
INFLUENCE OF MATHEMATICS ANXIETY ON MATHEMATICS ACADEMIC PERFORMANCE OF JUNIOR SECONDARY SCHOOL STUDENTS IN DUTSIN-MA, KATSINA STATE, NIGERIA

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Abstract

This study examined the influence of mathematics anxiety on mathematics academic performance among Junior Secondary School II (JSS II) students in Dutsinma Local Government Area, Katsina State, Nigeria. The study was prompted by the persistent poor performance of students in mathematics and the assumption that anxiety may be a contributing factor. A descriptive survey research design was adopted. The population comprised all JSS II students in selected public secondary schools, and a sample of 364 students was drawn using Krejcie and Morgan method of sampling technique. Data were collected through a structured Mathematics Anxiety Questionnaire, while students' academic performance was obtained from their examination records. The instrument was validated by experts in Educational Psychology and Counselling, and its reliability was established by conducting a pilot study and the scores obtained was analyzed using Cronbach's Alpha coefficient. Data were analyzed using descriptive statistics and inferential statistics at the 0.05 level of significance. The findings revealed a significant negative relationship between mathematics anxiety and academic performance. It was concluded that high mathematics anxiety adversely affects students' achievement, and counselling interventions were recommended to reduce anxiety and enhance performance among others.

Key words: Mathematics Anxiety, Academic Performance and Students.

Introduction

Mathematics is universally recognized as the foundation of scientific, technological, and economic advancement in any society. It is an essential subject in the curriculum of all levels of education and serves as a gateway to numerous disciplines such as engineering, medicine, economics, and technology. In Nigeria, mathematics is one of the core subjects taught at both primary and secondary school levels and is compulsory for all students up to the senior secondary level. Despite its significance, the subject continues to pose challenges to many students, especially at the junior secondary school level, where the foundational concepts are established. This persistent difficulty has raised concern among educators, counsellors, and policymakers, who have identified mathematics anxiety as one of the major affective variables influencing students' performance in the subject (Atoyebi, Atoyebi, and Ajao, 2023; Asanre et al., 2023).

Mathematics anxiety refers to a feeling of tension, apprehension, or fear that interferes with mathematics performance (Richardson and Suinn, 2022). Students who experience this form of anxiety often exhibit nervousness, worry, and avoidance behaviour when faced with mathematical tasks or classroom activities. According to Saleh (2025), mathematics anxiety has become a global concern but appears more prevalent in developing countries such as Nigeria, where inadequate

teaching methods, poor learning environments, and cultural perceptions about mathematics contribute to students' negative emotional reactions toward the subject. The anxiety experienced by students often translates into low participation, lack of confidence, and eventually poor academic performance in mathematics (Owan, Eno, and Uwase, 2019).

Several scholars in Nigeria have investigated the relationship between mathematics anxiety and academic performance at various educational levels. Atoyebi et al. (2023) found that mathematics anxiety significantly reduces students' mathematical value and interest in the subject. Similarly, Alao, Abdussalam, and Ismail (2024) in Katsina State reported that students with higher levels of mathematics anxiety demonstrated weaker academic performance, lower motivation, and less persistence in solving mathematical problems. These findings are consistent with the view of Asanre et al. (2023), who described mathematics anxiety as a psychological barrier that distorts concentration and problem-solving ability during learning and examinations. Furthermore, Adeoye (2011) observed that teacher-related factors such as harsh instructional methods, excessive punishment, and unsupportive classroom environments tend to increase students' anxiety levels, especially among junior secondary school learners who are still developing confidence in their academic abilities.

Mathematics anxiety is a form of emotional disturbance that manifests as feelings of tension, apprehension, or fear which interfere with the manipulation of numbers and the solving of mathematical problems. It is one of the most widely studied affective factors influencing students' academic achievement. According to Richardson and Suinn (1972), mathematics anxiety refers to "feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations." This definition has remained central to subsequent research, though scholars have expanded it to include both cognitive and physiological symptoms such as restlessness, sweating, rapid heartbeat, and avoidance behaviour when confronted with mathematics tasks.

Mathematics anxiety is not merely a dislike for mathematics; it represents a deeper emotional reaction that hampers students' learning efficiency and performance. Atoyebi, Atoyebi, and Ajao (2023) emphasized that anxiety in mathematics emerges from a combination of personal, instructional, and environmental factors. These include past experiences of failure, negative teacher attitudes, peer pressure, and societal beliefs that mathematics is inherently difficult. The anxiety leads to a self-reinforcing cycle where fear of failure produces avoidance, and avoidance in turn results in poorer performance, which further strengthens the initial fear.

The origin of mathematics anxiety can often be traced to early childhood learning experiences. When children are exposed to harsh teaching methods, ridicule, or punishment for errors, they begin to associate mathematics with embarrassment or frustration. Owan, Eno, and Uwase (2019) found that the administration of punishment during mathematics lessons in secondary schools increased students' anxiety levels, making them reluctant to participate actively. Similarly, Saleh (2025) noted that many Nigerian students develop anxiety due to the perception that mathematics is only for exceptionally intelligent people. This social stereotype discourages average learners from fully engaging with the subject, reinforcing feelings of inferiority.

Academic performance is one of the most widely researched constructs in educational psychology due to its central role in evaluating students' learning outcomes, school effectiveness, and educational quality. It represents the extent to which learners achieve the intended educational objectives within a specified period of instruction. In formal educational settings, academic performance is often regarded as the measurable outcome of teaching and learning processes and serves as a key indicator

of students' cognitive, affective, and psychomotor development. Scholars conceptualize academic performance from different perspectives, depending on disciplinary orientation, measurement approach, and educational level. Traditionally, academic performance has been associated with students' scores in examinations, tests, and continuous assessments. However, contemporary educational research recognizes academic performance as a multidimensional construct influenced by psychological, social, emotional, environmental, and instructional factors (Richardson, Abraham and Bond, 2016). From a psychological standpoint, academic performance reflects not only intellectual ability but also learners' motivation, emotional stability, self-concept, and coping mechanisms when confronted with academic demands. According to Steinmayr et al. (2018), academic performance is the observable manifestation of students' cognitive abilities interacting with non-cognitive factors such as anxiety, self-efficacy, and learning strategies. This view is particularly relevant in subjects like mathematics, where affective variables such as mathematics anxiety play a crucial role in determining students' performance outcomes.

In the context of junior secondary school education, academic performance is especially important because it lays the foundation for future academic success and career choices. At this level, students transition from basic numeracy to more abstract mathematical concepts, making them vulnerable to performance-related stress and anxiety. Studies have shown that poor academic performance during early adolescence often predicts long-term educational disengagement and low academic self-esteem (OECD, 2019).

Academic performance is commonly measured using both quantitative and qualitative indicators. Quantitative measures include standardized test scores, examination results, grade point averages (GPA), and teacher-made tests. These measures provide objective data that allow for comparison across students and schools. According to York et al. (2015), standardized assessments remain the most widely accepted indicators of academic performance due to their reliability and validity. However, reliance solely on test scores has been criticized for failing to capture the full scope of students' learning experiences. Consequently, contemporary researchers advocate for the inclusion of qualitative indicators such as classroom participation, assignment completion, problem-solving ability, and consistency in academic engagement (Kpolovie, Joe, and Okoto, 2017). In mathematics education, performance is often assessed through students' ability to understand concepts, apply formulas, solve problems accurately, and demonstrate logical reasoning.

In Nigeria, academic performance is typically assessed through continuous assessment scores and terminal or promotion examinations. These assessments play a significant role in determining students' progression from one class to another and influence parental and societal perceptions of students' academic competence (Aremu and Sokan, 2018). As such, academic performance holds high stakes for students, which may intensify anxiety, particularly in mathematics-related tasks.

Statement of the Problem

Mathematics continues to be one of the subjects in which Nigerian students perform poorly, despite its central role in science, technology, and everyday life. Reports from the West African Examinations Council (WAEC) and the National Examinations Council (NECO) consistently reveal low pass rates in mathematics among secondary school students. This persistent underachievement has attracted the attention of researchers, teachers, and educational psychologists who have identified several factors affecting students' performance one of the most significant being mathematics anxiety (Atoyebi et al., 2023; Asanre et al., 2023).

In Dutsin-Ma Local Government Area of Katsina State, teachers and counsellors often report that

many junior secondary school students show fear, nervousness, and avoidance behaviour during mathematics lessons. Some students refuse to attempt mathematics questions in class or during tests, while others develop tension whenever they are required to solve numerical problems. This high level of anxiety affects not only their classroom participation but also their examination performance. Although mathematics anxiety has been widely studied in different contexts, there remains limited empirical evidence within Katsina State particularly in Dutsin-Ma LGA focusing on junior secondary school students, who are at a foundational stage of mathematical learning. Existing studies have mostly examined senior secondary students or college-level learners, leaving a gap in understanding how anxiety develops and affects performance at the lower secondary level.

Therefore, the problem of this study is to determine the extent to which mathematics anxiety influences the academic performance of junior secondary school students in Dutsinma Local Government Area, Katsina State, and to identify factors that may contribute to this relationship. Without clear knowledge of this influence, effective counselling and intervention strategies may not be successfully developed or implemented in schools.

Objectives of the Study

The specific objectives of this study are:

1. To determine the level of Mathematics Anxiety among Junior Secondary School Students in Dutsinma Local Government Area.
2. To examine the Influence of Mathematics Anxiety on Students' Academic PERFORMANCE in mathematics.

Research Questions

The following research questions were formulated to guide the study:

1. What is the level of Mathematics Anxiety among Junior Secondary School students in Dutsinma Local Government Area?
2. What is the influence of Mathematics Anxiety on the Academic Performance of Students in Mathematics among Junior Secondary School Students in Dutsinma Local Government Area?

1.5 Research Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

H₀₁: There is no Significant Influence of Mathematics Anxiety on the Academic Performance of Junior Secondary School Students in Dutsinma Local Government Area.

Methodology

The study employed a Descriptive Survey Research Design. Descriptive survey research seeks to describe and interpret existing phenomena systematically without manipulating any variables. The population of this study consisted of all Junior Secondary School (JSS) students in public secondary schools within Dutsin-ma Local Government Area of Katsina State. According to data obtained from the Zonal Education Quality Assurance Dutsin-ma (2025), there are about 5 public junior secondary schools in Dutsin-ma, with an estimated population of 9,213 students across JSS I to JSS III classes. A sample of 364 students were selected from five (5) randomly chosen among junior secondary schools in Dutsin-ma Local Government using Krejcie and Morgan. Mathematics Anxiety and Academic Performance Questionnaire (MAAPQ) was used as the instrument for data collection. Lastly, the data collected was analyzed using described statistics SPSS package.

Results

Answering Research Questions

Research Questions One: What is the level of Mathematics Anxiety among junior secondary school students in Dutsin-ma Local Government Area?

Table 1: Mean and Standard Deviation for the Items Measuring Mathematics Anxiety

Item	Mean	Std. Deviation
I feel nervous whenever I have to solve a mathematics problem.	4.55	.498
I worry about failing mathematics tests.	3.97	.717
I feel tense or frustrated during mathematics lessons.	4.24	.654
I feel helpless when I cannot understand mathematics concepts.	4.15	.989
I feel anxious when mathematics teachers ask me questions in class.	4.06	.953
My heart beats faster when I take mathematics tests.	4.30	.969
I sweat or feel physically uncomfortable during mathematics lessons.	4.43	.740
I experience trembling hands or shaking while solving mathematics problems.	4.21	.845
I sometimes feel sick or dizzy before mathematics examinations.	4.09	.900
I feel muscle tension or headaches when studying mathematics.	4.12	1.009
I often think I will fail before attempting a mathematics problem.	4.02	1.172
Negative thoughts prevent me from concentrating during mathematics tasks.	3.64	1.070
I forget formulas or steps when I feel anxious about mathematics.	3.73	1.164
I believe I am not good at mathematics even if I understand some concepts.	4.30	1.000
I feel mentally blocked or confused when solving difficult mathematics problems.	4.46	.957
I am able to complete mathematics assignments on time.	4.09	1.139
I perform well in mathematics tests and examinations.	3.94	1.391
I feel confident solving new mathematics problems.	4.18	1.029
I participate actively in mathematics lessons.	3.94	1.179
I am able to understand and remember mathematics concepts taught in class.	4.18	1.114
Aggregate mean score	4.13	

Table 1 indicated that, high mean scores were recorded across several psychological and physical indicators of anxiety. For instance: "I feel nervous whenever I have to solve a mathematics problem" had the highest mean of 4.55, "I feel mentally blocked or confused when solving difficult mathematics problems" recorded a mean of 4.46, and "I sweat or feel physically uncomfortable during mathematics lessons" showed a mean of 4.43. The aggregate mean score for mathematics anxiety was 4.13 (SD = 9.350). Given that the scale for the 20 items ranges from a minimum of 20 to a maximum of 100, a mean of 4.13 indicates a very high level of mathematics anxiety among the students in the study area.

Research Questions Two: What is the influence of Mathematics Anxiety on the Academic Performance of Students in Mathematics among Junior Secondary School Students in Dutsinma Local Government Area?

Testing of Hypothesis

Hypothesis One (H₀₁)

There is no significant influence of mathematics anxiety on the academic performance of junior secondary school students in Dutsin-ma Local Government Area.

Table4: Influence of Mathematics Anxiety on the Academic Performance

Variables	Mean	Std. Deviation	r-value	p-value
Students' Academic Performance	78.38	13.820		

			.016	.762
Mathematics Anxiety	82.63	9.350		

Table 4 indicated that the correlation analysis showed a significance value (p-value) of .762. Since $.762 > 0.05$, we reject the null hypothesis. This implies that there is no statistically significant influence of mathematics anxiety on the academic performance of the sampled students.

Summary of Findings

Based on the statistical analysis, the following are the summary of the major findings of the study: Junior secondary school students in Dutsinma Local Government Area exhibit a high level of mathematics anxiety, reflected in a high aggregate mean score of 4.13.

There is no significant influence of mathematics anxiety on academic performance, as indicated by a negligible Pearson Correlation of .016 and a p-value of .762.

Discussion of Findings

The discussion of findings provides a critical interpretation of the research results by comparing them with the theoretical and empirical literature presented in the study. The study revealed a high level of Mathematics anxiety among junior secondary school students in Dutsinma, with an overall mean score of 4.13. This finding is consistent with the observations of Saleh (2025), who noted that mathematics anxiety is a widespread concern particularly prevalent in developing countries like Nigeria due to poor learning environments and negative cultural perceptions of the subject. Furthermore, the high mean scores for specific items such as feeling "nervous" (4.55) or "mentally blocked" (4.46) align with the descriptions provided by Asanre et al. (2023), who characterized mathematics anxiety as a psychological barrier that distorts concentration and problem-solving ability during examinations.

A central finding of this study was that mathematics anxiety had no significant influence on academic performance ($r = .016, p = .762$). This result contrasts sharply with much of the literature cited in the project: Alao, Abdussalam, and Ismail (2024) reported that students in Katsina State with higher levels of mathematics anxiety demonstrated significantly weaker academic performance. Owan, Eno, and Uwase (2019) argued that high anxiety levels typically translate into low participation and eventually poor academic achievement. Ramirez et al. (2016) asserted that anxiety negatively affects performance by impairing working memory resources needed for mathematical tasks.

Conclusion

Based on the results of the study, it was concluded that, Therefore, the study concludes that mathematics anxiety exists among junior secondary school students in Dutsinma LGA, but it is not a significant predictor of their academic performance. This suggests that other factors such as teaching methods, study habits, motivation, or school environment may play a more dominant role in determining students' performance in mathematics.

Recommendations

Based on the findings of the study,

1. Teachers should adopt student-friendly teaching methods: Mathematics teachers should use interactive, activity-based, and learner-centered approaches to reduce fear and improve students' confidence in mathematics.
2. Guidance and counselling services should be strengthened in schools: School counsellors should organize regular counselling sessions to help students manage anxiety and develop positive attitudes toward mathematics.

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