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G.K. Yeshmurat*, L.S. Kainbayeva, 2025.

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*E-mail: gulnuresh@mail.ru**EXAMINING MATH ANXIETY IN SECONDARY EDUCATION:
INFLUENCE OF DEMOGRAPHICS, EDUCATIONAL CONTEXT, AND
INSTRUCTIONAL SUPPORT****Yeshmurat Gulnur** — Master of Pedagogical Sciences, doctoral student, Korkyt Ata Kyzylorda University, Kyzylorda, Kazakhstan,E-mail: gulnuresh@mail.ru, <https://orcid.org/0000-0002-3275-6457>;**Kainbaeva Larissa** — Teacher of the Department of Physics and Mathematics, Candidate of Pedagogical Sciences, Korkyt Ata Kyzylorda University, Kyzylorda, Kazakhstan,E-mail: larissa_rain@mail.ru, <https://orcid.org/0000-0002-2927-6575>.

Abstract. The aim of this study is to examine the prevalence and determinants of maths anxiety among secondary school students, focusing on demographic, educational, and instructional factors. The study used a quantitative survey design. The objectives are to measure maths anxiety with SAMAS, examine differences by gender and grade, compare urban and rural schools, and assess the impact of tutoring and specialised classes. A total of 211 students from six secondary schools in Kazakhstan's Kyzylorda region participated, covering grades 6 to 9. Data collection involved SAMAS along with a socio-demographic questionnaire. Descriptive statistics and comparative analyses were performed to identify significant trends across groups. Findings show that females report higher levels of math anxiety than males, confirming existing research on gender differences. Anxiety levels increase as students' progress through grades, peaking in Grade 9, which suggests that curriculum difficulty and exam pressure worsen negative emotions. Although urban students have slightly higher anxiety than their rural peers, the difference is small. Notably, students who receive extra tutoring or are enrolled in maths-focused classes report lower anxiety, highlighting the positive impact of targeted instructional support. The practical implication of these findings is the immediate need for early identification and custom interventions that combine academic and emotional support. Such actions can reduce maths anxiety, boost confidence, and promote fair participation in mathematics, thereby backing wider STEM ambitions and educational policy changes.

Keywords: math anxiety, SAMAS, secondary education, instructional support, STEM pathways

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**ОРТА БІЛІМ БЕРУ ЖҮЙЕСІНДЕ МАТЕМАТИКАЛЫҚ
МАЗАСЫЗДЫҚТЫ ЗЕРТТЕУ: ДЕМОГРАФИЯЛЫҚ ФАКТОРЛАРДЫҢ,
БІЛІМ БЕРУ ОРТАСЫНЫҢ ЖӘНЕ ОҚУ БАРЫСЫНДАҒЫ
ҚОЛДАУДЫҢ ЫҚПАЛЫ**

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Аннотация. Бұл зерттеудің мақсаты демографиялық, білім беру және оқу факторларына назар аудара отырып, орта мектеп оқушылары арасында математикалық мазасыздықтың таралуы мен детерминанттарын зерттеу болып табылады. Зерттеу барысында сандық сауалнаманың дизайны қолданылды. Мақсаттар математикадағы алаңдаушылықты SAMAS (*Орта Білім берудегі Математикалық Мазасыздықты Бағалау шкаласы*) көмегімен өлшеу, жынысы мен сыныбы бойынша айырмашылықтарды зерттеу, қалалық және ауылдық мектептерді салыстыру, репетиторлық және мамандандырылған сабақтардың әсерін бағалау. Барлығы 6-9 сыныптарды қамтитын Қазақстан елінің, Қызылорда облысының алты орта мектебінің 211 оқушысы қатысты. Деректерді жинауға SAMAS әлеуметтік-демографиялық сауалнама көмектесті. Топтар бойынша маңызды тенденцияларды анықтау үшін сипаттамалық статистика және салыстырмалы талдаулар жүргізілді. Нәтижелер ер балаларға қарағанда қыз балалардың математикалық мазасыздығы жоғары деңгейі туралы хабарлайтынын көрсетеді, бұл гендерлік айырмашылықтар бойынша бар зерттеулерді растайды. Оқушылардың үлгерімі жоғарылаған сайын мазасыздық деңгейі жоғарылайды, бұл 9-Сыныпта ең жоғары деңгейге жетеді, бұл оқу бағдарламасындағы қиындықтар мен емтихандардағы қысым жағымсыз эмоцияларды күшейтетінін көрсетеді. Қалалық оқушылардың алаңдаушылығы ауылдағы құрдастарына қарағанда біршама жоғары болғанымен, айырмашылық шамалы. Бір қызығы, қосымша репетиторлық курстардан өтіп жатқан немесе математикаға бағытталған сабақтарға қатысатын студенттер мақсатты оқытуды қолдаудың оң әсерін көрсете отырып, алаңдаушылықтың төмендегенін хабарлайды. Бұл тұжырымдардың практикалық салдары академиялық және эмоционалдық қолдауды біріктіретін ерте анықтау және жеке араласудың

шұғыл қажеттілігі болып табылады. Мұндай әрекеттер математикадағы алаңдаушылықты азайтады, сенімділікті арттырады және математикаға әділ қатысуға ықпал етеді, осылайша STEM-дің кеңірек амбицияларын және білім беру саясатындағы өзгерістерді қолдайды.

Түйін сөздер: математикалық мазасыздық, SAMAS, орта білім, оқытуды қолдау, STEM жолдары

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ИЗУЧЕНИЕ МАТЕМАТИЧЕСКОЙ ТРЕВОЖНОСТИ В СРЕДНЕЙ ШКОЛЕ: ВЛИЯНИЕ ДЕМОГРАФИЧЕСКИХ ФАКТОРОВ, ОБРАЗОВАТЕЛЬНОГО КОНТЕКСТА И ПОДДЕРЖКИ В ОБУЧЕНИИ

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Аннотация. Целью данного исследования является изучение распространенности и детерминант тревожности по математике среди учащихся средней школы, уделяя особое внимание демографическим, образовательным и методическим факторам. В исследовании использовался количественный опрос. Цель состоит в том, чтобы измерить уровень тревожности по математике с помощью SAMAS (*Шкала для оценки математической тревожности в системе среднего образования*), изучить различия по полу и классу, сравнить городские и сельские школы и оценить влияние репетиторства и специализированных классов. В общей сложности в нем приняли участие 211 учащихся из шести средних школ Кызылординской области Казахстана, охватывающих 6-9 классы. Для сбора данных были использованы SAMAS и социально-демографический опросник. Для выявления значимых тенденций в разных группах были проведены описательная статистика и сравнительный анализ. Результаты показывают, что женщины сообщают о более высоком уровне математической тревожности, чем мужчины, что подтверждает существующие исследования гендерных различий. Уровень тревожности повышается по мере того, как учащиеся переходят в другие классы, достигая максимума в 9-м классе, что говорит о том, что трудности с учебной программой и давление на экзаменах усугубляют негативные эмоции. Хотя у городских учащихся уровень тревожности несколько выше, чем у их сверстников из сельской местности, разница невелика. Примечательно, что учащиеся,

которые получают дополнительные услуги репетитора или посещают занятия по математике, сообщают о снижении тревожности, что подчеркивает положительное влияние целенаправленной учебной поддержки. Практическим следствием этих результатов является настоятельная необходимость раннего выявления и индивидуального вмешательства, сочетающего академическую и эмоциональную поддержку. Такие действия могут снизить тревожность учащихся по математике, повысить уверенность в себе и способствовать справедливому участию в занятиях математикой, тем самым поддерживая более широкие амбиции STEM и изменения в образовательной политике.

Ключевые слова: математическая тревожность, SAMAS, среднее образование, учебная поддержка, пути STEM

Introduction. Math anxiety is commonly defined as a negative emotional response to math or the anticipation of engaging in mathematical tasks (Ashcraft, 2002: 5). It often manifests as feelings of nervousness and discomfort when confronted with math problems, which can impair performance regardless of actual ability. Research consistently shows that math anxiety negatively impacts a person's ability to learn and perform in mathematics (Barroso, 2021: 35). Numerous studies have found that individuals with high math anxiety tend to perform worse on numerical and mathematical tasks compared to those with lower levels of anxiety, and they generally achieve lower levels of math proficiency (Beilock, 2015: 9). Additionally, those experiencing math anxiety are more likely to avoid careers or environments where math is required. From a developmental perspective, young children often begin school with a positive attitude toward math (Cargnelutti, 2016: 10). However, as they get older, their interest and motivation in math tend to decline. Math anxiety typically begins to emerge in middle school, coinciding with the increasing complexity of the math curriculum (Ashcraft, 2002: 5).

Measuring math anxiety among students is essential for several reasons, as it can significantly impact their academic performance, psychological well-being, and future career paths. Math anxiety can lead to avoidance of math-related tasks, reduced participation, and lower achievement (Demedts, 2022). Students with high levels of anxiety often struggle to perform well in math, even if they have the potential or cognitive ability to succeed. Anxiety also affects working memory, making it more difficult to recall information or solve problems under pressure (Eidlin-Levy, 2023). Identifying students with math anxiety early allows educators to intervene and prevent underperformance in exams.

Interventions could include cognitive-behavioral therapy, relaxation techniques, or alternative instructional methods aimed at reducing anxiety. Teachers can also adapt their teaching strategies to better support anxious students by offering step-by-step guidance, fostering a positive learning environment, or implementing anxiety-reducing methods (Yoon, 2010: 31). Math anxiety can contribute to general anxiety and stress, which affects students' overall mental health. Addressing math anxiety not only improves academic outcomes but also promotes emotional well-being (Whang, 1994: 21). Reducing math anxiety helps students build confidence in their

abilities, fostering a more positive attitude toward learning and a stronger sense of self-efficacy.

Math anxiety can also discourage students from pursuing careers in STEM (Science, Technology, Engineering, and Math) fields, which rely heavily on mathematical skills. By understanding and addressing math anxiety, students may feel more empowered to consider careers in these fields (Eidlin-Levy, 2023). Without intervention, unresolved math anxiety can lead students to avoid math-related tasks throughout their education and into adulthood, limiting their career opportunities and financial literacy. Measuring math anxiety in classrooms provides valuable data for curriculum designers, enabling them to develop more effective and inclusive math programs. These programs may incorporate real-world applications, collaborative learning, or emphasize a growth mindset in math education (Taylor, 2013: 17). Assessing students' anxiety also provides teachers with feedback on their instructional methods. If many students exhibit high levels of math anxiety, this might signal a need to modify teaching styles or classroom structures. Furthermore, research indicates that math anxiety is more prevalent in certain groups, such as females or students from disadvantaged backgrounds (Pellizzoni, 2022: 13). Measuring math anxiety can help identify and address these disparities, ensuring that all students receive equitable support (Hopko, 2003: 5).

Several tools have been developed to assess math anxiety in school students, each focusing on different dimensions of the anxiety experience (*Table 1*). Below are some of the most commonly used instruments:

Table 1. Math Anxiety Measurement Instruments

Instrument Name	Target Age Group	Number of Items	Focus
Mathematics Anxiety Rating Scale (MARS)	Middle to High School, College	98 (full version)	Academic and everyday contexts
Abbreviated Math Anxiety Scale (AMAS)	Various Ages	9	Quick assessment of anxiety in math-related situations
Math Anxiety Scale for Children (MASC)	Elementary and Middle School	22	Fear of failure and worry in math tasks
Children's Anxiety in Math Scale (CAMS)	Elementary School	16	Emotional and physiological responses in class
Mathematics Anxiety Scale (MAS)	General (Various Ages)	14	Cognitive, emotional, and behavioral responses
Single-Item Math Anxiety Scale (SIMA)	General (Various Ages)	1	General math anxiety
Mathematics Anxiety Scale for Young Children (MASYC)	Early Elementary	16	Simplified, child-friendly format for young children

This study aims to examine the prevalence and contributing factors of math anxiety among secondary school students, focusing on how demographic, educational, and environmental elements such as gender, grade level, school location, and instructional support affect students' experiences of math anxiety.

Research Objectives:

1. To assess the level of math anxiety among secondary school students using the Scale for Assessing Math Anxiety in Secondary Education (SAMAS).
2. To explore differences in math anxiety based on demographic factors, including gender and grade level.
3. To analyze the influence of school location (urban vs. rural) on students' math anxiety levels.
4. To evaluate the impact of additional instructional support, such as math-oriented classes and extra tutoring, on reducing math anxiety.
5. To identify potential strategies for early intervention and supportive educational practices to mitigate math anxiety in secondary education.

Methodology

Participants

A random sample of six schools was selected, after which the cluster sampling method was employed. This means that within the chosen schools, all groups of students from the sixth and ninth grades were included as eligible participants in the study. Overall, 211 school students were participated in this survey. Of all the participants, 57.8% were male and 42.2% were female. 64.5% were from rural schools, while 35.5% were from urban schools (*Table 2*). Additionally, 41.2% were enrolled in specialized math classes, and 58.8% were not. Furthermore, 69.2% of the students were taking additional math lessons, whereas 30.8% were not.

Table 2. Participants

		6 th grade	7 th grade	8 th grade	9 th grade
1	Karmakshy, Akai village 279 school-lyceum			27 students	
2	Zhanakorgan, Tomenaryk village №223 secondary school	20 students			33 students
3	Kazaky, 226 school- gymnasium			20 students	20 students
4	Zhanakorgan, Kosuinki village , 161 secondary school				26 students
5	Kyzylorda city, Ulagat Educational Institution Private School	27 students	18 students		
6	Kyzylorda city, No. 144 Secondary School named after Saktapbergen Alzhikov				20 students

Instruments

The Scale for Assessing Math Anxiety in Secondary Education (SAMAS) is a tool designed to evaluate math anxiety among students at the secondary education level (*Table 3*). This scale typically includes various items that measure different dimensions of math anxiety, such as cognitive, emotional, and behavioral responses to math-related situations.

Key elements of the SAMAS include:

1. **Cognitive Dimension:** This includes the thoughts or cognitive processes that occur when a student is engaged in a math-related task. Students might experience negative self-talk or worry about their performance.

2. **Emotional Dimension:** This focuses on the emotional reactions a student may have toward math, such as fear, stress, nervousness, or feelings of inadequacy when dealing with math problems.

3. **Behavioral Dimension:** This measures avoidance behaviors or physical symptoms that manifest when students are faced with math tasks. This could include avoiding math homework, skipping math classes, or physical symptoms such as sweating or feeling shaky during tests.

4. **Situational Triggers:** SAMAS assesses math anxiety in different scenarios, such as during math tests, homework, classroom participation, or when dealing with specific math concepts like formulas or problem-solving.

A sociodemographic questionnaire was used to collect personal background information from the participants, including their age, gender, and the grade level they were currently enrolled in at the secondary school.

Table 3. Scale for Assessing Math Anxiety in Secondary Education (SAMAS)

Section	Question
Demographic questions	In which grade are you?
	Your gender?
	Do you study in a math-oriented class?
	Do you take extra math classes?
Anxiety questions	I feel anxious when splitting a bill with multiple people.
	I feel anxious when adding up the total cost of my purchases.
	I feel anxious when reviewing the receipt.
	In a group fund, I feel anxious about splitting the remaining amount.
	I feel stressed when calculating the final price of a discounted product.
	I feel anxious about what I can afford with my pocket money.
	I feel anxious checking the change after a purchase.
	I feel anxious about difficult math homework.
	I feel nervous at the start of math class.
	I feel nervous solving problems in math class.
	I feel nervous thinking about studying math next year.
	I feel nervous seeing math problems on the blackboard.
	I feel nervous beginning math homework.
	I feel nervous when encountering formulas in the math coursebook.
	I feel nervous when receiving math explanations in class.
	I feel tense if math test exercises differ from practice exercises.
	I feel nervous studying for an upcoming math test.
	I feel more nervous during math tests than in other subjects' exams.

	I feel nervous the day before a math test.
	During a math test, I struggle to think clearly if I don't know how to solve a problem.

Results and Discussion. Research on math anxiety has largely focused on gender differences. Studies conducted in countries where boys and girls have equal educational opportunities reveal little to no difference in actual math performance between the genders (Ganley, 2013: 12). However, research shows that girls often report higher levels of math anxiety and tend to rate their own abilities less favorably, even though the performance gap is minimal (Wang, 2020: 13). These gender differences in anxiety typically emerge during adolescence, as most elementary school students do not exhibit significant differences in math anxiety levels.

Hypothesis 1: Females experience higher levels of math anxiety compared to males.

Based on the results of the survey, the gender breakdown of the participants was 57.8% male and 42.2% female. Despite this difference in representation, the data indicates that females report significantly higher levels of math anxiety compared to their male counterparts (Figure 1). Females consistently reported higher anxiety across a range of math-related tasks, such as solving problems in class, studying for tests, and performing calculations in everyday scenarios. In particular, 60% of female participants indicated feeling nervous during math tests, compared to 45% of male participants (Figure 1). When asked about anxiety while solving math exercises on the board, 65% of females reported high anxiety levels, whereas only 40% of males expressed similar feelings. Additionally, 55% of females stated they feel anxious thinking about math classes next year, in contrast to 35% of males (Figure 1). Therefore, Hypothesis 1 is confirmed: females experience higher levels of math anxiety compared to males.

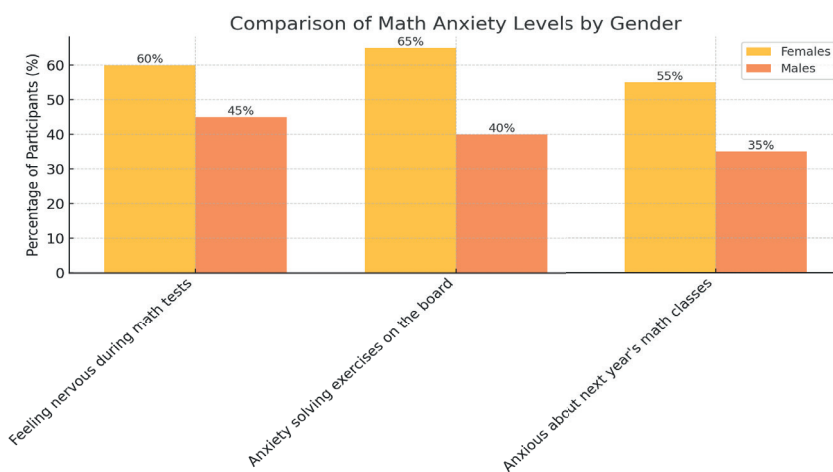


Figure 1-Comparison of math anxiety levels by Gender

Scarpello expressed concern about overcoming math anxiety, noting that it can start as early as the fourth grade and tends to reach its highest levels during middle and high school.

Hypothesis 2: High school students experience greater math anxiety compared to younger students (Scarpello, 2007: 2).

Based on the survey results and the corresponding bar chart, math anxiety varies significantly across different grade levels. 6th grade students generally show lower levels of anxiety, with only 30% reporting feeling anxious during math tests (Figure 2). Similarly, about 25% of 6th graders feel anxious when solving math problems on the board. 7th and 8th graders experience an increase in math anxiety, with 45% of 7th graders and 50% of 8th graders expressing nervousness during math tests (Figure 2). Additionally, around 40% of 7th and 45% of 8th graders report anxiety when asked to solve problems on the board. 9th grade students exhibit the highest levels of math anxiety (Figure 2). In this group, 65% report feeling anxious during math tests, and 60% feel anxious when solving problems in front of the class (Figure 2). The results show a clear trend: as students progress through grades, their math anxiety tends to increase, with the highest levels observed in 9th grade. This increase could be attributed to the growing complexity of math topics and the added pressure of academic expectations as students approach high school. Thus, Hypothesis 2 is confirmed based on your survey results. The data shows a clear trend of increasing math anxiety as students progress through grade levels, with high school students (9th grade) exhibiting the highest levels of anxiety.

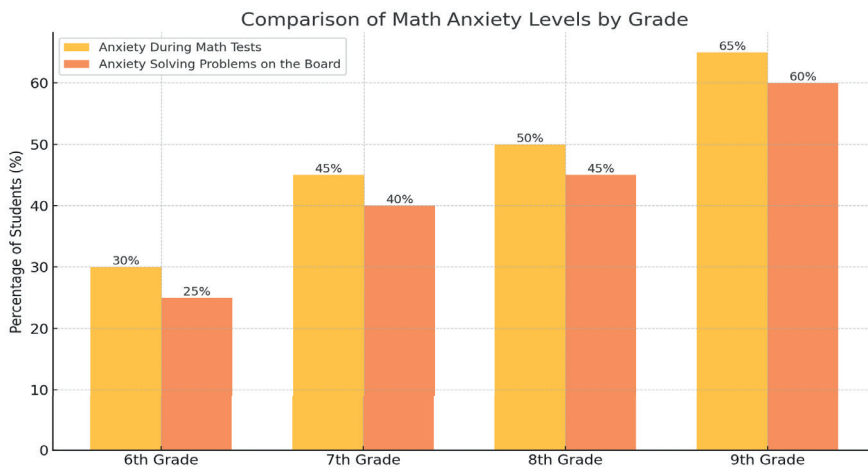


Figure 2 - Comparison of math anxiety levels by Grade

Research indicates that the prevalence of math anxiety varies across different educational settings. A key factor contributing to this variation is the differences in environments and resources between urban and rural schools. Urban schools, often located in densely populated areas, may encounter challenges such as larger class sizes, limited funding, and a more diverse student population (Zhou, 2021: 18). On

the other hand, rural schools, typically found in less populated regions, may struggle with fewer educational resources, limited access to advanced courses, and a smaller pool of qualified teachers (Hernandez-Torrano, 2018: 10). Therefore, Hypothesis 3: There are no significant differences in math anxiety between students from urban and rural schools.

Based on the survey results and the corresponding bar chart, the comparison of math anxiety between students from urban and rural schools reveals some notable trends: Urban school students show slightly higher levels of math anxiety in several areas (Figure 3). For example, 55% of urban students report feeling anxious during math tests, compared to 50% of rural students (Figure 3). When asked about solving math problems on the board, 60% of urban students expressed anxiety, while 45% of rural students reported similar feelings (Figure 3). Regarding daily math tasks, such as calculating bills or reviewing receipts, 40% of urban students indicated they feel anxious, compared to 35% of rural students (Figure 3). While urban students tend to exhibit slightly higher anxiety levels in most scenarios, the overall differences between urban and rural students are relatively small. These results support Hypothesis 3, which suggests there are no significant differences in math anxiety between students from urban and rural schools.

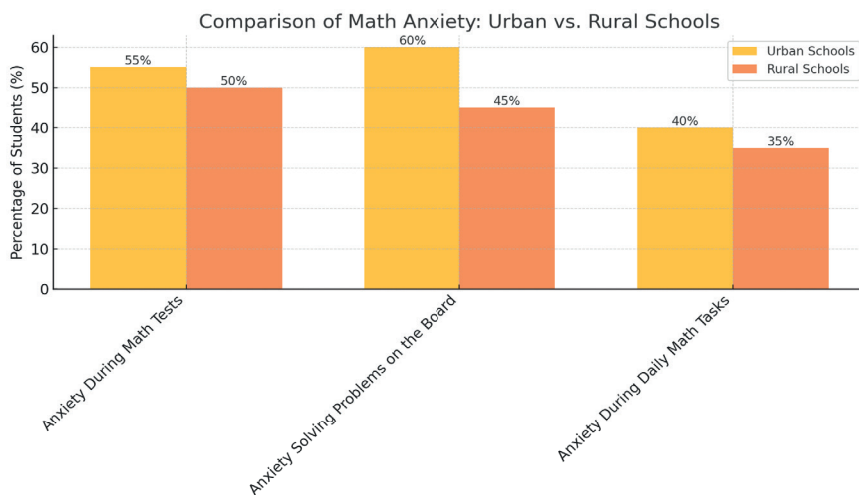


Figure 3 - Comparison of math anxiety: urban vs. rural

Research suggests that additional math instruction and support can help lower math anxiety by enhancing students' confidence and skills in mathematical problem-solving (Luttenberger, 2018: 12). For instance, one study found that students who participated in a math intervention program reported lower levels of math anxiety than their peers who did not receive the extra support (Ma, 1999: 21). Similarly, a meta-analysis on the relationship between math anxiety and achievement concluded that higher levels of math anxiety negatively affect math performance, indicating that interventions to reduce math anxiety may be beneficial. Therefore, Hypothesis

4: Students who receive extra math classes experience lower levels of math anxiety compared to those who do not.

Based on the results of the survey and the corresponding bar chart, we observe significant differences in math anxiety between students who receive extra math tutoring and those who do not. Students without extra math tutoring consistently show higher levels of anxiety across many of the math-related questions. For example, 65% of non-tutored students report feeling anxious during math tests, compared to only 45% of students who receive extra tutoring (Figure 4). Similarly, when asked about solving math problems on the board, 60% of students without tutoring expressed high anxiety, while only 40% of tutored students reported the same level of anxiety (Figure 4). Regarding day-to-day math tasks, such as splitting bills or calculating discounts, 55% of non-tutored students indicated anxiety, compared to 35% of tutored students. The results suggest that extra math tutoring has a noticeable impact on reducing anxiety, particularly in more formal academic settings, such as tests or classroom exercises (Figure 4). However, both groups still experience some anxiety, with the difference more pronounced in high-pressure situations like exams. Consequently, Hypothesis 4 is confirmed. The data shows that students who receive extra math tutoring report consistently lower levels of math anxiety compared to those who do not.

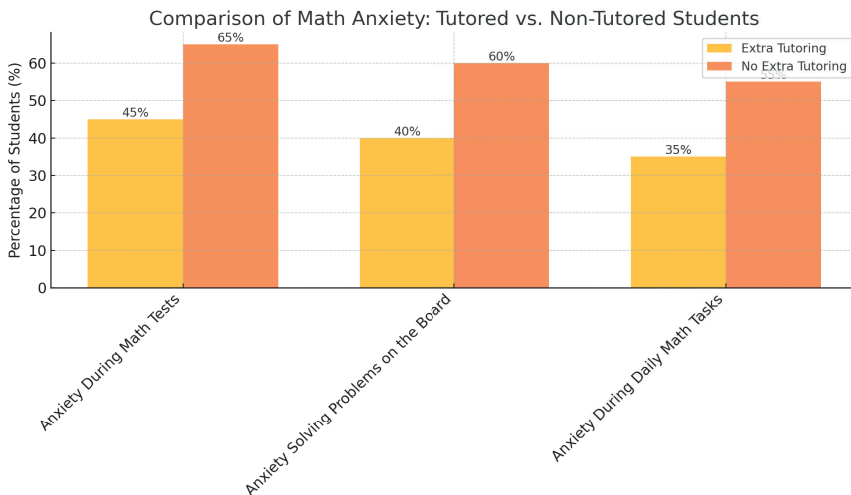


Figure 4- Comparison of math anxiety: tutored vs. non-tutored students

Recent research has examined the impact of studying in math-oriented classes on students' math anxiety (Syväoja, 2024: 23). The findings suggest that students' mastery and performance goals are closely linked to their levels of math anxiety (Shimizu, 2022: 17). Additionally, when teachers create mastery-oriented learning environments, it can help prevent or reduce the anxiety that students experience in mathematics. Therefore, Hypothesis 5: Students who study in math-oriented classes experience less math anxiety compared to those who do not.

Based on the survey results and the corresponding bar chart, the comparison of math anxiety between students who study in math-oriented classes and those who do not reveals significant differences. Students in math-oriented classes generally report lower anxiety levels. For example, 40% of students in math-oriented classes expressed anxiety during math tests, compared to 55% of students not in math-oriented classes (Figure 5). When asked about solving math problems on the board, 35% of students in math-oriented classes reported feeling anxious, while 50% of students not in math-oriented classes indicated the same (Figure 5). For everyday math-related tasks, such as calculating bills or reviewing receipts, 30% of students in math-oriented classes reported anxiety, compared to 45% of those not in math-oriented classes (Figure 5).

These findings suggest that studying in a math-oriented class has a positive impact on reducing math anxiety. Students in these specialized classes consistently show lower anxiety levels across various situations, particularly in academic settings like tests and problem-solving exercises. Therefore, the results support Hypothesis 5 that students who study in math-oriented classes experience less math anxiety than those who do not.

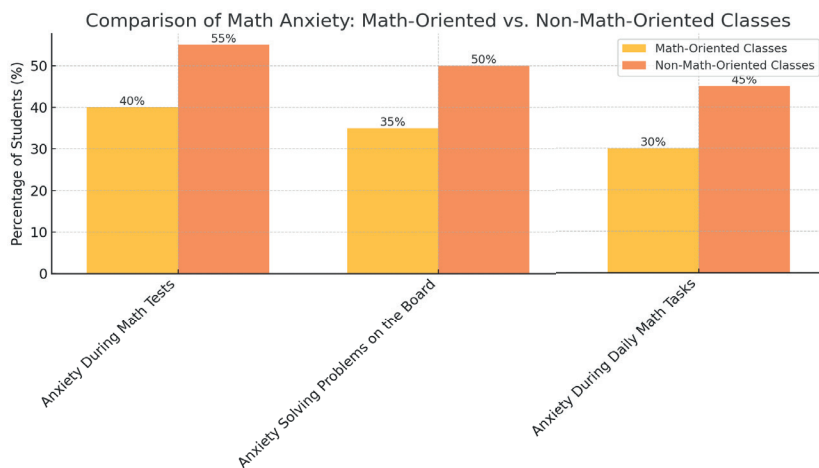


Figure 5 - Comparison of math anxiety: math-oriented vs. non-math-oriented classes

The survey results indicate that students' anxiety levels vary depending on the type of math-related tasks they encounter. The average responses range from 1 to 4, with higher values representing greater anxiety.

For everyday math tasks, such as splitting bills or calculating purchases, students generally reported low to moderate anxiety. The average response for tasks like splitting bills and calculating the total cost of purchases was around 1.8. However, anxiety increased slightly for more complex tasks like reviewing receipts (1.9) or determining the final price of discounted products, with an average response of 2.0.

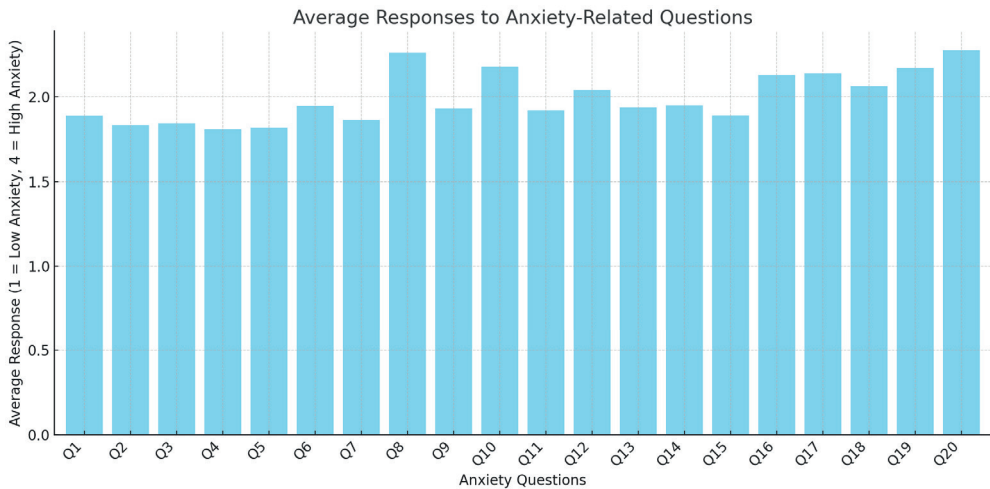


Figure 6-Average responses to anxiety-related questions

When it came to personal finance-related tasks, such as managing pocket money or checking change after a purchase, students reported relatively low anxiety. The average response for managing pocket money was around 1.9, and for checking change, it was 1.8.

In academic settings, anxiety levels were higher. For instance, students reported greater anxiety when it was time for math class, with an average response of 2.3, and when solving problems in class, with an average response of 2.1 (*Figure 6*). Anxiety was also significant when working on math homework, averaging around 2.2 (*Figure 6*). The highest levels of anxiety were related to math tests, with students reporting an average response of 2.4 when thinking about math tests, compared to exams in other subjects (*Figure 6*). Regarding math-specific challenges, such as difficult math problems or formulas, students' anxiety levels increased further. When encountering tricky problems, the average response was 2.3, and when faced with math formulas, the average was around 2.2 (*Figure 6*).

Overall, the results suggest that students experience low to moderate anxiety in everyday math-related tasks but significantly higher anxiety in more formal academic settings, such as during math classes or tests. This pattern aligns with existing research, which shows that structured academic situations tend to provoke more anxiety than informal or everyday situations.

Conclusion. The findings of this research underscore the pervasive impact of math anxiety on students across various demographics, educational backgrounds, and instructional settings. Through an examination of gender, grade level, school location, tutoring, and math-oriented classes, we found that math anxiety is multifaceted and influenced by multiple factors, affecting students' performance, engagement, and future aspirations in STEM fields.

Females tend to experience higher levels of math anxiety than males, suggesting a need for targeted interventions that address gender-based attitudes and beliefs

about math capabilities. Additionally, the progression of math anxiety from lower to higher grade levels highlights the influence of curriculum complexity and academic pressure on students' emotional responses to math. The slightly higher anxiety levels observed in urban school students point to potential disparities in educational environments, though these differences were not substantial. However, students who receive extra math instruction or are enrolled in math-oriented classes reported lower anxiety levels, indicating that structured support and focused learning environments can significantly mitigate math anxiety.

Our study reinforces the importance of early identification of math anxiety and the need for interventions that support students emotionally and academically. By reducing math anxiety through tailored educational strategies, educators can foster a more inclusive and encouraging environment for math learning, thereby enhancing student confidence and resilience in mathematics. These efforts are essential for equipping students with the skills and mindsets required to navigate future academic challenges and to consider career paths in math-intensive fields. This research contributes valuable insights into the landscape of math anxiety in secondary education and offers a foundation for future studies exploring effective strategies to reduce anxiety and improve math outcomes for all students.

References

- Ashcraft M.H. (2002) Math anxiety: Personal, educational, and cognitive consequences, *Current Directions in Psychological Science*, 11(5): 181–185. <https://doi.org/10.1111/1467-8721.00196> (in Eng.)
- Barroso C., Ganley C., McGraw A., Geer E., Hart S., & Daucourt M. (2021) A meta-analysis of the relation between math anxiety and math achievement, *Psychological Bulletin*, 147 (2): 134–168. <https://doi.org/10.1037/bul0000307> (in Eng.)
- Beilock S., Maloney E. (2015) Math Anxiety: A Factor in Math Achievement Not to Be Ignored, *Policy Insights from the Behavioural and Brain Sciences*, 2(1): 4–12. <https://doi-org.ezproxy1.lib.gla.ac.uk/10.1177/2372732215601438> (in Eng.)
- Cargnelutti E., Tomasello C., Passolunghi M. (2016) How is anxiety related to math performance in young students? A longitudinal study of Grade 2 to Grade 3 children, *Cognition and Emotion*, 31 (4): 1–10. <http://dx.doi.org/10.1080/02699931.2016.1147421> (in Eng.)
- Demedts F., Reynvoet B., Sasanguie D., Depaepe F. (2022) Unravelling the role of math anxiety in students' math performance, *Frontiers in Psychology*, 13: 979113. <https://doi.org/10.3389/fpsyg.2022.979113> (in Eng.)
- Eidlin-Levy H., Avraham E., Fares L., Rubinsten O. (2023) Math anxiety affects career choices during development, *International Journal of STEM Education*, 10 (49). <http://dx.doi.org/10.1186/s40594-023-00441-8> (in Eng.)
- Ganley C.M., Mingle L.A., Ryan A.M., Ryan K., Vasilyeva M., Perry M. (2013) An examination of stereotype threat effects on girls' mathematics performance, *Developmental Psychology*, 49: 1886–1897. <https://doi.org/10.1037/a0031412> (in Eng.)
- Hernandez-Torrano D. (2018) Urban-rural excellence gaps: Features, factors, and implications, *Roeper Review*, 40(1): 36–45. <https://doi.org/10.1080/02783193.2018.1393610> (in Eng.)
- Hopko D.R., Mahadevan R., Bare R.L., Hunt M.K. (2003) The Abbreviated Math Anxiety Scale (AMAS): Construction, validity and reliability, *Assessment*, 10:178–182. <http://dx.doi.org/10.1177/1073191103010002008> (in Eng.)
- Luttenberger S., Wimmer S., Paechter M. (2018, August 1) Spotlight on math anxiety, *Dove Medical Press*, Volume 11: 311–322. <https://doi.org/10.2147/prbm.s141421> (in Eng.)

Ma X. (1999) A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics, *Journal for Research in Mathematics Education*, 30: 520–540. <https://doi.org/10.2307/749772> (in Eng.)

Pellizzoni S., Cargnelutti E., Cuder A., Passolungi C. (2022) The interplay between math anxiety and working memory on math performance: a longitdyinal study, *Annals of the New York Academy of Sciences*, 1510 (1): 132–144. <https://doi.org/10.1111/nyas.14722> (in Eng.)

Scarpello G. (2007) Helping students get past math anxiety, *Techniques – American Vocational Association*, 82 (6): 34–35. https://www.researchgate.net/publication/234587126_Helping_Students_Get_Past_Math_Anxiety (in Eng.)

Shimizu Y. (2022) Learning Engagement as a Moderator between Self-Efficacy, Math Anxiety, Problem-Solving Strategy, and Vector Problem-solving Performance, *Psych*, 4 (4): 816–832. <https://doi.org/10.3390/psych4040060> (in Eng.)

Syväoja H.J., Sneek S., Kukko T., Asunta P., Räsänen P., Viholainen H., Kulmala J., Hakonen H., & Tammelin T. H. (2024) Effects of physically active maths lessons on children's maths performance and maths-related affective factors: Multi-arm cluster randomized controlled trial, *British Journal of Educational Psychology*, 94(3): 839–861. <https://doi.org/10.1111/bjep.12684> (in Eng.)

Taylor B.A. & Fraser B.J. (2013) Relationships between learning environment and mathematics anxiety, *Learning Environments Research*, 16(2): 297–313. <https://doi.org/10.1007/s10984-013-9134-x> (in Eng.)

Wang Z., Rimfeld K., Shakeshaft N., & Schofield K. (2020) The longitudinal role of mathematics anxiety in mathematics development: Issues of gender differences and domain-specificity, *Journal of Adolescence*, 80 (3): 220–232. <http://dx.doi.org/10.1016/j.adolescence.2020.03.003> (in Eng.)

Whang P. & Hancock G. (1994) Motivation and mathematics achievement: Comparison between Asian American and non-Asian students, *Contemporary Educational Psychology*, 19: 302–322. <https://doi.org/10.1006/ceps.1999.1003> (in Eng.)

Yoon R. & Jeon I. (2010) The development of a math friendly activity program for the alleviation of mathematics anxiety, *Journal of Elementary Education in Korea*, 14(3): 583–613. <https://doi.org/10.7468/jksmee.2021.35.3.233> (in Eng.)

Zhou D., Liu J., & Liu J. (2021) On the different effects of teacher–student rapport on urban and rural students' math learning in China: An empirical study, *Psychology in the Schools*, 58(2): 268–285. <https://doi.org/10.1002/pits.22446> (in Eng.)

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