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Causes and Remedies of Mathematics Anxiety Among Secondary School Students in Kontagora, Niger State

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Abstract

Mathematics anxiety is a pervasive issue affecting students' performance and attitudes toward the subject, particularly in Nigeria, where systemic challenges exacerbate the problem. This study investigates the causes and potential remedies of mathematics anxiety among secondary school students in Kontagora, Niger State, using a descriptive survey design. Data was collected from 220 students senior secondary school students in Kontagora through structured questionnaire tagged Mathematics Anxiety Student's questionnaire (MASQ) and analyzed using mean, standard deviation, and t-tests. Key findings reveal that mathematics anxiety stems from multiple factors, including a lack of conceptual understanding (Mean = 3.28), fear of failure (Mean = 3.03), poor teaching methods (Mean = 3.00), and inadequate support systems (Mean = 2.91). Remedies identified include peer/tutor support (Mean = 3.40), collaborative learning (Mean = 3.37), teacher empathy (Mean = 3.31), and mindfulness techniques (Mean = 3.26). No significant difference was found between private and public school students' perceptions (t(218) = 1.74, p = 0.083). The study underscores the need for holistic interventions combining improved pedagogy, emotional support, and resource provision to mitigate mathematics anxiety. Recommendations include teacher training, curriculum reforms, parental involvement, and school-based counselling to foster a positive learning environment.

Keywords: Mathematics anxiety, secondary education, Nigeria, teaching strategies, student performance.

Introduction

Mathematics is a discipline that fosters self-reliance and the ability to solve problems, equipping learners with the tools to think for themselves (Godwin, 2021). Its profound relevance is undeniable and extends across every facet of life, serving as an indispensable factor in the progress of the modern world. The scientific, technological, and economic advancements of any nation are fundamentally tied to the strength of its mathematics education. By providing a framework for giving precise form to ideas and conclusions, mathematics has become a critical component of human development.

Despite this widespread acknowledgment of its vital role, a concerning paradox exists within Nigerian society, where high expectations for student performance in the subject are often unmet. A significant contributing factor to this issue is the nonchalant attitude many students display toward mathematics, even when they recognize its importance for their future careers and academic success (Tan and Tang, 2022). This lackadaisical approach is a critical determinant of academic outcomes, as a negative perception of mathematics—viewing it as a difficult subject—leads to a corresponding lack of interest and effort, which ultimately results in poor performance on tests and examinations (Adepoju and Obasan, 2023; Oke and Olubukola, 2020). In spite the common perception of mathematics as a challenging and uninteresting subject, its applications are profoundly useful in daily life (Awoyale and Niyi, 2023). The discipline is seen as a key determinant of an individual's ability to function effectively in society. Often defined as the science of numbers and space, mathematics is also considered the essential language of science and technology, a vital requirement for intellectual and human development. It is a fundamental tool that shapes our understanding of the world, with its importance extending far beyond the classroom (Niyi et al., 2024). The study of mathematics provides students with a myriad of benefits, including enhanced problem-solving and critical thinking skills, improved financial literacy, better time management, and a deeper appreciation for real-world applications that foster technological and career readiness. This viewpoint is further supported by the assertion that mathematics is a core subject and an indispensable tool for the advancement of all science-based disciplines, such as technology, astronomy, graphics, and industry, as well as for the development of analytical reasoning in everyday situations (Maaß et al., 2019).

According to Ajiboye (2022), the acquisition of mathematical knowledge in Nigeria is hampered by numerous systemic challenges. These include a shortage of qualified teachers, inadequate teaching facilities, and insufficient funding for essential equipment. Additional obstacles are poor-quality textbooks, oversized classes, unmotivated educators, and a lack of proper laboratories and libraries.

The educational system is further hindered by issues such as poorly coordinated supervisory activities, interference from the civil services, frequent transfers of school personnel, and the practice of automatic student promotion. The negative influence of public examinations on the teaching-learning process and a general inequality in educational opportunities also contribute to the problem.

Compounding these issues is the widespread prevalence of mathematics anxiety, which is cited as a major cause of poor performance among secondary school students. Afolabi and Oluwatobi (2020) characterize this fear as an "academic sickness" whose underlying causes are not yet fully understood for effective classroom treatment. The symptoms of this anxiety are often visibly expressed on the faces of mathematics students in their classes. Mathematics is a discipline that fosters self-reliance, assisting learners in developing the capacity to think independently and solve their own problems (Godwin, 2021). Its relevance is far-reaching and cannot be overstated, as the technological, scientific, and economic progress of any nation is directly dependent on the quality of its mathematics education. The subject provides a framework for giving precise interpretation to ideas and conclusions, making it an indispensable factor in the advancement of the modern world.

Despite this widespread recognition of mathematics' crucial contribution to societal development, the expected satisfactory student performance in the subject has not been realized in Nigeria; in fact, the opposite is true. A significant number of students exhibit a nonchalant or lackadaisical attitude toward mathematics, even while acknowledging its importance for their future careers and academic progress (Tan and Tang, 2022; Adepoju and Obasan, 2023). This negative outlook, characterized by a perception of mathematics as a difficult subject, often manifests as a lack of interest and effort, which is a critical factor leading to poor performance in tests and examinations (Oke and Olubukola, 2020).

Afolabi and Oluwatobi (2020) define mathematics anxiety as a psychological construct encompassing the emotional and cognitive challenges of learning mathematics, often incorrectly viewed as an indicator of a student's inherent weakness. This highlights how the emotional, or affective, dimension of learning is frequently neglected in educational contexts. The "perception of mathematics" is a concept that is shaped by an individual's mental representation of the subject, which is built upon their social interactions and experiences with parents, teachers, peers, and the media. This mental representation is deeply rooted in past experiences, which, as Bello and Yusuf (2020) note, involve both cognitive aspects like problem-solving and affective ones like emotions and attitudes. The attitudes and beliefs of primary school teachers themselves, often a product of their own experiences in secondary school, can contribute to the "mystification" of mathematics, causing students to

perceive it as an elite subject (Adebayo and Okewole, 2022). At its core, mathematics anxiety is the emotional and mental distress that students experience when engaging with the subject.

Many students have a negative attitude towards mathematics, which influences their approach to problem-solving and can lead to anxiety or even phobia, ultimately resulting in poor academic performance (Atoyebi and Adeola, 2023). This issue is particularly significant because mathematics anxiety has a direct impact on a student's motivation and interest in the subject (Ali and Hussan, 2019).

The central purpose of this research is to investigate the causes and potential solutions for mathematics anxiety among secondary school students in Kontagora, Niger State. By exploring the perceptions of both students and teachers, the study aims to identify the key factors contributing to this anxiety, including how teacher practices may influence student attitudes. The findings are intended to provide valuable and actionable information to students, educators, and parents, thereby contributing to the development of effective strategies to improve students' confidence and performance in mathematics.

Research Questions

The following research questions were raised a guide for the study.

1. What are the causes of mathematics anxiety among secondary school students as perceived by respondents?
2. What are the remedies to the problem of mathematics anxiety as perceived by respondents?

Hypothesis

The following null hypothesis was formulated to guide the study:

$H_0$1: There is no significance difference between the perception of respondents from private and public school on the causes and remedies of mathematics anxiety.

Methodology

The study employed a descriptive survey research design, using a quantitative approach to gather data from students and teachers. Two structured questionnaire were used to collect data. The instrument used for this research is a four (4) point Likert scale questionnaire tagged Mathematics Anxiety Students Questionnaire (MASQ) and Mathematics Anxiety Teacher's Questionnaire (MATQ). Both instruments were designed by the researcher and validated by experts. The population for this study is

all secondary school students and mathematics teachers in Kontagora Local Government Area, Niger State. The questionnaire was administered to a sample of two hundred (200) randomly selected students from selected senior secondary school and twenty (20) teachers were selected from senior secondary schools in Kontagora Local Government Area of Niger State. It was subdivided into two (2) sections as follows: Section A: Bio-data of the respondents and Section B: causes and remedies of mathematics anxiety. The question is made of twenty (20) items. The following acronyms were used Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). For reliability of the instrument, a Cronbach's alpha coefficient of 0.93 for the students' questionnaire and 0.96 for teachers' questionnaire was obtained. The data collected were analyzed and presented in tables as research questions were answers with mean and standard deviation, while the null hypothesis were tested using t-test.

Results

Research Question 1: What are the causes of mathematics anxiety among secondary school students? As perceived by the respondents.

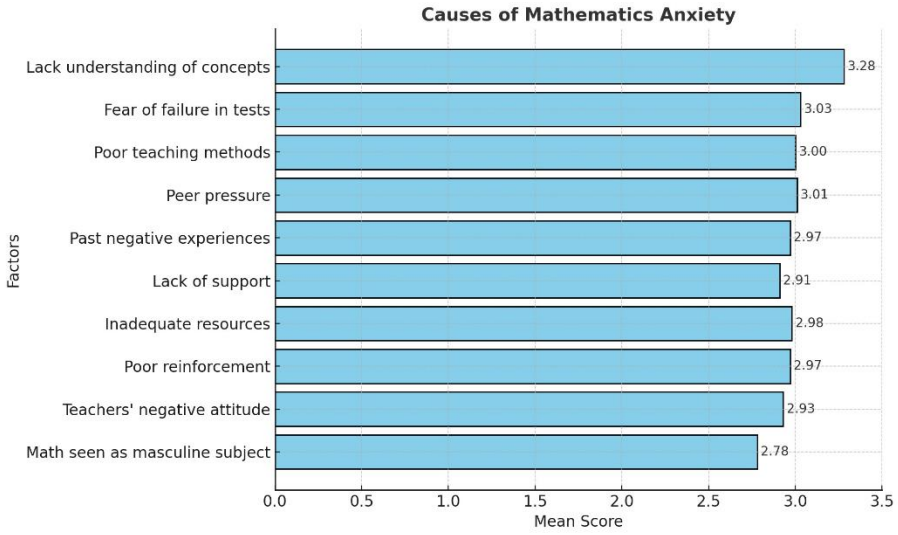
Table 1: Causes of mathematics anxiety

S/N	Item	Mean	Standard deviation	Remark
1.	Lack understanding of mathematics concepts	3.28	0.88	Accepted
2.	Fear of failure in mathematics tests/anxiety-provoking.	3.03	0.94	Accepted
3.	Poor teaching methods contribute to mathematics anxiety.	3.00	1.03	Accepted
4.	Peer pressure affects mathematics performance.	3.01	1.02	Accepted
5.	Past negative experiences with mathematics.	2.97	1.01	Accepted
6.	Lack of support from teachers/parents.	2.91	1.04	Accepted
7.	Inadequate resources for teaching and learning mathematics contribute to mathematics anxiety.	2.98	0.99	Accepted
8.	Poor reinforcement contribute to students' performance.	2.97	0.58	Accepted
9.	Teachers' attitude towards mathematics increase mathematics anxiety in students.	2.93	0.52	Accepted

10.	Mathematics is considered a masculine subject.	2.78	0.42	Accepted

Grand mean = 2.99

Chart 1: Mean response of respondents on the factors contributing to Mathematics anxiety in Kontagora, Niger State



The findings in Table 1 reveal that mathematics anxiety among students is influenced by a range of societal, school, student, and teacher-related factors. All ten listed items were accepted as significant causes, with mean scores above the threshold of 2.50. The highest-rated cause was a lack of understanding of mathematics concepts (Mean = 3.28, SD = 0.88), indicating that conceptual difficulties remain the most critical source of anxiety. This suggests that many students struggle to grasp fundamental mathematical ideas, which may stem from the way lessons are delivered or from gaps in prior knowledge.

Fear of failure in mathematics tests and anxiety related to assessment ranked second (Mean = 3.03, SD = 0.94), underscoring the role of examination pressure in shaping negative attitudes toward the subject. Poor teaching methods (Mean = 3.00, SD = 1.03) and peer pressure (Mean = 3.01, SD = 1.02) also emerged as significant factors, pointing to both instructional practices and social classroom dynamics as contributors to anxiety. Other important influences include past negative experiences with mathematics (Mean = 2.97, SD = 1.01) and a lack of support from teachers or parents (Mean = 2.91, SD = 1.04), both of which can reinforce feelings of inadequacy and disengagement. Inadequate teaching and learning resources (Mean = 2.98, SD = 0.99) highlight the structural challenges that

hinder effective instruction, while poor reinforcement of student performance (Mean = 2.97, SD = 0.58) and negative teacher attitudes (Mean = 2.93, SD = 0.52) reflect the impact of classroom climate on learner confidence. Although rated lowest, the perception of mathematics as a masculine subject (Mean = 2.78, SD = 0.42) indicates that gender stereotypes still influence students' relationship with the subject, even if to a lesser extent compared to other factors.

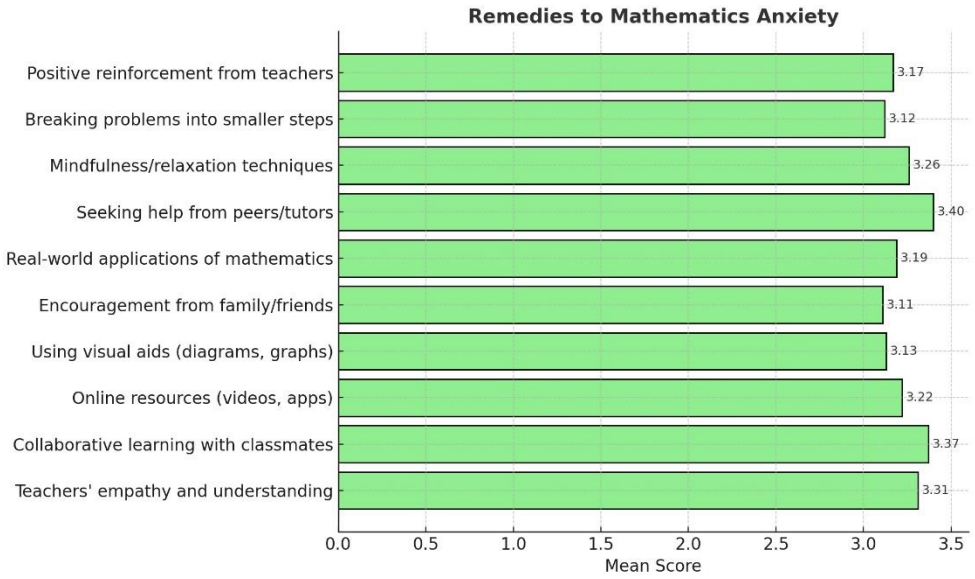
Research Question 2: What are the remedies to the problem of mathematics anxiety as perceived by the respondents?

Table 2: Remedies to Mathematics Anxiety

S/N	Possible Remedies to Mathematics Anxiety.	Mean	Standard deviation	Remark
1.	Receiving positive reinforcement from teachers helps alleviate mathematics anxiety.	3.17	1.05	Accepted
2.	Breaking problems into smaller steps reduces mathematics anxiety.	3.12	0.73	Accepted
3.	Practicing mindfulness/relaxation techniques helps manage mathematics anxiety**.**	3.26	1.05	Accepted
4.	Seeking helps from peers/tutors improves Mathematics confidence.	3.40	0.78	Accepted
5.	Understanding real-world applications of mathematics motivates students.	3.19	1.01	Accepted
6.	Encouragement from family/friends reduces mathematics anxiety.	3.11	0.90	Accepted
7.	Using visual aids diagrams, graphs helps comprehension.	3.13	0.93	Accepted
8.	Online resources (videos, apps) supplement classroom learning.	3.22	0.42	Accepted
9.	Collaborative learning with classmates reduce mathematics anxiety.	3.37	1.11	Accepted
10.	Teachers' empathy and understanding help alleviate mathematics anxiety.	3.31	0.86	Accepted

Grand mean= 3.23

Chart 2: Mean response of respondents on remedies to Mathematics anxiety in Kontagora, Niger State



The analysis of Table 2 indicates that all ten identified remedies for mathematics anxiety were considered effective, as each recorded a mean score above the acceptance threshold of 2.50. The most highly rated approach was seeking help from peers or tutors (M = 3.40, SD = 0.78), underscoring the importance of collaborative academic support in building mathematics confidence. Closely following this were collaborative learning with classmates (M = 3.37, SD = 1.11) and teachers' empathy and understanding (M = 3.31, SD = 0.86), which reflect the significance of positive interpersonal relationships in reducing anxiety.

Psychological strategies such as practicing mindfulness or relaxation techniques (M = 3.26, SD = 1.05) also ranked highly, suggesting that anxiety management benefits from emotional regulation techniques alongside instructional methods. The use of online resources, including videos and apps (M = 3.22, SD = 0.42), and understanding real-world applications of mathematics (M = 3.19, SD = 1.01) further highlight the value of making learning relevant and providing accessible supplementary materials. Supportive practices such as receiving positive reinforcement from teachers (M = 3.17, SD = 1.05) and encouragement from family and friends (M = 3.11, SD = 0.90) reinforce the role of emotional support networks in alleviating anxiety. Instructional techniques like breaking problems

into smaller, manageable steps (M = 3.12, SD = 0.73) and using visual aids such as diagrams and graphs (M = 3.13, SD = 0.93) point to the effectiveness of scaffolding and visual learning in promoting understanding and confidence.

Test for Hypothesis

H_0: There is no significance difference between private and public school respondents' perception on the causes and remedies of mathematics anxiety.

Table 3

Items	**No**	**Mean**	**SD**	**Df**	**T-value**	**p-value**	**Remark**
Private	111	65.36	6.36	218	1.74	0.083	Fail to reject H_0
Public	109	62.33	4.62				

(α=0.05)

Table 3 shows the independent samples t-test was conducted to compare perceptions of mathematics anxiety causes and remedies between private (*n = 111, M = 65.36, SD = 6.36*) and public school students (*n = 109, M = 62.33, SD = 4.62*). The results indicated no statistically significant difference between groups, *t(218) = 1.74, p = 0.083*. The null hypothesis was retained at the .05 significance level, suggesting that school type (private vs. public) does not significantly affect students' perceptions of mathematics anxiety causes and remedies.

Discussion

The findings indicate that mathematics anxiety arises from a variety of interconnected factors related to students, teachers, schools, and broader societal influences among secondary schools in Kontagora. Central to these causes is the gap in understanding mathematical concepts, which often leaves students feeling unprepared and insecure. This lack of conceptual mastery is compounded by the pressure of high-stakes testing, where fear of failure and anxiety-provoking assessment environments discourage confidence and participation. Instructional approaches also play a significant role. Ineffective teaching methods and a lack of engaging, student-centred strategies can make mathematics seem inaccessible or intimidating. Social dynamics, including peer pressure, can further undermine a learner's confidence, while past negative experiences may create long-lasting aversions to the subject. The absence of adequate support from both teachers and parents, along with limited

access to resources, adds to the challenge. Negative reinforcement or discouraging attitudes from educators, as well as gender stereotypes portraying mathematics as a male-dominated field, further exacerbate these issues.

In addressing these challenges, the study identified a range of strategies that could alleviate mathematics anxiety among secondary schools in Kontagora. Collaborative learning whether through peer support or group activities emerges as a particularly powerful tool, fostering both academic improvement and emotional reassurance. Teacher empathy and understanding are equally vital, helping to create a safe and supportive learning environment. Psychological approaches such as mindfulness and relaxation techniques can help students manage stress, while real-world applications of mathematics make learning more relevant and engaging. Additional strategies include the use of visual aids, the integration of technology and online resources, breaking complex problems into smaller steps, and offering consistent encouragement from teachers, family, and friends. Collectively, these remedies point toward the need for a holistic approach, one that combines effective pedagogy, emotional support, relevant learning contexts, and access to learning tools. The results highlight that addressing mathematics anxiety is not just about improving instructional methods; it requires building a culture of encouragement, inclusivity, and mutual respect, where students feel supported both academically and emotionally.

Conclusion

In conclusion, this study provides valuable insights into the causes and remedies of mathematics anxiety among secondary school students. The findings highlight the importance of addressing mathematics anxiety from both students' and teachers' perspectives. By understanding the factors contributing to mathematics anxiety and the possible remedies, educators, policymakers, and researchers can work together to create a more supportive and inclusive learning environment that promotes student success in mathematics.

Recommendations

Based on the findings of the study, the following are recommended;

- Schools and stakeholders should invest in a more conducive learning environment with adequate facilities, such as laboratories and reading materials. The curriculum should also be made less abstract by integrating practical applications to enhance student understanding.
- A broad re-orientation is needed to change the societal perception of mathematics and its role in national development.
- Teachers are critical to this effort and should receive regular training on innovative and effective teaching strategies. This includes fostering a supportive teacher-student relationship, promoting enthusiasm for the subject, and providing students with ample time to reflect on their work.
- Additionally, educators and parents should collaborate to debunk negative myths about mathematics to foster a more positive learning attitude.
- Schools should establish comprehensive counselling units to help students address their anxieties and highlight the subject's career relevance.
- Parents are encouraged to provide a strong support system for their children by avoiding negative comments about mathematics, offering emotional encouragement, and actively monitoring their academic progress.

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