A Descriptive-Correlational Study of Mathematics Anxiety and Academic Attainment among Junior High School Students of Balagunan National High School

Edmund A. Lopez

Student, Master in Science Teaching, Major in Mathematics, Institute of Advanced Studies, Davao del Norte State College, Panabo City, Davao del Norte

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ABSTRACT

Mathematics anxiety has long been associated with students' academic performance, yet its role remains complex and context-dependent. This study examined the level of mathematics anxiety, the level of academic attainment, and the relationship between these variables among junior high school students in a public secondary school. Using a descriptive–correlational design, data were collected from 228 students through an adapted Mathematics Anxiety Rating Scale (MARS) and a researcher-developed academic attainment questionnaire. Descriptive statistics and Pearson's correlation coefficient were employed for data analysis. Results indicated a moderate level of mathematics anxiety (M = 3.12) and a high level of academic attainment (M = 3.92). Contrary to prevailing literature, findings revealed a statistically significant positive relationship between mathematics anxiety and academic attainment ($r = 0.20–0.30$, $p < .05$). However, the strength of the relationships was weak to moderate, suggesting limited practical significance. These findings are interpreted in light of the Yerkes–Dodson Law, which posits that moderate levels of anxiety may facilitate performance. Nevertheless, the results should be interpreted with caution due to the reliance on self-reported measures and a single-school sample, which may have introduced response bias and limited generalizability. The study highlights the need to distinguish between facilitative and debilitative anxiety and recommends the use of objective academic records in future research.

Keywords: mathematics anxiety, academic attainment, facilitative anxiety, junior high school students, correlational study

INTRODUCTION

Mathematics plays a critical role in the development of learners' cognitive skills, problem-solving abilities, and overall academic success. Despite its importance, many students perceive mathematics as a challenging and anxiety-inducing subject. Mathematics anxiety, characterized by feelings of tension, fear, and worry during mathematical tasks, has been widely recognized as a factor that influences academic performance.

Extensive research has established a generally negative relationship between mathematics anxiety and academic achievement. High levels of anxiety have been shown to interfere with working memory and cognitive processing, thereby reducing students' ability to solve problems effectively. In addition, mathematics anxiety is associated with decreased motivation, avoidance behaviors, and lower engagement in learning activities.

However, emerging perspectives suggest that the relationship between mathematics anxiety and performance is not uniformly negative. Some studies propose that moderate levels of anxiety may function as a motivating force, increasing alertness, effort, and task engagement. This perspective aligns with the Yerkes–Dodson Law, which posits that optimal levels of arousal can enhance performance, while excessive anxiety becomes detrimental.

In the Philippine context, students continue to face challenges in mathematics, as reflected in international assessments such as PISA and TIMSS. These challenges are often linked to negative attitudes, low confidence,

and anxiety toward mathematics. While previous studies have primarily focused on academic performance measured through test scores, there is limited research examining the relationship between mathematics anxiety and broader indicators of academic attainment, including attendance and classroom behavior.

Moreover, existing literature has largely treated mathematics anxiety as a uniformly negative factor, with limited attention given to its potential facilitative role. This creates a gap in understanding how anxiety operates across different dimensions of academic functioning, particularly in localized school settings.

Thus, this study aims to examine the relationship between mathematics anxiety and academic attainment among junior high school students. Mathematics anxiety is analyzed across three dimensions: math course anxiety, math test anxiety, and numerical task anxiety, while academic attainment is assessed in terms of attendance, grades, and behavior. By exploring this relationship, the study seeks to provide a more nuanced understanding of the role of anxiety in students' academic experiences and to inform instructional practices that support both performance and emotional well-being.

Research Questions

The researchers sought to answer the following questions:

1. What is the level of math anxiety among junior high school students in Balagunan National High School in terms of:

a) Math Course Anxiety;

b) Math Test Anxiety; and

c) Numerical Task Anxiety?

2. What is the level of academic attainment among junior high school students in Balagunan National High School in terms of:

a) Attendance;

b) Grades; and

c) Behavior?

3. Is there a significant relationship between students' math anxiety and their academic attainment in mathematics among junior high school students in Balagunan National High School?

LITERATURE REVIEW

Presented in this section were the topics related to the study. First, the independent variable, mathematics anxiety, in terms of: a) Math Course Anxiety, b) Math Test Anxiety, and c) Numerical Task Anxiety. The second part was about the dependent variable, which is academic attainment, with its indicators: a) Attendance, b) Grades, and c) Behavior.

Mathematics Anxiety

Mathematics anxiety is a psychological condition characterized by feelings of tension, fear, and worry that interfere with an individual's ability to perform mathematical tasks. Contemporary research highlights its significant role in shaping students' cognitive processing and academic performance. Specifically, mathematics anxiety has been shown to disrupt working memory, limiting students' capacity to process and manipulate numerical information effectively (Barroso et al., 2020; Dowker et al., 2020).

A substantial body of literature consistently reports a negative relationship between mathematics anxiety and academic achievement. Large-scale meta-analyses indicate that students with higher levels of anxiety tend to demonstrate lower performance in mathematics, reduced motivation, and increased avoidance of mathematical

tasks (Barroso et al., 2020; Li et al., 2021). These findings suggest that anxiety functions as a cognitive and emotional barrier to effective learning.

However, mathematics anxiety is increasingly recognized as a multidimensional construct that varies across learning contexts. It encompasses cognitive, emotional, and behavioral components that interact to influence students' engagement and performance (Caviola et al., 2022). Recent studies further suggest that the impact of anxiety may depend on its intensity, with moderate levels potentially supporting rather than hindering academic functioning (Namkung et al., 2022).

In this study, mathematics anxiety is conceptualized across three dimensions: math course anxiety, math test anxiety, and numerical task anxiety, allowing for a more nuanced analysis of its relationship with academic attainment..

Math Course Anxiety

Math course anxiety refers to students' feelings of discomfort or apprehension during classroom instruction and participation in mathematical activities. It is influenced by factors such as prior learning experiences, self-efficacy, and classroom environment.

Research indicates that students with high levels of course-related anxiety tend to avoid participation and experience cognitive interference during instruction, which can negatively affect conceptual understanding (Namkung et al., 2022). Classroom dynamics, including perceived evaluation and comparison with peers, also contribute to heightened anxiety (Mutlu et al., 2021). Furthermore, low self-efficacy has been identified as a key predictor of disengagement in mathematics learning (Lee & Stankov, 2021).

These findings highlight the importance of supportive instructional practices in minimizing anxiety and promoting active participation in mathematics classrooms.

Math Test Anxiety

Math test anxiety is a form of performance anxiety that occurs before or during mathematics assessments. It is characterized by worry, fear of failure, and emotional distress, which can impair concentration and information retrieval.

Studies show that students with high test anxiety often underperform despite adequate preparation due to difficulties in focus and time management (Foley-Nicpon et al., 2023). Fear of negative evaluation and high-stakes testing environments further intensify this form of anxiety (Carey et al., 2022). In addition, test anxiety has been linked to avoidance behaviors such as procrastination, which can indirectly affect academic performance (Bicer et al., 2020).

These findings suggest that test anxiety is influenced not only by academic ability but also by emotional and psychological factors.

Numerical Task Anxiety

Numerical task anxiety refers to the discomfort experienced when performing mathematical computations and problem-solving tasks. Unlike test anxiety, it occurs during direct interaction with numerical content.

Research indicates that numerical anxiety can interfere with cognitive functioning, particularly working memory, resulting in slower processing and increased errors (Ashcraft & Ridley, 2020; Dowker et al., 2020). Neurocognitive studies further suggest that anxiety responses can become automatic over time, even in simple numerical tasks (Núñez-Peña & Suárez-Pellicioni, 2020). Consequently, students with high numerical anxiety may avoid engaging with mathematics, which can negatively impact long-term skill development (Mammarella et al., 2021).

Academic Attainment

Academic attainment refers to measurable outcomes of students' performance in school and is increasingly viewed as a multidimensional construct. Beyond grades, it includes behavioral and engagement-related factors such as attendance and classroom participation (Steinmayr et al., 2019; Liu et al., 2023).

Studies emphasize that consistent attendance supports learning continuity and improves academic outcomes, while absenteeism is associated with lower achievement and reduced motivation (Almeida et al., 2020; Kearney & Graczyk, 2021). Similarly, grades reflect not only cognitive ability but also students' effort, self-regulation, and emotional stability (Hasanah & Supena, 2021; Mega et al., 2020). Behavioral engagement, including attentiveness and participation, has also been identified as a strong predictor of academic success (Fredricks et al., 2021; Wang & Eccles, 2020).

In this study, academic attainment is measured across three indicators: attendance, grades, and behavior, providing a comprehensive view of students' academic functioning beyond traditional performance measures.

Attendance

Attendance refers to the consistency of a student's presence in school and participation in classroom activities. It is a critical factor in academic attainment, as regular attendance ensures continuous exposure to instruction and feedback. According to Almeida et al. (2020), irregular attendance disrupts learning continuity, resulting in gaps in knowledge and reduced academic performance.

Similarly, Kearney and Graczyk (2021) emphasized that chronic absenteeism is associated with lower academic achievement, decreased motivation, and behavioral challenges. Gottfried (2020) also found that absenteeism negatively affects academic outcomes, particularly in early secondary education. Liu et al. (2023) further noted that consistent attendance supports better engagement and persistence. In addition, Ansari et al. (2020) highlighted that school attendance plays a crucial role in long-term academic development.

Grades

Grades are standardized indicators used to evaluate students' academic performance and level of mastery of subject content. They reflect not only cognitive ability but also students' motivation and effort. According to Hasanah and Supena (2021), students with higher self-confidence and emotional stability tend to achieve better academic results.

Moreover, Liu et al. (2023) found that grades are significantly influenced by self-regulation and resilience. Chiu and Chow (2020) emphasized that students' beliefs about their academic abilities affect learning behavior and performance. Similarly, Mega et al. (2020) reported that motivation and emotional factors strongly predict academic achievement. In addition, Pintrich (2020) highlighted the role of self-regulated learning in maintaining high academic performance.

Behavior

Behavior refers to students' conduct in the classroom, including attentiveness, participation, discipline, and interaction with peers and teachers. It plays a crucial role in academic attainment, as positive behavior promotes engagement and effective learning. According to Merrell et al. (2020), students who exhibit self-regulation and appropriate classroom behavior tend to achieve higher academic outcomes.

Furthermore, Liu et al. (2023) found that behavioral engagement is closely linked to academic success. Wang and Eccles (2020) also emphasized that classroom engagement predicts academic achievement over time. Similarly, Skinner et al. (2020) reported that active participation enhances learning outcomes. In addition, Fredricks et al. (2021) highlighted that behavioral engagement supports both short-term and long-term academic success.

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative descriptive–correlational design to examine the relationship between mathematics anxiety and academic attainment among junior high school students. This design is appropriate for identifying the strength and direction of relationships between variables without establishing causality.

Research Respondents

The respondents were 228 junior high school students from Balagunan National High School, selected from a total population of 425 students. A stratified random sampling technique was used to ensure proportional representation across 12 sections, with each section serving as a stratum. Respondents were aged between 12 and 16 years.

Instruments of the Study

Two instruments were used in this study:

Mathematics Anxiety Questionnaire. Adapted from the Mathematics Anxiety Rating Scale (MARS), this instrument measured mathematics anxiety across three dimensions: math course anxiety, math test anxiety, and numerical task anxiety. Each dimension consisted of five items, rated on a 5-point Likert scale ranging from 1 (Not Worried) to 5 (Extremely Worried).

Academic Attainment Questionnaire. A researcher-developed instrument measured academic attainment in terms of attendance, grades, and behavior, with five items per indicator. Responses were rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Both instruments were validated by subject matter experts and demonstrated acceptable content validity. Reliability testing using Cronbach's alpha indicated satisfactory internal consistency..

Procedure

Permission to conduct the study was obtained from the school administration. Data were collected through survey questionnaires administered to the respondents during designated school hours. Participants were informed about the purpose of the study and were given sufficient time to complete the questionnaires..

Data Analysis

Descriptive statistics, particularly the **mean,** were used to determine the level of mathematics anxiety and academic attainment. The **Pearson Product–Moment Correlation Coefficient (r)** was employed to examine the relationship between the variables. Statistical significance was set at the 0.05 level.

Ethical Considerations

Participation in the study was voluntary, and informed consent was obtained from participants and their guardians. Confidentiality and anonymity were strictly maintained, and all data were used solely for research purposes.

RESULTS

This section presents the results of the study derived from the two adapted survey questionnaires. The data were analyzed by computing the mean of each item for every indicator. Furthermore, the indicators were correlated to determine their relationship with students' academic attainment. The results of the analysis serve as the basis for answering the research problems presented in Chapter 1.

Mathematics Anxiety

Table 1 shows that mathematics anxiety across all dimensions is moderate (M = 3.12), with math test anxiety emerging as the most prominent. This indicates that students experience anxiety in various contexts, including classroom participation, assessments, and everyday numerical tasks.

The overall pattern suggests that mathematics anxiety functions as a persistent but manageable factor in students' learning experiences. While it may not completely prevent students from engaging in tasks, it can still influence their cognitive processes, particularly in situations involving pressure or difficulty.

These findings highlight that mathematics anxiety is not uniform but varies depending on context and task demands. As such, its impact on learning may differ across situations, emphasizing the importance of creating supportive environments that help students manage anxiety effectively.

Table 1 Mathematics Anxiety

Indicator	**Mean**	**Descriptive equivalent**
Math Course Anxiety	3.04	Moderate
Math Test Anxiety	3.24	Moderate
Numerical Task Anxiety	3.08	Moderate
Average mean	**3.12**	**Moderate**

Academic Attainment

Table 2 shows that overall academic attainment is high (M = 3.92), indicating that students consistently demonstrate strong performance across attendance, grades, and behavior.

Among the indicators, behavior obtained the highest mean, suggesting that positive classroom conduct and engagement are key contributors to academic success. Attendance also remains high, reflecting students' recognition of its importance in maintaining learning continuity. Although grades obtained the lowest mean among the indicators, they still reflect strong academic performance, indicating that students are generally successful in meeting academic expectations.

These findings suggest that academic attainment is not solely determined by intellectual ability but is also shaped by consistent participation, positive behavior, and sustained effort. The combination of these factors contributes to students' overall academic success and supports their continued development.

Table 2 Academic Attainment

Indicator	**Mean**	**Descriptive equivalent**
Attendance	3.97	High
Grades	3.78	High
Behavior	4.02	High
Average mean	**3.92**	**High**

Relationship between the indicators of Mathematics Anxiety and Academic Attainment

Table 3 presents the relationship between the indicators of mathematics anxiety and academic attainment. The results reveal that all three indicators—Math Course Anxiety ($r = 0.30$, $p = 0.03$), Math Test Anxiety ($r = 0.27$, $p = 0.02$), and Numerical Task Anxiety ($r = 0.20$, $p = 0.02$)—have statistically significant relationships with academic attainment. Based on the correlation coefficients, Math Course Anxiety demonstrates a moderate positive relationship, while Math Test Anxiety and Numerical Task Anxiety exhibit weak positive relationships.

Notably, the positive direction of these relationships diverges from the majority of existing literature, which consistently reports a negative association between mathematics anxiety and academic performance. This

inconsistency suggests that the relationship between these variables may be more complex and context-dependent than traditionally assumed.

One possible explanation is that students with higher academic attainment may also experience increased performance-related pressure, which can elevate anxiety levels. High-performing students often set higher expectations for themselves and may become more anxious in evaluative contexts such as examinations and classroom participation. In such cases, anxiety may coexist with strong academic engagement rather than directly impairing performance.

Another plausible explanation relates to the measurement of academic attainment, which relied on self-reported indicators such as attendance, grades, and behavior. This approach may have introduced response bias, as students may overestimate their academic performance or provide socially desirable responses. Consequently, the observed positive relationship may reflect perceived rather than actual academic attainment.

Table 3 Relationship between the indicators of Mathematics Anxiety and Academic Attainment

Independent variable (X)	**Dependent variable (Y)**	**Pearson Coefficient (r) value**	**Probability Value**	**H_0 Decision**
Math Course Anxiety	Academic Attainment	0.30	0.03	reject
Math Test Anxiety		0.27	0.02	reject
Numerical Task Anxiety		0.20	0.02	reject

****sig at 0.05*

Furthermore, the findings may indicate that moderate levels of anxiety can function as a facilitative factor, motivating students to exert greater effort, maintain focus, and actively engage in learning tasks. This aligns with the perspective that anxiety can have both facilitative and debilitative effects depending on its intensity and the individual's coping mechanisms.

Although Cognitive Interference Theory posits that anxiety consumes cognitive resources and may impair performance, the present results suggest that this effect is not uniformly negative. Instead, the impact of anxiety appears to vary depending on its level and context. Moderate anxiety may not significantly disrupt cognitive functioning, allowing students to maintain satisfactory academic performance.

However, these findings should be interpreted with caution. The use of a single-school sample and reliance on self-reported measures limit the generalizability and validity of the results. Future studies are encouraged to utilize objective academic records and include more diverse samples to further examine the nature of this relationship.

Overall, the results indicate that mathematics anxiety is a significant factor in students' academic experiences; however, its role is not exclusively detrimental. These findings highlight the importance of helping students regulate anxiety at an optimal level that supports engagement and academic performance.

DISCUSSION

This study examined the relationship between mathematics anxiety and academic attainment among junior high school students. The findings revealed a moderate level of mathematics anxiety and a high level of academic attainment, indicating that students experience anxiety while maintaining strong academic engagement.

A key finding of this study is the statistically significant positive relationship between mathematics anxiety and academic attainment. This result diverges from the dominant body of literature, which consistently reports a negative association between these variables. However, the strength of the correlations observed in this study was weak to moderate ($r = 0.20–0.30$), suggesting limited practical significance.

One possible explanation for this finding is the concept of facilitative anxiety, as described by the Yerkes–Dodson Law. Moderate levels of anxiety may enhance performance by increasing alertness, effort, and task

engagement. In this context, students may respond to academic demands with heightened focus and motivation, allowing them to maintain satisfactory academic performance despite experiencing anxiety.

Another plausible explanation relates to performance-related pressure among higher-achieving students. Students who perform well academically may experience increased expectations from themselves, teachers, or peers, which can elevate anxiety levels. In such cases, anxiety may function as a byproduct of academic engagement rather than a direct determinant of performance.

However, a more critical interpretation suggests that the observed positive relationship may be influenced by methodological limitations rather than representing a true reversal of established theoretical patterns. The use of self-reported measures of academic attainment, including attendance, grades, and behavior, may have introduced systematic bias. Students may overestimate their performance due to social desirability or self-perception effects, resulting in inflated correlations that reflect perceived rather than actual academic competence.

In addition, the relatively high levels of reported academic attainment among respondents may indicate a restricted range of scores, which can artificially influence correlation results. Limited variability in the dependent variable reduces the ability to detect the expected negative relationship and may contribute to the emergence of a weak positive association.

Contextual and cultural factors may also play a role. In educational settings where strong academic expectations are emphasized, students who are more engaged and motivated may simultaneously experience higher levels of anxiety. In such contexts, anxiety may coexist with achievement rather than directly impair it.

These findings do not necessarily contradict Cognitive Interference Theory but instead suggest that the impact of anxiety is dependent on its intensity and regulation. While high levels of anxiety are likely to disrupt cognitive functioning, moderate levels may not significantly impair performance and may even support engagement under certain conditions.

Nevertheless, the findings must be interpreted with caution. The results highlight the complexity of the relationship between mathematics anxiety and academic attainment and underscore the need for more rigorous methodological approaches in future research.

Despite its contributions, this study has several important limitations. First, academic attainment was measured using self-reported indicators, which are inherently subjective and may be influenced by social desirability bias or inaccuracies in self-assessment. As such, the reported levels of academic attainment may not accurately reflect students' actual performance.

Second, the study was conducted within a single public secondary school, limiting the generalizability of the findings. School-specific factors such as instructional practices, classroom environment, and student characteristics may have influenced the results.

Third, the correlational design precludes any inference of causality. The identified relationship does not establish whether mathematics anxiety influences academic attainment or vice versa, and other variables such as motivation, self-efficacy, or socioeconomic background may have contributed to the observed outcomes.

Finally, the weak to moderate correlation coefficients indicate that mathematics anxiety explains only a small portion of the variance in academic attainment. Therefore, the practical significance of the findings remains limited.

Implications

The findings of this study offer several implications for educational practice. First, mathematics anxiety should not be viewed solely as a negative factor. At moderate levels, it may coexist with academic engagement and even serve as a motivating force. Educators should therefore focus on helping students regulate anxiety rather than attempting to eliminate it entirely.

Second, teachers should adopt instructional strategies that balance academic challenge with emotional support. Approaches such as formative assessment, constructive feedback, and collaborative learning may help reduce excessive anxiety while maintaining student engagement.

Third, schools should consider integrating socio-emotional learning into mathematics instruction to address both cognitive and affective dimensions of learning. Supporting students' emotional well-being may enhance their ability to cope with academic demands.

Finally, future research should prioritize the use of objective academic records and more diverse samples to improve the validity and generalizability of findings related to mathematics anxiety and academic attainment.

CONCLUSION

This study found that junior high school students exhibit a moderate level of mathematics anxiety alongside a high level of academic attainment. A statistically significant but weak positive relationship was identified between these variables, suggesting limited practical significance.

The findings indicate that mathematics anxiety is not inherently detrimental and may, at moderate levels, coexist with academic engagement. However, the observed relationship should be interpreted with caution due to methodological limitations, particularly the use of self-reported measures and a single-school sample.

Overall, this study highlights the context-dependent nature of mathematics anxiety and its potential dual role in academic performance. Future research using objective measures and broader samples is necessary to further clarify this relationship.

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