

MATH ANXIETY AND GENDER AS DETERMINANTS OF MATH ACHIEVEMENT AMONG ELEMENTARY SCHOOL STUDENTS

Rifyan Firdaus¹, Tatang Herman², Wahyudin³

¹²³Universitas Pendidikan Indonesia

Correspondence Email; rifyanf@upi.edu

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Abstract

This study aimed to examine differences in mathematics achievement based on mathematics anxiety levels and gender, as well as the interaction between mathematics anxiety and gender among sixth-grade elementary school students. A quantitative cross-sectional design was employed involving all 32 sixth-grade students, consisting of 18 male and 14 female students, at SD Negeri Cibangan, Cipongkor District, West Bandung Regency, West Java, Indonesia. The entire population participated in the study through a total sampling technique. The data utilized were quantitative primary data comprising mathematics anxiety scores, mathematics achievement scores, and gender information, all obtained directly from the student participants. Mathematics anxiety data were collected using the Abbreviated Math Anxiety Scale (AMAS) questionnaire; mathematics achievement data were obtained via the Mathematical Achievement Test (MAT); and gender data were derived from the participants' demographic information. Statistical testing using two-way ANOVA with the assumption that it has met the requirements of normal distribution and the same population variance. The results of this study are that there is no difference in the influence of math anxiety on math achievement, there is no difference in the influence of gender on math achievement, and there is no interaction effect between math anxiety and gender on math achievement. This study provides important insights to support more inclusive and adaptive mathematics education, which takes into account psychological factors and gender differences.

Keywords

Math Anxiety, Gender, Math Achievement, Elementary School.



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INTRODUCTION

Mathematics is a subject that plays a central role in the development of cognitive skills and problem-solving in children at the elementary school level. However, despite the importance of mathematics in education, many students have difficulty learning it (Fauzi & Ariesyawan, 2020). One of the factors that can affect mathematics achievement is math anxiety (Lau et al., 2022; Szczygiel, 2021; Zakaria et al., 2012). Ramirez et al. (2013a) agree that math anxiety is one factor affecting mathematics achievement in elementary schools.

Math anxiety is an emotional condition characterized by feelings of excessive anxiety, fear, or stress when faced with math tasks or tests (Ashcraft, 2002). Previous research has shown that students who experience math anxiety tend to have lower achievement in math compared to students who do not experience the same anxiety (Beilock & Maloney, 2015). Therefore, it is important to understand how math anxiety can affect students' math abilities, especially at the elementary school level, when the foundation of math skills is being formed (Mejias et al., 2019; Sergejeva et al., 2018).

Preliminary observations at SD Negeri Cibangban, Cipongkor District, revealed a concerning condition in sixth-grade mathematics learning. When mathematics was mentioned, or mathematics learning activities were about to begin, all 32 students showed observable signs of anxiety toward the subject. At the same time, students' mathematics achievement indicated a substantial academic challenge. Of the 32 sixth-grade students, only four students obtained a mathematics score above the school's established standard, while the remaining students had not achieved scores above that standard. These preliminary findings suggest that difficulties in mathematics learning at the school are not limited to academic achievement but may also involve students' emotional response toward mathematics.

This situation becomes particularly important when viewed from the perspective of mathematics anxiety and gender. Students' observable anxious responses toward mathematics raise questions about whether different levels of mathematics anxiety are associated with differences in their mathematics achievement. At the same time, the presence of both male and female students in the same learning environment provides an opportunity to examine whether mathematics achievements differ according to gender and whether gender is related to the way mathematics anxiety is associated with achievement. These issues are relevant because previous studies have reported inconsistent findings regarding mathematics anxiety, gender, and mathematics

performance. Some studies have identified negative associations between mathematics anxiety and achievement, whereas others have reported weak or non-significant relationships. Similarly, findings concerning gender differences in mathematics performance remain inconclusive across educational and sociocultural contexts.

Previous studies, however, have reported inconsistent findings regarding the relationship between mathematics anxiety and mathematics achievement. Several studies have identified a negative relationship between mathematics anxiety and achievement (Gashaj et al., 2023; Gunderson et al., 2018; Lau et al., 2022; Quintero et al., 2021; Szczygiel, 2021; Zakaria et al., 2012), and there are also those that find positive findings (Altakhynéh, 2020). Therefore, it is necessary to review research on math anxiety's influence on math achievement.

Research on mathematics anxiety and its relationship to gender and mathematics achievement has yielded mixed results. While some studies have found no significant gender differences in mathematics anxiety (Altakhynéh, 2020; Zakaria et al., 2012), others have reported higher levels of mathematics anxiety in girls, especially in test situations (Szczygiel, 2020). Mathematics anxiety generally has a negative impact on mathematics achievement (Milovanović, 2020; Zakaria et al., 2012), although moderate levels of anxiety may have positive effects (Altakhynéh, 2020). These findings highlight the importance of early identification and intervention for mathematics anxiety, especially in girls (Van Mier et al., 2019).

Contradictory findings have also been reported regarding gender and mathematics achievement. Some studies suggest that male students perform better than female students in certain areas of mathematics (Bassey et al., 2011; Ross et al., 2012), while other studies have found no significant gender differences in mathematics achievement (Sarouphim & Chartouny, 2017; Sullivan, 2009). Cross-national evidence further suggests that gender differences in mathematics performance may vary according to social and cultural contexts (Else-Quest et al., 2010). These findings indicate that gender cannot be assumed to have a uniform relationship with mathematics performance across different educational contexts.

The inconsistencies in previous research reveal an important gap concerning the simultaneous roles of mathematics anxiety and gender in elementary students' mathematics achievement. Previous studies have commonly examined the relationship between mathematics anxiety and achievement or differences in mathematics achievement according to gender, yet more limited attention has been given to whether the relationship between mathematics anxiety and

achievement varies according to gender, particularly among elementary school students. This issue indicated both observable anxiety toward mathematics and limited mathematics achievement among sixth-grade students. Therefore, examining the main effects of mathematics anxiety and gender, as well as their interaction within a single analytical framework, may provide contextual evidence that contributes to understanding previously inconsistent findings.

Understanding these relationships also has practical implications for elementary mathematics education. Identifying whether differences in mathematics achievement are associated with mathematics anxiety, gender, or their interaction may help educators avoid making assumptions about the causes of students' mathematics difficulties and support the development of more responsive learning environments (Recher et al., 2018). Moreover, understanding students' emotional responses toward mathematics may contribute to the development of appropriate strategies for reducing mathematics anxiety and supporting mathematics learning (Devine et al., 2012; Ramirez et al., 2018).

Accordingly, this study aims to (1) examine differences in mathematics achievement across different levels of mathematics anxiety, (2) examine differences in mathematics achievement between male and female students, and (3) investigate the interaction effect between mathematics anxiety levels and gender on mathematics achievement among sixth-grade students at SD Negeri Cibangban, Cipongkor District. By examining both the main effects and their interaction within a single analytical framework, this study seeks to clarify previous inconsistent findings and provide empirical evidence for developing more responsive and inclusive mathematics education at the elementary school level.

METHOD

This study employs a quantitative cross-sectional design to examine differences in mathematics achievement based on levels of mathematics anxiety and gender, as well as the interaction between these two factors among sixth-grade elementary school students. A cross-sectional design was deemed appropriate because all variables were measured at a single point in time, without any intervention or manipulation by the researcher.

The study was conducted at SD Negeri Cibangban, Cipongkor District, West Bandung Regency, West Java, Indonesia. The school was purposively selected because its student characteristics, curriculum implementation, and mathematics learning context were considered

representative of general primary education characteristics in the study area. The research focuses on sixth-grade students because they have completed the mathematics material taught in the fifth grade, which serves as the prerequisite mathematical competence for their current level of study.

Population, Sample, and Sampling

The target population of this study comprised sixth-grade elementary school students, while the accessible population consisted of all sixth-grade students enrolled at the participating school. The accessible population included 32 students, consisting of 18 males and 14 females.

Given the relatively small size of the accessible population, all 32 students were included as research participants. Consequently, this study employed a total sampling technique (census) rather than selecting only a subset of the population. This procedure enabled the study to encompass the entire accessible population and ensured the representation of both male and female students in the analysis.

The selection of schools and students was conducted at different levels. Research schools were selected purposively based on their relevance to the research context, whereas all sixth-grade students in the selected schools were included using a total sampling technique.

Types and Sources of Data

This study utilizes quantitative primary data obtained directly from the 32 participating students. The research data comprise three main components: mathematics anxiety, mathematics achievement, and gender.

Data on mathematics anxiety were obtained through students' responses to the Abbreviated Math Anxiety Scale (AMAS), while mathematics achievement data were derived from students' scores on the Mathematical Achievement Test (MAT). Gender data were obtained from the participants' demographic information and categorized as male or female.

Thus, the primary source of research data was the group of sixth-grade student participants, while research instruments served as the means to obtain quantitative data regarding mathematics anxiety and mathematics achievement.

Data Collection

Data were collected by giving questionnaires to measure math anxiety and tests to measure math achievement to students. Data collection is carried out simultaneously (at the same time) to ensure that the data obtained describes the same conditions related to math anxiety and math achievement in each student. At this stage, there is no intervention or manipulation of variables from

the researcher. All variables are only observed and recorded at the same point in time.

The instrument used in this study was a modified Abbreviated Math Anxiety Scale (AMAS) instrument quoted from Mitchell & George (2022). The Abbreviated Math Anxiety Scale (AMAS) is a measuring tool to capture psychological reactivity, negative cognition, avoidance behavior, and anxiety experienced when faced with mathematical stimuli. This scale has 9 items representing two sub-dimensions: mathematics learning anxiety and mathematics evaluation anxiety. The minimum and maximum possible scores (nine and 45, respectively) are used to determine the range associated with the level of mathematics anxiety (low anxiety = 9-20, moderate anxiety = 21-32, and high anxiety = 33-45).

The next instrument is related to the Mathematical Achievement Test (MAT). The questions contained in this instrument are based on modifications of questions developed for fifth graders in Nebraska by Nebraska State Accountability Mathematics (NeSA-Mathematics) (Z. Li, 2024). The following is the Mathematical Achievement Test (MAT).

Research Hypotheses

To ensure direct alignment among the research objectives, research variables, and statistical analysis techniques, this study tests the following three hypotheses:

Hypothesis 1: There is a significant difference in mathematics achievement among students with different levels of mathematics anxiety.

Hypothesis 2: There is a significant difference in mathematics achievement between male and female students.

Hypothesis 3: There is a significant interaction effect between the level of mathematics anxiety and gender on mathematics achievement.

The first hypothesis examines differences in mathematics achievement based on three levels of mathematics anxiety. The second hypothesis examines differences in mathematics achievement based on gender. Meanwhile, the third hypothesis examines whether the pattern of differences in mathematics achievement based on mathematics anxiety levels differs between male and female students.

Data Analysis

The collected data were analyzed using descriptive and inferential statistics. Descriptive analysis was conducted first to provide an overview of the characteristics of mathematics achievement data based on mathematics anxiety levels and gender. The distribution of students

across low, moderate, and high mathematics anxiety categories was identified, while mathematics achievement scores were described based on mathematics anxiety levels, gender, and the combination of these two factors.

Subsequently, inferential analysis was performed using Two-Way Analysis of Variance (Two-Way ANOVA) with the aid of IBM SPSS Statistics Version 27. The use of Two-Way ANOVA aligns with the study's factorial structure, as it involves two categorical independent variables—mathematics anxiety level and gender—and one quantitative dependent variable: mathematics achievement. Two-Way ANOVA was also the method used to analyze the results presented in the manuscript.

In this factorial model, mathematics anxiety comprises three levels (low, moderate, and high), while gender consists of two groups (male and female). Mathematics achievement scores obtained via the MAT served as the dependent variable. Thus, Two-Way ANOVA was used to simultaneously test three statistical effects.

First, the main effect of mathematics anxiety level was analyzed to determine whether there were differences in mathematics achievement among students with low, moderate, and high mathematics anxiety levels. This analysis was used to test H1.

Second, the main effect of gender was analyzed to determine whether there were differences in mathematics achievement between male and female students. This analysis was used to test H2.

Third, the interaction effect between mathematics anxiety level and gender was analyzed to determine whether the pattern of differences in mathematics achievement based on mathematics anxiety level differed between male and female students. This analysis was used to test H3.

The analysis was conducted with due regard for the assumptions underlying factorial ANOVA, including the independence of observations, approximate normality, and homogeneity of variance. Statistical decisions were made at a significance level of $\alpha = 0.05$. A p-value of less than 0.05 is interpreted as evidence of a statistically significant effect, whereas a p-value greater than 0.05 indicates that the obtained statistical evidence is insufficient to reject the relevant null hypothesis.

FINDINGS AND DISCUSSION

Findings

All data analysis in this research is based on the main data contained in tables 1, 2, and 3 below:

Table 1. Math Achievement Scores Based on Math Anxiety Levels

	Low	Moderate	High
Math Achievement	11; 14; 8; 10	5; 4; 9; 11; 8; 7; 5; 15; 15; 14; 6; 11; 7; 7; 11; 10; 2; 4; 11; 10; 12; 8	7; 15; 14; 14; 12; 8;
Average	10,75	8,72	11,67

Table 2. Math Achievement Scores By Gender

	Gender	
	Male	Female
Math Achievement	7; 5; 11; 4; 15; 14; 9; 11; 8; 7; 14; 5; 15; 15; 14; 12; 6; 11;	7; 7; 11; 10; 8; 2; 4; 14; 8; 10; 11; 10; 12; 8
Average	10,17	7,62

Table 3. Math Achievement Scores of Males and Females by considering the level of math anxiety

		Low	Moderate	High
Gender	Male	11;	5; 4; 9; 11; 8; 7; 5; 15; 15; 14; 6; 11	7; 15; 14; 14; 12
	Average	11	9,17	12,4
	Female	14; 8; 10	7; 7; 11; 10; 2; 4; 11; 10; 12; 8	8;
	Average	10,7	8,2	8

Based on the identification of the problem, the researcher has conducted research on:

1. Hypothesis 1: There is a significant difference in mathematics achievement among students with different levels of mathematics anxiety.
2. Hypothesis 2: There is a significant difference in mathematics achievement between male and female students.
3. Hypothesis 3: There is a significant interaction effect between the level of mathematics anxiety and gender on mathematics achievement.

Formally, the three hypotheses above are, respectively, statistical hypotheses (H_0) and research hypotheses (H_1) as follows:

1. $H_0 : \alpha_1 = \alpha_2 = \alpha_3$

$H_1 : \text{not } H_0$

Note:

α_1 = The effect of high math anxiety on math achievement

α_2 = The effect of moderate math anxiety on math achievement

α_3 = The effect of low math anxiety on math achievement

2. $H_0 : \beta_1 = \beta_2$

$H_1 : \beta_1 \neq \beta_2$

Note:

β_1 = The effect of male gender on math achievement

β_2 = The effect of female gender on math achievement

3. $H_0 : \alpha_1\beta_1 = \alpha_1\beta_2 = \alpha_2\beta_1 = \alpha_2\beta_2 = \alpha_3\beta_1 = \alpha_3\beta_2$

$H_1 : \text{not } H_0$

Note:

$\alpha_1\beta_1$ = Interaction between high math anxiety and male gender on math achievement

$\alpha_1\beta_2$ = Interaction between high math anxiety and female gender on math achievement

$\alpha_2\beta_1$ = Interaction between moderate math anxiety and male gender on math achievement

$\alpha_2\beta_2$ = Interaction between moderate math anxiety and female gender on math achievement

$\alpha_3\beta_1$ = Interaction between low math anxiety and male gender on math achievement

$\alpha_3\beta_2$ = Interaction between low math anxiety and female gender on math achievement

To test the hypothesis written above, SPSS Version 27 analysis assistance was used, which is related to Two-Way Anova, and the output is as follows:

Table 4. Two-Way ANOVA Results for Mathematics Achievement

Source	Sum of Squares	df	Mean Square	F	P
Corrected Model	68.835	5	13.767	1.081	.394
Gender	11.960	1	11.960	0.939	.341
Mathematics Anxiety Level	16.833	2	8.416	0.661	.525
Gender x Mathematics Anxiety Level	9.315	2	4.657	0.366	.697
Error	331.133	26	12.736	-	-
Corrected Total	399,969	31	-	-	-

From Table 4 above, the following important notes are obtained:

1. The sig. value at high, medium, and low math anxiety levels is 0.525, and this value is greater than 0.05 (α), meaning that there is no difference in the influence of math anxiety levels on math achievement.
2. The sig. value on gender is 0.341, and this value is greater than 0.05, meaning that there is no difference in the influence of male and female gender on math achievement. This means that H0 is accepted and H1 is rejected.
3. The sig. value at the math anxiety and gender levels (interaction effect) is 0.697 and is greater than 0.05, which means that there is no interaction effect/influence between math anxiety levels and gender on math achievement.

Discussion

Math Anxiety and Math Achievement

The findings showed that mathematics achievement did not differ significantly across low, moderate, and high levels of mathematics anxiety among sixth-grade students at SD Negeri Cibangban. The statistical analysis indicated a non-significant main effect of mathematics anxiety on mathematics achievement ($p = .525$). Descriptively, the mean mathematics achievement scores were 10.75 for students with low mathematics anxiety, 8.72 for those with moderate mathematics anxiety, and 11.67 for those with high mathematics anxiety. This pattern does not show a consistent decline in mathematics achievement as the level of mathematics anxiety increases. Therefore, within the context of the present study, mathematics anxiety level alone did not statistically differentiate students' mathematics achievement.

This finding is noteworthy because mathematics anxiety is theoretically associated with cognitive and emotional processes that may interfere with mathematical performance. Anxiety experienced during mathematics-related activities can consume cognitive resources that would

otherwise be used to process mathematical information, maintain attention, and solve problems (Ashcraft & Krause, 2007). Similarly, mathematics anxiety may encourage avoidance of mathematics-related activities, thereby reducing opportunities to develop mathematical competence (Beilock & Maloney, 2015). Ramirez et al. (2013) also demonstrated that the relationship between mathematics anxiety and achievement can emerge during the elementary school years. Nevertheless, the present findings suggest that such a relationship may not manifest uniformly across all students or educational contexts.

The result differs from several previous studies reporting a negative relationship between mathematics anxiety and mathematics achievement (Gashaj et al., 2023; Gunderson et al., 2018; Lau et al., 2022; Quintero et al., 2021; Szczygiel, 2021; Wu et al., 2012; Zakaria et al., 2012). However, the current finding also reinforces evidence that the association between mathematics anxiety and achievement is not necessarily uniform across populations and contexts (Altakhyneh, 2020). Therefore, mathematics anxiety should not automatically be assumed to correspond directly to lower achievement in every group of students.

The context of SD Negeri Cibangban may help explain this finding. Preliminary observations indicated that anxious responses toward mathematics were relatively common among the sixth-grade students, while mathematics achievement was also generally limited, with only four of the 32 students obtaining scores above the school's established standard. Under such conditions, differences in achievement may be associated with a broader combination of cognitive, motivational, instructional, and prior-learning factors rather than mathematics anxiety alone. Previous research has similarly shown that mathematics achievement is associated with multiple factors, including cognitive ability, motivation, previous learning experiences, and problem-solving-related competencies (Abín et al., 2020; Siegler et al., 2012).

However, this interpretation should be made cautiously. The absence of statistical significance does not demonstrate that mathematics anxiety has no relevance to students' mathematics learning. Rather, it indicates that the present data did not provide sufficient statistical evidence that mathematics achievement differed across the three mathematics anxiety categories. The relatively small number of participants and the unequal distribution of students across the anxiety categories may also have limited the ability of the analysis to identify differences. Therefore, the present finding is better interpreted as contextual evidence than as evidence that mathematics anxiety is unrelated to mathematics achievement in general.

Gender and Math Achievement

The second finding indicated that mathematics achievement did not differ significantly between male and female students at SD Negeri Cibangban ($p = .341$). Thus, the data did not provide sufficient statistical evidence to conclude that gender differentiated mathematics achievement among the sixth-grade students participating in this study.

This result is consistent with studies reporting no significant gender differences in mathematics achievement (Hyde, 2016; Sarouphim & Chartouny, 2017; Sullivan, 2009). Such findings challenge the assumption that either male or female students inherently demonstrate superior mathematics performance. Instead, mathematics achievement may be more closely related to students' learning opportunities, prior knowledge, motivation, instructional experiences, and sociocultural environments than to gender alone.

Nevertheless, the result contrasts with studies reporting gender differences in particular areas of mathematical performance. Bassey et al. (2011), for example, reported differences in mathematics achievement between male and female students, while Ross et al. (2012) identified gender-related patterns in mathematics performance and confidence. Other studies have also suggested differences in particular cognitive or mathematical tasks (Chang & Kajackaite, 2019; Wei et al., 2016). These contrasting results indicate that the relationship between gender and mathematics achievement is context-dependent rather than universal.

The educational context should therefore be considered when interpreting the results at SD Negeri Cibangban. Male and female students in this study were educated within the same school environment, curriculum, grade level, and mathematics learning context. One plausible interpretation is that these shared educational experiences may have reduced systematic differences in achievement according to gender. However, the present study did not directly measure instructional equality, teacher expectations, learning opportunities, or gender-related classroom experiences. Consequently, this explanation should be regarded as a contextual interpretation rather than an empirically tested mechanism.

The finding is also compatible with cross-national evidence showing that gender differences in mathematics achievement vary considerably between social and educational contexts (Else-Quest et al., 2010). Therefore, the absence of a statistically significant gender difference at SD Negeri Cibangban should not be interpreted as evidence that gender is irrelevant in all mathematics-learning contexts. Rather, it demonstrates that gender was not a statistically significant

differentiating factor in mathematics achievement within the sample examined in this study.

Interaction Between Math Anxiety and Gender on Math Achievement

The third finding showed that the interaction between mathematics anxiety level and gender was not statistically significant in predicting differences in mathematics achievement ($p = .697$). This result indicates that, within the present sample, the pattern of mathematics achievement across low, moderate, and high mathematics anxiety levels did not differ significantly between male and female students.

This finding is particularly relevant because previous studies have suggested that mathematics anxiety may be experienced differently according to gender. Devine et al. (2012), for example, reported gender-related differences in mathematics anxiety and its relationship with mathematics performance, while Van Mier et al. (2019) found that the relationship between mathematics anxiety and arithmetic performance differed according to gender among elementary school children. Such findings suggest the possibility that gender may condition the relationship between mathematics anxiety and achievement.

In contrast, the present study did not find sufficient statistical evidence for such an interaction. This means that the relationship between mathematics anxiety categories and mathematics achievement could not be statistically distinguished between male and female students at SD Negeri Cibangban. The finding, therefore, contributes contextual evidence to the broader literature by demonstrating that gender-related differences in the association between mathematics anxiety and achievement may not emerge consistently across all groups of elementary school students.

Importantly, a non-significant interaction should not be interpreted as proof that mathematics anxiety operates identically among male and female students. Interaction effects generally require sufficient observations within each combination of factor levels to be detected reliably. In the present study, only 32 students participated, and the students were unevenly distributed across the three mathematics anxiety categories. Consequently, the statistical analysis may have had limited sensitivity to detect subtle differences in the mathematics anxiety–achievement relationship between male and female students. Future studies involving larger and more balanced samples are therefore required before stronger conclusions regarding the interaction between mathematics anxiety and gender can be drawn.

Taken together, the three findings suggest that mathematics achievement among sixth-grade students at SD Negeri Cibangban cannot be sufficiently explained by mathematics anxiety level, gender, or the interaction between these two variables alone. This does not imply that mathematics anxiety and gender are unimportant in mathematics education. Instead, the findings indicate that students' mathematics achievement should be understood as a multidimensional outcome that may also involve cognitive, motivational, instructional, and contextual factors.

From a practical perspective, the findings suggest that teachers should avoid assuming that students' mathematics difficulties can be explained solely by their gender or observable anxiety toward mathematics. Although preliminary observations indicated anxious responses among the students, interventions should address both emotional and academic aspects of mathematics learning. Supportive classroom environments, appropriate instructional strategies, opportunities to strengthen mathematical understanding, and efforts to reduce unnecessary anxiety may therefore benefit students regardless of gender.

Several limitations should be considered when interpreting these findings. First, the study involved only 32 sixth-grade students from one public elementary school, limiting the extent to which the findings can be generalized to other schools or populations. Second, the cross-sectional design captures mathematics anxiety and achievement within a particular period and therefore does not establish causal relationships among the variables. Third, the distribution of students across mathematics anxiety categories was unequal, which may have reduced the statistical sensitivity of the factorial analysis, particularly for detecting an interaction effect. Finally, the study focused specifically on mathematics anxiety and gender and did not directly examine other potentially relevant variables, such as motivation, prior mathematical knowledge, cognitive ability, instructional practices, or family-related factors.

Future research should therefore involve larger and more diverse samples across public and private schools, urban and rural settings, and different grade levels. Longitudinal studies may also provide a clearer understanding of how mathematics anxiety and achievement develop over time. In addition, future research should consider integrating cognitive, motivational, instructional, and contextual variables to provide a more comprehensive explanation of mathematics achievement among elementary school students.

CONCLUSION

This study shows that low, medium, and high levels of math anxiety do not have a significant effect on elementary school students' math achievement. Although math anxiety is often considered a factor that influences students' math abilities, especially at the elementary level, these results indicate that its impact is not always consistent. Then, the results of the gender study showed that there was no significant difference between male and female students in math achievement. This finding indicates that gender is not a major factor in math achievement at the elementary school level. Finally, related to the three variables, it shows that there is no significant effect of the interaction between math anxiety levels (low, medium, high) and gender (male and female) on elementary school students' math achievement.

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