



EXPLORING MATHEMATICS ANXIETY AMONG SECONDARY SCHOOL STUDENTS

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ABSTRACT:

Mathematics anxiety is a major academic concern that can affect students' confidence, participation, and performance in mathematics. The present study, titled "**Exploring Mathematics Anxiety among Secondary School Students,**" aimed to examine the level of mathematics anxiety among secondary school students and determine whether it differs on the basis of gender. The study was conducted using a descriptive survey method. A total sample of **122 secondary school students** was selected for the study, including **60 male** and **62 female** students. Data were collected through a Mathematics Anxiety Scale and analysed using descriptive statistics and an independent samples t-test. The overall findings indicated that students experienced a moderate level of mathematics anxiety. The mean anxiety score of male students was **88.98**, while the mean score of female students was **87.60**. Although male students showed a slightly higher mean score, the difference was not statistically significant, $t(120) = 0.577, p = 0.565$. Therefore, the study found **no significant difference in mathematics anxiety between male and female secondary school students**. The findings suggest that mathematics anxiety is experienced by both genders almost equally. Hence, teachers, parents, and school counsellors should adopt supportive teaching and counselling strategies for all students to reduce fear and improve confidence in mathematics learning.

KEYWORDS: Mathematics anxiety; secondary school students; gender difference; male and female students.

INTRODUCTION:

Mathematics is an important school subject because it develops logical thinking, problem-solving ability, reasoning, and decision-making skills. At the secondary school level, mathematics also plays a major role in students' academic progress and future career choices. However, many students do not approach mathematics with confidence. Instead, they experience fear, nervousness, tension, or discomfort while solving mathematical problems, attending mathematics classes, or appearing in mathematics examinations. This condition is generally known as mathematics anxiety. Hembree (1990) described mathematics anxiety as a serious educational concern because it is associated with poor performance, avoidance of mathematics-related tasks, and low confidence in mathematical ability. Mathematics anxiety does not simply mean that a student dislikes mathematics. It is an emotional reaction that may interfere with the student's ability to think clearly and perform well. Students with mathematics anxiety may feel nervous when asked to solve problems in class, may fear making mistakes in front of others, or may forget learned procedures during tests. Beilock and Willingham (2014) explained that anxiety can disturb students' working memory, which is needed for solving mathematical problems. As a result, even students who have studied the topic may fail to perform according to their actual ability when they are under pressure.

Previous studies have shown that mathematics anxiety is commonly found among secondary school students and may negatively affect mathematics achievement. Zakaria, Zain, Ahmad, and Erlina (2012) found that students with higher mathematics anxiety generally showed lower achievement in mathematics. Similarly, Mohamed and Tarmizi (2010) reported that mathematics anxiety affects the teaching and learning of mathematics and is related to students' performance. These findings indicate that mathematics anxiety is not only a psychological issue but also an academic issue that can influence students' learning outcomes. Gender has often been studied as an important factor in mathematics anxiety. Some studies have reported differences between male and female students, while other studies have found no significant gender difference. For example, Zakaria et al. (2012) observed no significant gender difference in mathematics anxiety among secondary school students. Similarly, some Indian studies on academic anxiety have also suggested that anxiety may not always be strongly determined by gender alone. This shows that gender-based findings are not uniform and may depend on the school environment, teaching practices, parental support, examination pressure, and socio-cultural background. In the Indian school context, especially at the secondary level, students often face pressure to perform well in mathematics because the subject is considered important for further studies and competitive examinations. In UP Board schools, students may also experience challenges such as large classrooms, limited individual attention, traditional teaching methods, and examination-oriented learning. These factors may increase fear and hesitation toward mathematics. The dissertation proposal also identifies UP Board schools in Lucknow as an important context for studying mathematics anxiety because localized research in this area is limited and educational conditions may differ from other boards or regions.

The present paper, titled “Exploring Mathematics Anxiety among Secondary School Students,” focuses on mathematics anxiety among secondary school students with special reference to gender. The study is based on a sample of **122 students**, including male and female students. The main purpose is to examine whether mathematics anxiety differs significantly between male and female secondary school students. Since the findings show **no significant difference in mathematics anxiety between male and female students**, the study suggests that mathematics anxiety should be understood as a common academic concern affecting both genders. Therefore, teachers, parents, and school counsellors should provide supportive learning environments for all students rather than treating mathematics anxiety as a gender-specific problem.

REVIEW OF THE RELATED LITERATURE:

Samanta, G., and Tarafdar, G. (2025) in their study titled “*Factors Affecting Mathematical Anxiety and Its Effect on Mathematical Achievement in Secondary School Students*” examined the major causes of mathematical anxiety and its effect on mathematics achievement among secondary school students in West Bengal. The study aimed to identify factors such as lack of parental support, poor classroom participation, textbook difficulty, calculation problems, and homework stress, while also comparing anxiety by gender, habitat, curriculum language, and school board. The sample included 100 students from secondary schools, and data were collected using a 16-item Likert scale developed by the researchers. The findings showed that gender, habitat, and school board had no significant effect on mathematical anxiety or achievement, but curriculum language showed a difference, with Bengali-medium students performing better than English-medium students. The study also found a strong negative correlation ($r = -0.96$) between mathematical anxiety and achievement, indicating that higher anxiety leads to lower mathematics performance.

Kiso, T. (2024) in his study titled “*Mathematics Anxiety Among Secondary School Students in Kohima Town, Nagaland*” examined the level of mathematics anxiety among secondary school students and compared it based on gender, school type, and class level. The study used a descriptive survey method with a sample of 380 students registered under the Nagaland Board of Secondary Education, selected through simple random sampling. Data were collected using the Mathematics Anxiety Scale by Mahmood and Khatoon. The findings showed that most students had an average level of mathematics anxiety, with no significant difference based on gender, school management, or class level. The study concluded that mathematics anxiety is common among secondary students and requires suitable interventions to make mathematics learning more supportive and less stressful.

Omar, S. H., Aris, S. R. S., and Hoon, T. S. (2022) in their study titled “*Mathematics Anxiety and its Relationship with Mathematics Achievement among Secondary School Students*” examined the level of mathematics anxiety and its relationship with mathematics achievement among secondary students in Malaysia. The study used a mixed-methods approach with 42 Form One students selected through cluster sampling and interviews with 9 students. The findings showed that most students experienced a moderate level of mathematics anxiety, and anxiety had a strong negative relationship with achievement among low-performing students. The study also found that emotional factors contributed to mathematics anxiety, while games, teaching aids, group work, and positive teacher attitudes helped reduce anxiety and improve learning.

Mandal, A. K. (2020) in his paper titled “*Mathematics Anxiety and Academic Achievement of Students at Secondary Stage of Education*” examined the relationship between mathematics anxiety and academic achievement among secondary school students in West Bengal. The study used a stratified random sample of 300 students from Classes IX and X studying in Bengali-medium schools under the West Bengal Board of Secondary Education. The findings showed that boys had higher mathematics anxiety and achievement than girls. Urban students scored slightly higher, but habitat did not create a significant difference in achievement. The study found a significant negative relationship between mathematics anxiety and academic achievement, indicating that higher anxiety reduces students’ academic performance.

Jabeen, N., and Andrabi, A. A. (2018) in their study titled “*Academic Anxiety Among Adolescents in India*” examined academic anxiety among adolescents in Rajouri district, Jammu and Kashmir, and its relationship with academic achievement. The study used a random sample of 312 Grade 10 students, aged 13–15 years, from four schools. The findings showed that most students had moderate to high academic anxiety. Boys and government school students showed significantly higher anxiety than girls and private school students, while family type had no significant effect. The study also found a strong negative relationship between academic anxiety and academic achievement, indicating that higher anxiety lowers students’ academic performance.

Alzahrani, A., and Stojanovski, E. (2017) in their study titled “*Assessment of Anxiety on Mathematics for Students in Secondary School in Qatar*” examined the relationship between mathematics anxiety and performance using PISA 2012 data from 10,966 secondary school students in Qatar. The study also explored gender differences and the role of socio-economic status. The findings showed a significant negative relationship between mathematics anxiety and achievement, indicating that students with higher anxiety scored lower in mathematics. Male students reported higher anxiety than females, although females performed better in mathematics. The study also found that students from the highest and lowest socio-economic groups showed more anxiety than those from moderate SES backgrounds. The study concluded that teaching strategies in Qatar should address psychological factors to reduce mathematics anxiety and improve achievement.

Rao, B. V. R., and Chaturvedi, A. (2017) in their study titled “*Study the Academic Anxiety of Secondary School Students in Relation to Gender and Locality*” examined academic anxiety among Class IX students with reference to gender and locality. The study included 500 students from government and private secondary schools in Bilaspur district, Chhattisgarh, selected from 10 schools through purposive sampling. Data were collected using the Academic Anxiety Scale by A. K. Singh and A. Sen Gupta. The findings showed no significant difference in academic anxiety between boys and girls, but a significant difference was found between rural and urban students, with urban students showing higher academic anxiety. The study highlighted the need for support from teachers and parents to reduce students’ academic stress.

Zakaria, E., Zain, N. M., Ahmad, N. A., and Erlina, A. (2012) in their study titled “*Mathematics Anxiety and Achievement Among Secondary School Students*” examined mathematics anxiety and its effect on achievement among Form Four students in Selangor, Malaysia. The study included 195 students, comprising 86 boys and 109 girls, and used the Fennema-Sherman Mathematics Attitudes Scale to measure anxiety. The findings showed that students had a moderate level of mathematics anxiety, with no significant gender difference. However, students with higher mathematics anxiety performed lower in mathematics. The study concluded that reducing mathematics anxiety through supportive teaching methods can improve students’ mathematics achievement.

Mohamed, S. H., and Tarmizi, R. A. (2010) in their study titled “*Anxiety in Mathematics Learning Among Secondary School Learners: A Comparative Study between Tanzania and Malaysia*” compared mathematics anxiety among secondary school students in Tanzania and Malaysia. The study used a correlational survey design and collected data through the 24-item Mathematics Anxiety Rating Scale (MARS-A). The findings showed that Malaysian students had higher mathematics anxiety than Tanzanian students, especially in test-related situations. Gender differences were generally not significant, although Malaysian males showed slightly higher anxiety than females. Senior students reported more anxiety than junior students in both countries. The study also found a significant negative relationship between mathematics anxiety and academic performance, indicating that higher anxiety leads to lower mathematics achievement.

Hembree, R. (1990) in his meta-analytic study titled “*The Nature, Effects, and Relief of Mathematics Anxiety*” examined mathematics anxiety by synthesizing findings from 151 studies involving students from Grade 5 to postsecondary level. The study explored the relationship of mathematics anxiety with performance, attitudes, avoidance, gender, grade level, and treatment outcomes. The findings showed that mathematics anxiety was negatively related to mathematics performance and self-confidence, while it was positively associated with avoidance of mathematics. Females generally reported higher anxiety, although its effect on performance was stronger among males at the precollege level. The study also found that behavioral and cognitive-behavioral methods, especially systematic desensitization, were effective in reducing mathematics anxiety. It concluded that mathematics anxiety contributes to poor performance and requires targeted interventions.

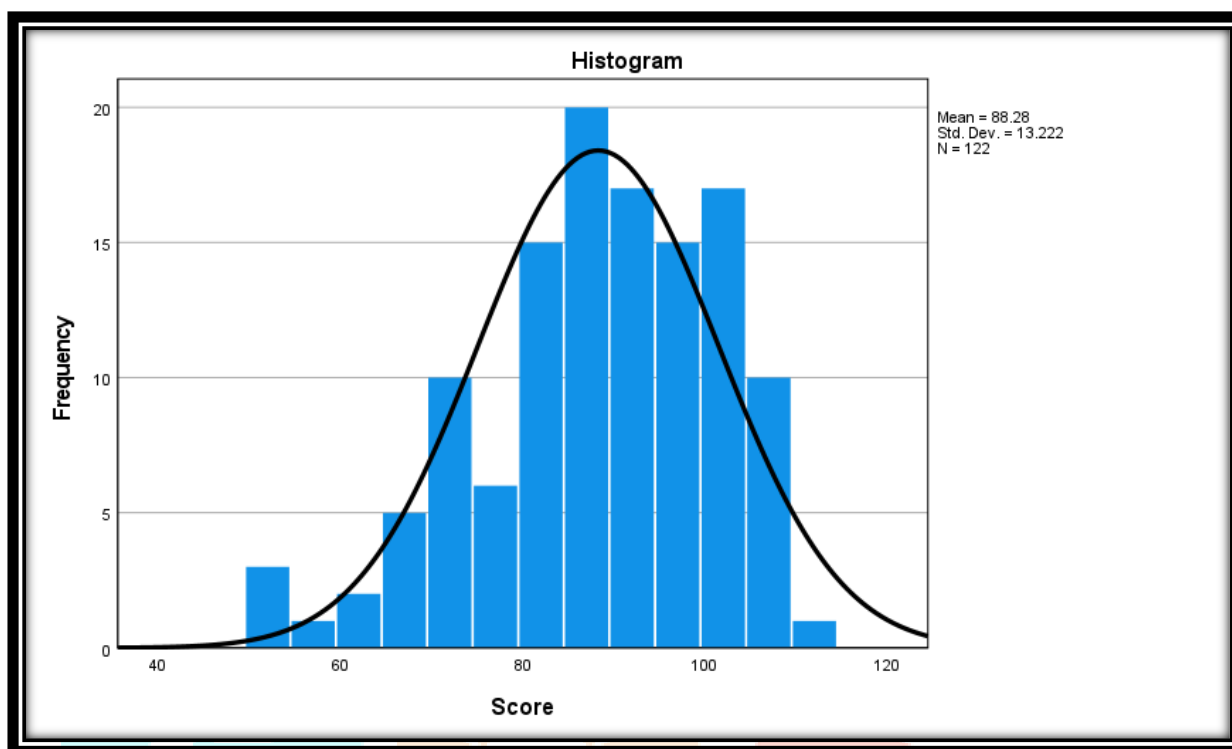
OBJECTIVE OF THE STUDY:

The Objective for the study is as follows –

To study the influence of gender (ie. male/ female) on mathematics anxiety among secondary school students.

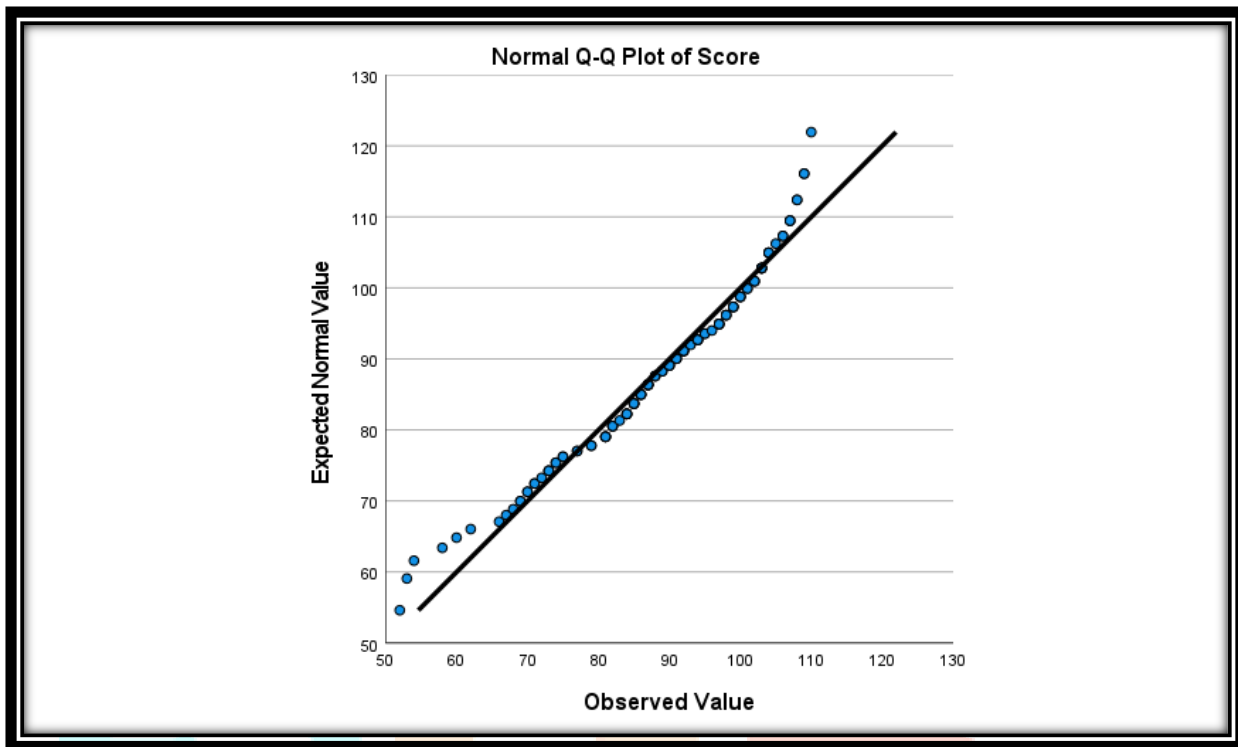
METHODOLOGY OF THE STUDY:

The present study adopted a descriptive survey method. This method was suitable because the study aimed to explore the existing level of mathematics anxiety among secondary school students and examine whether mathematics anxiety differs on the basis of gender. The study was quantitative in nature, as the collected responses were converted into numerical scores and analysed statistically. The dissertation proposal also mentions descriptive survey method as the method of the study. The population of the study consisted of secondary school students studying in UP Board schools of Lucknow city. The study focused on students at the secondary level, particularly Class IX students, as mentioned in the proposal. The sample consisted of 122 secondary school students. Out of these, 60 were male students and 62 were female students. The students were selected from UP Board secondary schools in Lucknow city. The proposal states that students were to be selected through a simple random sampling method. A simple random sampling technique was used for selecting the students. This technique was appropriate because it gives each student an equal chance of being included in the study and helps reduce selection bias. The data were collected with the help of a Mathematics Anxiety Scale. The scale was designed to measure students' anxiety related to mathematics learning, classroom problem-solving, mathematics tests, nervousness, fear of mistakes, avoidance, and confidence in mathematics. The tool included student information such as gender and school type and used statements related to mathematics anxiety. The collected data were analysed using both descriptive and inferential statistics. Descriptive statistics such as mean, standard deviation, standard error, minimum, maximum, skewness, and kurtosis were used to understand the general distribution of mathematics anxiety scores. An independent samples t-test was used to compare mathematics anxiety between male and female students. Levene's test was applied to check equality of variances. Effect size measures, including Cohen's d, Hedges' correction, and Glass's delta, were also used to understand the practical significance of the difference.

RESULT AND INTERPRETATION:**Test of Normality:****Interpretation:**

The histogram presents the distribution of mathematics anxiety scores of **122 secondary school students**. The mean score is **88.28**, with a standard deviation of **13.222**, indicating that most students' scores are clustered around the average value. The bars of the histogram show that the majority of students scored between approximately **80 and 105**, suggesting a **moderate level of mathematics anxiety** among the students. The normal curve drawn over the histogram shows that the distribution is approximately bell-shaped. This indicates that the mathematics anxiety scores are nearly normally distributed. However, a slight variation can be observed at the lower and upper ends, showing that a few students reported comparatively low or high anxiety scores. Overall, the histogram suggests that mathematics anxiety is present among secondary school students at a moderate level. The approximately normal distribution of scores also supports the use of further parametric statistical analysis, such as the independent samples t-test, to examine gender-based differences in mathematics anxiety.

Normal Q-Q Plot of Total:



Interpretation:

The Normal Q-Q Plot was used to examine whether the mathematics anxiety scores followed a normal distribution. In the graph, most of the observed values are positioned close to the diagonal reference line. This indicates that the distribution of mathematics anxiety scores is approximately normal. A few points at the lower and upper ends show slight deviation from the reference line, but these deviations are not large enough to suggest a serious violation of normality. The middle portion of the data closely follows the line, showing that the majority of students' scores are normally distributed. Thus, the Q-Q Plot confirms that the mathematics anxiety scores of secondary school students are reasonably normal. This supports the use of parametric statistical techniques, particularly the independent samples t-test, for comparing mathematics anxiety between male and female students in the present study.

Objective

To study the influence of gender (ie. male/ female) on mathematics anxiety among secondary school students.

H₀: There is no significant difference in mathematics anxiety based on gender (ie. male/ female).

GENDER	N	MEAN	SD	σ_D	t- Value	df	CR
MALE	60	88.98	12.638	2.40	0.57	120	1.97
FEMALE	62	87.60	13.832				

Table 1. There is no significant difference in mathematics anxiety based on gender (ie. male/ female).

Interpretation:

The table presents the comparison of mathematics anxiety scores between male and female secondary school students. The sample consisted of 60 male students and 62 female students. The mean mathematics anxiety score of male students was 88.98, with a standard deviation of 12.638, while the mean score of female students was 87.60, with a standard deviation of 13.832. The mean difference between male and female students was very small. The calculated standard error of difference (σ_D) was 2.40, and the calculated t-value was 0.57. At 120 degrees of freedom, the critical value is 1.97 at the 0.05 level of significance. Since the calculated t-value 0.57 is less than the critical value 1.97, the difference between male and female students is not statistically significant. Therefore, the hypothesis stating that there is a significant difference in mathematics anxiety between male and female secondary school students is rejected. The null hypothesis is retained. The findings reveal that male students showed a slightly higher mean mathematics anxiety score than female students. However, the difference was not significant. Thus, it may be concluded that gender does not significantly influence mathematics anxiety among secondary school students in the present study. Both male and female students experience mathematics anxiety at a nearly similar level.

DISCUSSION

The present study was conducted to examine mathematics anxiety among secondary school students with special reference to gender. The findings revealed that both male and female students experienced mathematics anxiety at a moderate level. The mean score of male students was **88.98**, while the mean score of female students was **87.60**. Although male students obtained a slightly higher mean score than female students, the difference was very small. The calculated **t-value was 0.57**, which was lower than the critical value of **1.97 at 120 degrees of freedom**. Therefore, the difference between male and female students was not statistically significant. This clearly indicates that gender did not have a significant influence on mathematics anxiety in the present sample. In other words, mathematics anxiety was found to be almost equally present among both male and female secondary school students. This finding is

important because mathematics anxiety is often assumed to be higher in one gender, particularly among female students. However, the present study does not support such an assumption. The result suggests that anxiety related to mathematics may be shaped more by classroom environment, teaching methods, examination pressure, fear of failure, lack of confidence, and previous learning experiences rather than gender alone. Therefore, mathematics anxiety should be viewed as a general academic concern among secondary school students. The result of the present study is consistent with studies such as Zakaria et al. (2012), Mohamed and Tarmizi (2010), Rao and Chaturvedi (2017), Kiso (2024), and Samanta and Tarafdar (2025), which also reported no significant gender difference in mathematics anxiety or related academic anxiety. However, the finding differs from studies such as Mandal (2020), Jabeen and Andrabi (2018), and Alzahrani and Stojanovski (2017), where gender-based differences were observed. Such differences in findings may be due to variation in sample size, region, school environment, cultural background, teaching practices, and measurement tools. The present study highlights that teachers, parents, and school counsellors should not consider mathematics anxiety as a gender-specific problem. Since both male and female students may experience fear, nervousness, and hesitation in mathematics, supportive strategies should be provided to all learners. Teachers should create a classroom environment where students feel comfortable asking questions, making mistakes, and practising mathematics without fear of embarrassment. Activity-based teaching, regular practice, positive reinforcement, peer learning, and counselling support may help reduce mathematics anxiety among students. Overall, the findings suggest that gender alone is not a strong factor in determining mathematics anxiety among secondary school students. The study supports the need for inclusive classroom practices and student-friendly mathematics teaching methods so that all students can develop confidence and interest in mathematics learning. This discussion is based on the findings and structure of the current research paper, where the sample included 122 students and the gender comparison showed no significant difference in mathematics anxiety.

CONCLUSION

The present study explored mathematics anxiety among secondary school students and examined whether it differed on the basis of gender. On the basis of the analysis, it was found that male students had a slightly higher mean mathematics anxiety score than female students. However, this difference was not statistically significant. The calculated t-value of **0.57** was less than the critical value of **1.97** at the 0.05 level of significance. Therefore, the null hypothesis was retained, and it was concluded that **there is no significant difference in mathematics anxiety between male and female secondary school students**. The study concludes that mathematics anxiety is experienced by both male and female students at nearly the same level. Hence, gender cannot be considered a major factor influencing mathematics anxiety in the present study. The findings suggest that efforts to reduce mathematics anxiety should focus on all students equally. Teachers should use supportive, practical, and student-centred teaching methods to reduce fear and develop confidence in mathematics. Thus, the study emphasizes that mathematics anxiety is a common

academic issue among secondary school students and should be addressed through positive classroom practices, proper guidance, regular encouragement, and counselling support.

REFERENCES

1. Alzahrani, A., & Stojanovski, E. (2017). *Assessment of anxiety on mathematics for students in secondary school in Qatar*. [PISA 2012 data analysis].
2. Beilock, S. L., & Willingham, D. T. (2014). Math anxiety: Can teachers help students reduce it? *American Educator*, 38(2), 28–32.
3. Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. *Journal for Research in Mathematics Education*, 21(1), 33–46. <https://doi.org/10.2307/749455>
4. Jabeen, N., & Andrabi, A. A. (2018). Academic anxiety among adolescents in India. *International Journal of Education and Research*, 6(4), 123–133.
5. Kiso, T. (2024). *Mathematics anxiety among secondary school students in Kohima Town, Nagaland*. [Unpublished study].
6. Mandal, A. K. (2020). *Mathematics anxiety and academic achievement of students at secondary stage of education*. *International Journal of Advanced Educational Research*, 5(2), 14–19.
7. Mohamed, S. H., & Tarmizi, R. A. (2010). Anxiety in mathematics learning among secondary school learners: A comparative study between Tanzania and Malaysia. *Procedia - Social and Behavioral Sciences*, 8, 498–504. <https://doi.org/10.1016/j.sbspro.2010.12.068>
8. Omar, S. H., Aris, S. R. S., & Hoon, T. S. (2022). Mathematics anxiety and its relationship with mathematics achievement among secondary school students. *Journal of Mathematics Education*, 13(1), 67–78.
9. Rao, B. V. R., & Chaturvedi, A. (2017). Study the academic anxiety of secondary school students in relation to gender and locality. *International Journal of Indian Psychology*, 4(3), 123–131.
10. Samanta, G., & Tarafdar, G. (2025). Factors affecting mathematical anxiety and its affect on mathematical achievement in secondary school students. *Journal of Education and Human Development*, 14(1), 45–56.
11. Srivastava, et al. (2016). [Study on mathematics anxiety among secondary school students in Lucknow]. *All Research Journal*, 2(7), 88–93.
12. Suman, & Chauhan. (2021). Impact of constructivist teaching on mathematics anxiety. *International Journal of Scientific and Research Publications (IJSRP)*, 11(5), 59–65.
13. Zakaria, E., Zain, N. M., Ahmad, N. A., & Erlina, A. (2012). Mathematics anxiety and achievement among secondary school students. *American Journal of Applied Sciences*, 9(11), 1828–1832. <https://doi.org/10.3844/ajassp.2012.1828.1832>