examination (grand mean = 3.16) in Jalingo Local Government.

Research question three: What are the mean interest scores of male and female on test anxiety on students' academic achievement in senior secondary schools mathematic examination in Jalingo Local Government Area of Taraba state?

Table 3: mean and standard deviation interest score of male and female on test anxiety on students' academic achievement.

S/NO	Items	$\bar{x}$	d	Remark
1.	Boys have more interest in mathematics than female	3.20	0.75	Agreed
2.	I don't like mathematics when taught by female teacher	2.70	0.90	Agreed
3.	I like mathematics but fear to fail	2.50	1.12	Agreed
4.	My mates tell me that mathematics is difficult	3.20	0.75	Agreed
5.	Mathematics is too difficult to be passed	3.50	0.50	Agreed
	Grand mean/standard deviation			

Criterion mean $\overline{X} \geq 2.50 \rightarrow$ agree

$\overline{X} < 2.50 \rightarrow$ disagree

Result of table 3 shows the mean and standard deviation scores the rating items on the interest scores of male and female on test anxiety on students' academic achievement in senior secondary schools mathematics examination. All the items have mean rating scales above 2.50, including grand mean. This shows that there is interest affect the performance of both male and female students in mathematics examination (grand mean = 3.02) in Jalingo Local Government.

Hypothesis one

There is no significance difference between test anxieties and students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area of Taraba state.

Table 4: T-test statistics on significance difference between test anxieties and students' academic achievement in senior secondary school mathematics examination.

Variables	N	Mean	S.D	D.F	T	Sig
Test and Anxiety	66	17.91	1.79	148	.056	.956
Students Achievement	84	17.89	1.75			

The mean of test and anxiety (M = 17.91, SD = 1.79) and students achievement (M = 17.89, SD = 1.75) did not differ statistically significantly (t = 0.056, df = 148, two – tailed P = .956). Hence we can say that there is no significance difference between test anxieties and students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area of Taraba state.

Hypothesis two

There is no significant difference in the mean score of male and female test anxiety on students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area of Taraba state.

Table 5: T-test statistic on mean scores of male and female test anxiety on students' academic achievement.

Variables	N	Mean	SD	DF	T	Sig.
Test and Anxiety	66	16.00	1.99	148	1.061	0.290
Student Achievements	84	15.64	2.09			

The mean of the test and anxieties (m=16.00, SD = 1.99) and students achievement (M = 15.64, SD = 2.09) did not differ statistically significantly (t = 0.056, df = 148, two tailed P = 290). Hence, we can conclude that there is no significant difference between in the mean scores of male and female test anxiety on students' academic achievement in senior secondary schools mathematics examination in Jalingo Local Government Area of Taraba state.

Discussion of Findings

The study examined the influence of test anxiety on students' academic achievement in senior secondary school mathematics examinations in Jalingo Local Government Area of Taraba State. The findings reveal that test anxiety significantly affects students' performance, leading to difficulties in learning, reading, remembering, and writing, which in turn contribute to poor academic performance. The results also indicate that test anxiety fosters a fear of mathematics among students, further exacerbating performance challenges.

The study found that both male and female students experience mathematics anxiety, with female students generally performing worse than their male counterparts. Additionally, mathematics anxiety was identified as a key psychological factor affecting students' achievement, with teachers playing a significant role in influencing students' anxiety levels.

Regarding students' interest in mathematics, the results indicate that boys show more interest in the subject than girls. A notable percentage of students reported fearing failure despite having an interest in mathematics. Furthermore, external influences, such as peer opinions and perceptions about the subject's difficulty, contribute to the overall anxiety and performance outcomes.

The hypothesis testing revealed no statistically significant difference between test anxiety and students' academic achievement. Similarly, no significant difference was found in the mean scores of male and female students concerning test anxiety and academic achievement. These findings suggest that while test anxiety is a prevalent issue among students, its impact on performance does not differ significantly between genders.

Overall, the study confirms that test anxiety negatively affects students' academic achievements in mathematics. It reduces motivation, hinders concentration, and limits students' ability to excel in their examinations. Addressing test anxiety through appropriate interventions, such as teacher support and student counseling, could improve students' performance in mathematics.

Conclusion

The fear of mathematics is a significant factor affecting students' performance in both internal and external examinations. This widespread issue impacts students across various categories, leading to lower academic achievement. Test anxiety has a notable effect on students' learning capabilities, reducing their ability to concentrate, retain information, and stay motivated. In severe cases, it can contribute to academic failure.

The findings of this study establish a significant relationship between test anxiety and students' academic achievement in mathematics. Addressing test anxiety through targeted interventions, such as effective teaching strategies, psychological support, and confidence-building activities, can help mitigate its negative effects and improve students' overall performance.

Recommendations

Schools should enhance their guidance and counseling services to support students in managing test anxiety. Counselors should introduce stress management techniques, confidence-building exercises, and personalized academic guidance to help students develop a positive attitude toward mathematics. By addressing students' fears and anxieties, they can improve their concentration, motivation, and overall academic performance.

Teachers should also adopt interactive and student-centered teaching methods to make mathematics more engaging. Using real-life applications, hands-on activities, and psychological interventions can help reduce anxiety and increase students' interest in the subject. Additionally,

curriculum improvements should emphasize the importance of mathematics in future careers, helping students develop a growth mindset and confidence in their mathematical abilities.

References

Anderson S.B, (2002). "*The Role of Teacher made Test in Higher Education"* in D. Bray and M.J Florida Gulf Coast University.

Arem C.A, (2003). *Conquering Math Anxiety*. 2nd Edn. Brooks/colethomsom learning. Pacific Grove ISBN-10: 0534286342, PP: 193.

Arem C.A (2009). *Conquering Math Anxiety.* 3rd Edn. Cengage learning, Belmont. ISBN-10:0495829404, PP: 215.

Bai H.W Wangpan, P.L and Frey, M, (2009). *Measuring Mathematics Anxiety:* Psychometric analysis of a bi-dimensional affective scale. *Journal of Instructional Psychology, 36 (3), pp 185-19*

Bidin, J.N, Sharif and Kasim Z., (2003). *Kegelisahammatematiks di kalanganpelajarmenengahrendah di perlis.* Proceedings of the 13th National symposium of Mathematical Science, mathematics anxiety among Secondary School Perlis.

Diprost, N., Watter, (2002). *Encyclopedia* – Americana Vol. 26. University of New Hampshirei.

Elenchothy, O., (2007). *KebimbangaMatematikdanLunbungamyadaganPencapalamPelajatTingkatanEmpa di DearanKlang.*M.Sc thesis. University Putra Malasia hardiness in high school students. Intl. J. Educ. Sci., 1:33-37.

Zakaria, E., Zain, N.M Ahmad, N.A and Erlina, A. (2012). Mathematics Anxiety and Achievement among Secondary Schools Students. *American Journal of Applied Science, (2012), 9(11), 1828-1832.*