

Research Paper

Correlational Study of Mathematical Anxiety and Problem Solving Ability in Mathematics among Secondary School Students of Kashmir Division

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ABSTRACT

The present study investigated the relationship between mathematical anxiety and Problem solving ability in mathematics among secondary school students of Kashmir Division. A descriptive correlational research method was used and a sample of 500 secondary school students were collected from different secondary school of Kashmir by using Simple random sampling. Pearson's product-moment correlation coefficient was used to analyze the data. The results demonstrated a negative correlation between mathematical anxiety and Problem solving ability in Mathematics, implying that students with low problem solving ability in mathematics have more mathematical anxiety. So, the findings emphasize the importance of supportive classroom practices and interventions that promote confidence and positive mathematical engagement.

Keywords: *Mathematical Anxiety, Problem solving Abilities, Secondary school students, Kashmir*

Mathematical anxiety is characterized by feelings of tension and apprehension when engaging with mathematical concepts, significantly impedes students capacity for effective problem-solving (Krisnanto & Istiandaru, 2022). This pervasive issue, evident across various educational levels, often leads to poorer performance, as individuals with high anxiety frequently exhibit difficulties in comprehending problems, devising strategic plans, executing solutions, and verifying results (Kameubun et al., 2023; Wahyuni et al., 2024). This negative emotional response can further manifest as avoidance behaviors towards mathematics, diminished self-confidence, and reduced achievement in mathematical assessments (Dwivedi & Singh, 2023). The causal relationship between mathematical anxiety and problem-solving ability, however, is not always unidirectional; lower mathematical aptitude can also precipitate anxiety, creating a reciprocal cycle that further exacerbates academic difficulties (Grezo & Sarmany-Schuller, 2018). Specifically, this cyclical relationship can lead to a "vicious cycle" where early negative experiences with mathematics increase anxiety, subsequently prompting avoidance and further negative

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experiences (Kaskens et al., 2020). This cyclical interplay can diminish problem-solving abilities by interfering with working memory and the processing of symbolic numbers, thereby impacting mathematical performance directly and indirectly (Svecova, 2024). Consequently, this debilitating condition can manifest as intense stress or fear, disrupting an individual's ability to engage effectively with mathematical tasks (Diponegoro et al., 2024). This interference often makes it difficult for students to concentrate, thereby diminishing their capacity to effectively solve problems (Mangarin & Caballes, 2024). This emotional impediment to cognitive function is posited to negatively correlate with problem-solving scores, suggesting that heightened anxiety directly undermines performance on mathematical tasks (Safitri et al., 2022). Research consistently demonstrates a negative correlation between math anxiety and problem-solving abilities, indicating that as anxiety levels increase, proficiency in mathematical problem-solving tends to decrease (Grezo & Sarmany-Schuller, 2018). This impairment often stems from the intrusive thoughts and physiological responses associated with anxiety, which consume cognitive resources that would otherwise be dedicated to problem conceptualization and execution (Handayani & Permatasari, 2022). Such cognitive resource depletion, particularly affecting working memory, is especially pronounced in complex mathematical tasks, where the demands on cognitive processing are already high (Halme et al., 2022). This is consistent with the processing efficiency theory, which posits that anxiety-related ruminations act as a secondary task, diverting attentional resources from the primary mathematical task and thus disrupting cognitive performance (Ashkenazi et al., 2024). This diversion of cognitive resources is particularly detrimental to problem-solving, as it can hinder strategy selection and the effective execution of solutions (Yu, 2023). Furthermore, excessive negative emotions and intrusive thoughts associated with math anxiety can co-opt working memory resources, thereby diminishing an individual's capacity to process and retain information crucial for mathematical problem-solving (Pizzie & Kraemer, 2023). This reduction in working memory capacity not only increases reaction times and errors but also significantly predicts an individual's ability to engage in arithmetic problem-solving and implement effective solution strategies (Mutlu, 2019). This depletion of executive function resources due to anxiety further limits the cognitive capacity available for complex mathematical operations, exacerbating difficulties in problem-solving (Finell et al., 2022). This interference aligns with the attentional control theory, which suggests that anxiety shifts attentional focus away from the task at hand towards threat-related stimuli, thereby compromising the efficiency of goal-directed attentional systems crucial for complex problem-solving (Caviola et al., 2021). Specifically, this impact is more pronounced in tasks requiring higher cognitive load, where working memory is heavily utilized, leading to a more severe decline in performance for mathematics-anxious individuals (Eden et al., 2013). This is because the intrusive thoughts characteristic of anxiety consume the limited attentional resources of the central executive of working memory, thereby reducing the cognitive capacity available for complex mathematical processing (Suarez-Pellicioni et al., 2015). This resource depletion becomes particularly evident when tasks necessitate intricate computations or strategic shifts, as these processes inherently demand greater working memory engagement (Caviola et al., 2017; Ibrahim, 2018; Si et al., 2016). The attentional control theory, derived from the processing efficiency theory, further elaborates on how anxiety biases attentional resources, leading to less efficient processing and ultimately hindering effective problem-solving performance (Pellizzoni et al., 2021; Suarez-Pellicioni et al., 2014).

REVIEW OF RELATED LITERATURE

Nagarani & Sasikumar (2026) studied mathematical anxiety of students studying in high schools of Karaikudi Sivaganga district of Tamil Nadu. For data collection descriptive survey design was employed and a sample of 300 students were selected on random bases. Results highlighted an overall moderate level of mathematical anxiety among secondary school students. Further no significant difference was found between male and female students. Also, a significant difference was observed between government and private school students in which private school students reported higher mathematical anxiety than government school students.

Yanti et al (2025) investigated the impact of mathematical anxiety and self efficacy toward prospective mathematics teachers performance. Pearsons's correlation and multiple regression were statistical methods used in the study. Findings revealed a negative correlation between mathematical anxiety and performance, in contrast self efficacy has a positive correlation with performance.

Nehra and Raj (2025) conducted a correlational study of mathematical interest and problem solving ability of males and female students of secondary level. The study adopted correlational research which includes a sample of 160 secondary school students selected through random sampling from CBSC affiliated schools. Findings of the study revealed that there is no statistically significant correlation between problem solving ability and mathematical interest for boys and girls.

Horo & Denis (2024) in a descriptive study examined problem solving ability of secondary school students of CBSE Board and ICSE Board of Mankapur city. A sample of 200 students from class XI and XII from two different higher secondary schools of both CBSC and ICSE board was selected through random sampling. Study depicted a no significant difference between male and female higher secondary school students and no significant difference was found between rural and urban higher secondary school students.

Objective of the Study

- To find out correlation between Mathematical Anxiety and Problem Solving Ability in Mathematics among Secondary School Students of Kashmir Division.

Hypothesis

There is no significant correlation between Mathematical anxiety and problem solving ability in mathematics among secondary school students of Kashmir Division.

METHODOLOGY

The present study employed descriptive correlational research design to examine relationship between mathematical anxiety and Problem Solving Ability in Mathematics. This study was conducted in Kashmir Division and population of the study comprised Secondary school students. A sample of 500 secondary school students were selected from different secondary schools of Kashmir Division. Simple Random sampling was the sampling technique employed for selection of the respondents.

Tools used

- Mathematical Anxiety Scale (2011) by Mahmood and Khatoon. The scale consists of 14 items.

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- Problem Solving Ability in Mathematics Scale (2018) by Ralhan. The scale consists of 26 items.

Data Analysis and Interpretation

The Statistical Package for the Social Sciences (SPSS) was used to analyze the gathered data. Quantitative data was analysed using inferential analysis, including Pearson's correlation, to investigate the relationship between Mathematical Anxiety and Problem Solving Ability in Mathematics.

Table 1: Correlation between Mathematical Anxiety and Problem Solving Ability in Mathematics

Variables	Sample	r
Mathematical Anxiety	500	-0.68**
Problem Solving Ability in Mathematics		

****Correlation is significant at the 0.01 level (2-tailed)**

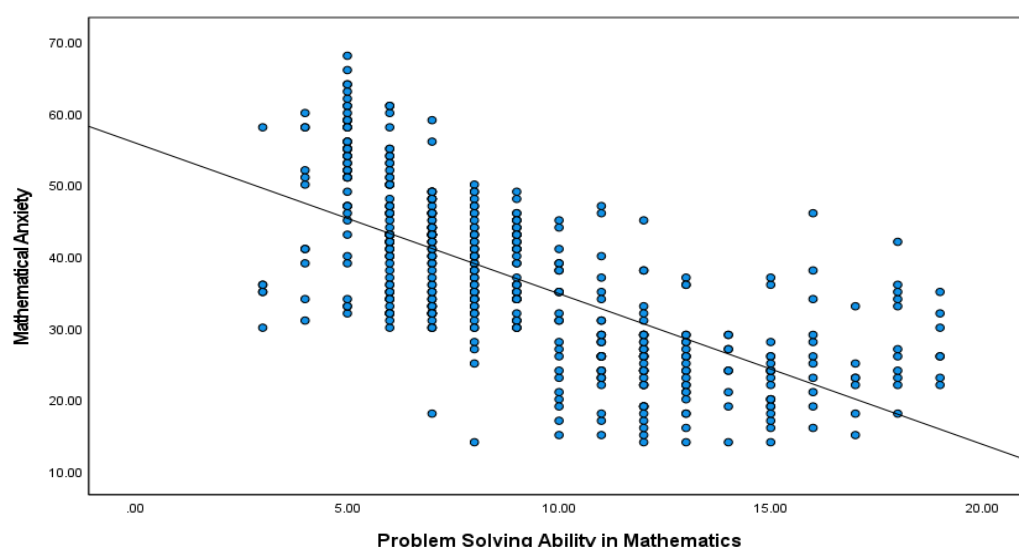


Figure 1 Scatter Diagram Illustrating Correlation between Mathematical Anxiety and Problem Solving Ability in Mathematics

The result depicted that Mathematical Anxiety and Problem Solving Ability in Mathematics has strong negative relationship $r = -0.68$ which is significant at 0.01 level. The scatter plot in Figure 1 depicts the negative correlation between Mathematical Anxiety and Problem Solving Ability in Mathematics as the maximum dots in the scatter plot are gathered on and around the downward line of best fit. Hence, Null Hypothesis there is no significant relationship between Mathematical Anxiety and Problem Solving Ability in Mathematics got rejected.

DISCUSSION

The results of the study which show a strong negative correlation between mathematical anxiety and problem solving ability in mathematics are in line with studies conducted by Akinsola (2008) found that problem-solving skill was substantially associated with mathematics anxiety, students with higher problem-solving ability had lower anxiety issues. Similarly, Pimta et al. (2009) discovered that students' attitudes and confidence, which were associated with lower mathematics anxiety, influenced their mathematical problem-solving

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skills. Aljaberi (2016) also found that pre-service teachers with better mathematical problem-solving abilities had lower levels of mathematics anxiety. Similarly, Rusyda et al. (2021) found that instructional approaches that improve mathematical problem-solving abilities help to reduce students' mathematics anxiety. More recently, Vallejos and Edig (2025) found that students with stronger mathematical problem-solving abilities had significantly lower levels of mathematics anxiety, emphasizing the importance of developing problem-solving ability among students. Maloney et al. (2011) discovered that mathematics anxiety affects both mathematical achievement and students' motivation to participate in mathematical problem-solving activities. Students with high levels of anxiety were more likely to avoid challenging mathematics activities, restricting their opportunities to build effective problem-solving skills. Ramirez et al. (2013) discovered that mathematics anxiety has a negative impact on students' mathematical performance by depleting cognitive resources required to solve mathematical problems. Their findings show that worry interferes with efficient information processing, making it difficult for pupils to use suitable problem-solving skills.

CONCLUSION

The current study finds that mathematical anxiety is negatively connected to problem-solving abilities in mathematics among secondary school students in Kashmir Division. The findings show that students with low problem solving ability have higher level of mathematical anxiety higher level of mathematical anxiety. This shows that low problem solving ability impairs student's cognitive functioning, confidence, and motivation to engage with mathematical tasks, and increasing their mathematical anxiety. As a result, efforts to improve students mathematical problem-solving abilities should focus not only on increasing mathematical knowledge and skills, but also on lowering mathematical anxiety through supportive classroom environments, effective teaching strategies, and appropriate psychological and academic interventions.

Educational Implications

1. Mathematics teachers should focus more on improving students problem-solving skills rather than depending on procedural computations and rote memorization. Regular exposure to non-routine and real-world mathematical issues can help students improve their reasoning skills, gain confidence, and reduce their anxiety about math.
2. Teachers should create a supportive classroom environment in which mistakes are recognized as opportunities to learn rather than failures. Encouraging children to ask questions, debate alternate solution ideas, and learn cooperatively can help to reduce mathematical anxiety and build good problem-solving attitudes.
3. Teachers should detect students who exhibit high levels of mathematical anxiety or persistent difficulty with problem solving at secondary stage. Diagnostic evaluations, remedial education, peer tutoring, and tailored support can all help to close learning gaps before anxiety becomes chronic.
4. Mathematics enrichment programs in schools, math laboratories, counselling services and teacher capacity-building activities can all help to minimize mathematical anxiety while also boosting students problem-solving skills and overall arithmetic proficiency.
5. Teacher education and in-service training programs should provide mathematics teachers with tools for recognizing symptoms of mathematical anxiety and applying

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instructional practices that increase problem-solving skills while reducing anxiety related to mathematics

6. Schools should implement frequent mathematics enrichment programs, such as math clubs, problem-solving workshops, quizzes, and contests, to strengthen students mathematical reasoning and eliminate their anxiety related to mathematics.
7. Rather than depending primarily on high-stakes exams, assessment procedures should be varied to include project work, classroom debates, and open-ended problem-solving assignments. This can help to alleviate mathematical anxiety among secondary school students.

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Conflict of Interest

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