

**MATHEMATICS ANXIETY: AN INVESTIGATION OF GENDER DIFFERENCES****Sawinder Arora¹ & Yogesh Sharma²***G.N. College of Education for Women, Kapurthala, Punjab, India**Ramgarhia College of Education, Phagwara, Punjab, India***Abstract**

The purpose of this study was to investigate differences for boys and girls in terms of mathematics anxiety. A sample of 192 boys and 112 girls' studying in seven secondary schools of Punjab were selected. The second investigator had personally met the participants and administered the tool. Mathematics Anxiety Scale developed by Sharma and Sansanwal (2011) was used. Mean S.D.S and T-test were calculated to analyse the data. The findings reveal that girls had significantly higher mathematics anxiety than boys.



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Introduction

The importance of mathematics in progress and preservation of a civilization is beyond any debate. However, mathematics anxiety impedes a student's mathematics learning. The reciprocal relationship between mathematics learning and mathematics anxiety has been established in the previous studies. Further, students with mathematics anxiety tend to avoid mathematics classes and devote less time to mathematics work, which in turn further hampers their learning in mathematics. Mathematics anxiety can be defined as feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations" (Richardson and Suinn, 1972, p. 551).

Moreover, Ho et al. (2000) pointed out that mathematics anxiety has cognitive (worry component of anxiety which is often displayed through negative expectations, preoccupation with and self-deprecatory thoughts about an anxiety-causing situation) and affective dimensions (emotional component of anxiety, feelings of nervousness, tension, dread, fear, and unpleasant physiological reactions to testing situation).

Previous studies also points out that girls have more mathematics anxiety than boys (Ashcraft, 2002; Campbell & Evans, 1997; Ganley and Vasilyeva, 2013; Hembree, 1990; Ma,

1999; Satake & Amato, 1995). If these gender differences in mathematics anxiety are present, few females will opt for college streams and career paths that depend heavily on mathematics. So, these gender differences in mathematics anxiety need to be further studied. Keeping this in mind the present study was undertaken.

Method

Participants

Three hundred four participants were drawn from seven government, private and grant-in-aid secondary schools in Shaheed Bhagat Singh Nagar of Punjab State. Participants varied by gender (boys, 192 and girls, 112), and grade (VII, 98; IX, 96; and X 110). The age of the students ranged from 13-17 years.

Design of the study

In the present study descriptive survey method was used.

Measure

Mathematics Anxiety Scale (MAS). The MAS developed by Sharma and Sansanwal (2011) was used as a measure of mathematics anxiety. The MAS comprises 44 items pertaining to cognitive and affective dimensions. There was no time limit but generally students took 25 minutes. Moreover, there were 22 positive statements and 22 negative statements. The weight age given for positive statements was 1, 2 and 3 for yes, undecided and no, while, in case of negative statements the weight age given was 3, 2 and 1 for yes, undecided and no. The test-retest reliability and split-half reliability coefficients were reported as .80 and .82 respectively. They also reported a criterion validity (The mathematics achievement test developed by L.N. Dubey was used as a measure of mathematics achievement) as $-.74$.

Procedure

After getting institutional approval the participants were given proper instructions of giving a response before the commencement of MAS in each school. The responses were scored as per the scoring principle.

Results and Discussion

The significance of the difference between the mean scores of the boys and that of the girls of secondary school students was examined for the measure of mathematics anxiety. The analysis of the results is given in Table 1.

Table 1 Gender-wise N, M, SD, t-value and Level of significance

Gender	N	M	SD	't' value	Level of significance
Boys	192	77.81	14.78	3.18	0.01
Girls	112	83.78	16.32		

Comparison between boys and girls on mathematics anxiety shows significant difference between the two groups. From Table 1 it can be seen that the mean scores of boys and girls were 77.81 and 83.78 and S.D.S. were 14.78 and 16.32 respectively. The 't' value was 3.18 which is significant at 0.01 levels. As such, it may be concluded that girls with their significantly higher mean score possessed significantly higher mathematics anxiety than boys.

The results of the present study are in agreement with the findings of a meta-analysis based on 151 studies by (Hembree, 1990). Thus, gender difference in mathematics anxiety is not only a foreign concern and in fact they are also prevalent in Indian scenario. The gender differences in mathematics anxiety may be due to differences in the upbringing of boys and girls; acceptance of mathematics anxiety by girls as compared to boys; and mathematics-gender stereotype.

Suggestions

Additional studies are necessary to investigate gender differences in mathematics anxiety across all grade levels. Furthermore, the use of interventions like systematic desensitization, relaxation training, and modeling for alleviating mathematics anxiety need to be introduced in the B.Ed. training. Further, as parents and teachers, there is need to resist anything that promote mathematics-gender stereotype. Moreover, we need to have positive and accepting attitude towards students' informal mathematics. Mathematics is important for daily life and career choices and this must be conveyed to girls also.

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