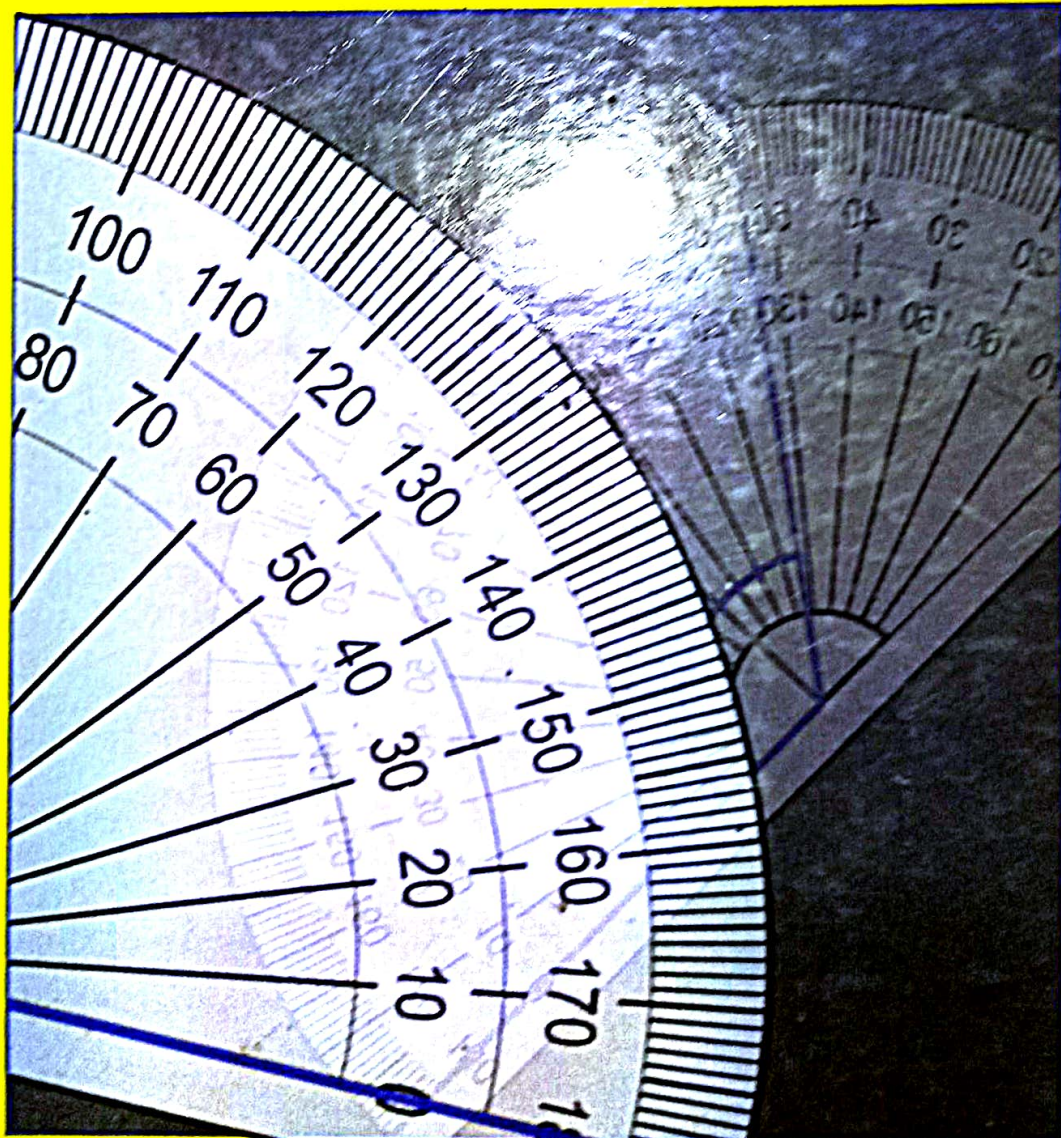# Recent Trends of
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Edited by
Saifur Rahman

Saifur Rahman
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Math Anxiety in Secondary School: An Experimental Study in Dhupdhara Locality of Goalpara District, Assam

Abdul Wahed
Sahin Ahmed

Abstract

Anxiety, a dreadful fear of the students towards mathematics has been persisting in their mind from kindergarten to college. It is regarded as one of the causes of avoiding mathematics and poor performance in mathematics. This paper attempts to assess the level of anxiety and performance of the secondary students in mathematics in *Dhupdhara locality* of Goalpara district. Attempt is also made to examine the relationship between anxiety and performance. Another objective of the paper is to assess the gender difference in math anxiety as well as in their performance if exists. With the help of *math anxiety scale (MAS)*, a psychometric test was conducted in the school environment to measure the level of anxiety of the students towards mathematics. For this purpose 70 students (M=40, F=40) of class X were selected in accordance to judgment sampling method from three high schools taking exhaustively in the locality. Performances in mathematics were measured with the help of their math scores in the last promotional examination. *Correlation* and *paired t-test* are used as statistical tools to analyze the data. The study revealed that mathematics anxiety is negatively correlated with the performance of the students and gender difference is significant in math anxiety as well as in their performance.

Key Words: *Math anxiety; Math Anxiety Scale (MAS) performance; curriculum gap; gender difference.*

Introduction

The studies of mathematics anxiety were started by an elementary school teacher M.F. Gough in the early 1950. After careful observation of the suffering of her students from fear and nervousness in doing math she published "Mathemaphobia: causes and treatments" in 1954. Just after three year Dreger and Aiken (1957) published the article "The identification of number anxiety in a college population" in the Journal of Educational Psychology. In this study they introduced a new term 'Mathematics Anxiety' for students' attitude towards difficulties with mathematics and defined it as "the presence of a syndrome of emotional reactions to arithmetic and mathematics" (p. 344).

Richardson and Suinn (1972) defined math anxiety 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." This definition provides us with the most valuable information regarding math anxiety. Firstly, math anxiety is a dreadful fear that affects negatively in the students' performance and participation (Suinn et al, 1988) in their academic life. Secondly, it has influential effects in the ordinary life of the people in performing their daily business. In other words negative feelings and avoidance of mathematics can be termed as math anxiety and it greatly impacts school math education as well as in the choice of the students' career option (Mahmood et al 2011)

Review of literature revealed that research in mathematics education as well as in math anxiety is still a little in Indian context. Among the few researchers Karimi et al., 2009, asserted that many students who suffer from math anxiety have little confidence in their ability to do mathematics. He also pointed out that mathematics anxiety is the outcome of low self-esteem and the fear of failure. This fear causes problems for processing the incoming information as well as the previously learned information to do the math. As a result anxiety victimized students suffer from depression and the problem solving capacity reduces day by day.

Another remarkable research finding revealed that a small degree of cognitive anxiety i.e. seriousness and concern about the subject may motivate student to try harder (Alexander, 2010). But when this seriousness or concern becomes high and strong then it may interfere with performance (Wig field et.al, 1988; Ho et.al. 2000).

Research studies (R.Das et.al, 2013) already conducted in Assam summarized few important lines regarding math anxiety as follows-

Causes of Math Anxiety: Negative class room experiences; over emphasis on drill; high-stake test and parents unrealistic expectations.

Effects of Math Anxiety: Math avoidance; distress; interfere on thinking skill and interference on memory process.

Remedy of Math Anxiety: Conceptual understanding rather than memorizing; teaching problem solving relating to everyday life activities and cooperative group discussion justifying one's thinking.

Research in India and abroad regarding relationship between math anxiety and performance (Green, 1990; Hembree, 1990; Ashcraft et al., 2001; Karimi et al. 2009) revealed that the mathematics anxiety and academic performance is negatively correlated. The students who have a high level of mathematics anxiety have lower levels of mathematics achievement.

This paper tries to focus the prevailing level of math anxiety among secondary students and seeks to alleviate the suffering of the students through appropriate pedagogical approaches. Attempt is also made to examine the relationship between students' math anxiety and performance in the subject. Another dimension of the study is to assess the gender differences in math anxiety. The study revealed that math anxiety is negatively correlated with their performance and gender difference is significant.

Justification of the Study

The choice of the topic is disposed on the current world trend and research emphasis that math anxiety is found among the school students across the country and it has an adverse effect in their performance in Mathematics. Math anxiety has been persisting in the mind of the students since early stage. Curriculum gap, incomplete study, misconception of the subject in the lower classes and inability to read, write and identify the math symbols causes puzzles in their mind. This anxiety is accelerated by the parents and teachers attitude as they show their self anxiety towards mathematics. Instead of passing some inspiring words that mathematics is fun, and easy compared to other subjects, they used to alert the students with the terrified words that 'mathematics is very hard subject; it requires lot of time and labour'. As a result, they gradually avoid the subject. This attitude reduces skilled labour having sound mathematical knowledge in the society and it has influential impacts in the professional and economic field of a country. Thus, in the present day context math anxiety is being a matter of grave concern in the society.

Research Questions

The study was conducted keeping in view the following research questions-

1. What is the relationship between math anxiety and performance?
2. Are there any gender differences in math anxiety as well as in performance?
3. Are there any differences in math anxiety and performance in Govt. and private school?
4. What are the average rate of math anxiety and performance in secondary school?

Delimitation of the Study

The study is delimited to Dhupdhara locality taking four Assamese medium High School (Govt=2, Private=2). The sample Size is delimited to 80 students of Class X.

Methodology

The Samples are collected according to the judgment sampling design as presented in the Table 15.1.

Table 15.1 Judgement Sampling

Name of the Schools	Male	Female	Total	G. Total
Dhupdhara High School	16	14	30	Govt. 40
Dhupdhara Girls High School	.....	10	10	
Sankardev Shisu/ Vidya Niketan	19	11	30	Pvt. 40
Navodaya Jatiya Vidyalaya	5	5	10	
G.Total	40	40		80

Experiment

The math anxiety experiment was conducted in the school environment among 80 students of class x with the help of Math Anxiety Scale (MAS) developed by S. Mahmood and T.Khatun of A.M.U. The MAS is modified and translated into Assamese version by the researcher. And their performances are measured by the marks obtained in mathematics in the last promotional examination.

Analysis of the Study

The collected data are arranged in tabular forms and analyzed with the help of common statistical tools such as, correlation coefficient, mean and graphs.

The Math Anxiety Scale (MAS) is a 5-point Likert type instrument that assesses positive and negative dimensions of math anxiety. The calculated mean of anxiety and performance scores together with the correlation between anxiety and performance scores are given in the following table-2. From the table it is clear that math anxieties of the students are negatively correlated with their performance. That is increase of one implies decrease of the other. Moreover, the table-2 reveals that the correlations are significant as r lies within -0.21 and -0.72.

Graph-15.1 reveals that math anxiety of male is less than the female and math anxiety of private schools is also less than the Govt. schools. The graph also witness in the fact that irrespective of categories and genders the anxiety scores

lies within the range from 33.7 to 36.45. And the total average score of math anxiety is almost 50% (35.08) out of 70.
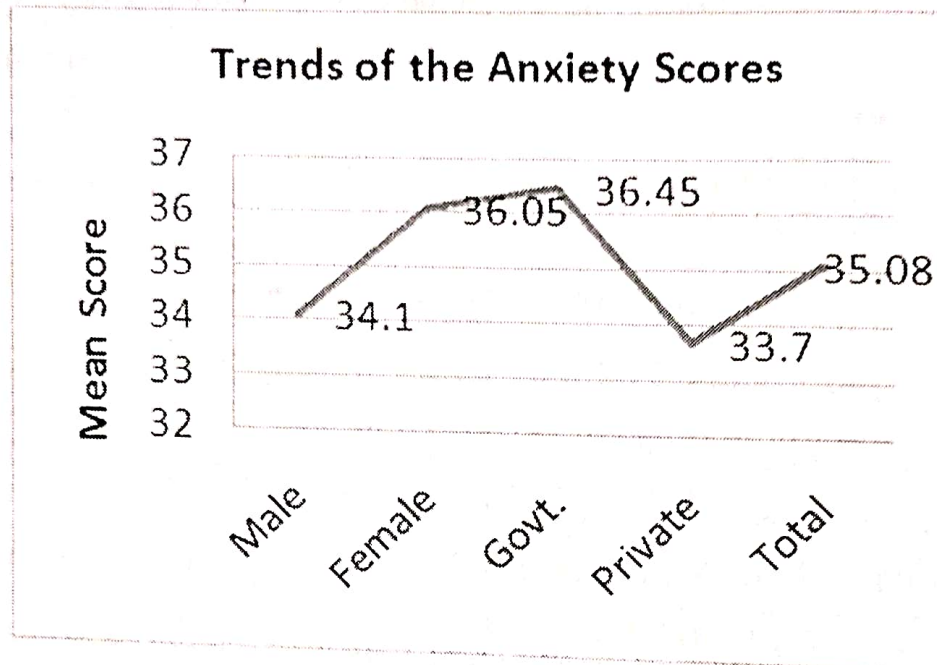
Trends of the Anxiety Scores

Fig. 15.1 Trends of the Anxiety Scores

Table 15.2 Mean of Anxiety scores and performance

	Anxiety Score X	Performance Y	Correl (X,Y)
Mean	$\bar{X}$	$\bar{Y}$	r
Male	34.1	49.1	-0.62
Female	36.05	39.78	-0.33
Govt.	36.45	34.93	-0.21
Private	33.7	53.95	-0.72
Total	35.08	44.44	-0.44

The most remarkable observation from the graph-15.2 is that the females are poor performer than males. That is the gender disparities are still continuing in the achievement of secondary mathematics. Moreover, in regard to performance in mathematics Govt. schools are poor performer than private schools. The graph also reveals that the students' achievements are not satisfactory irrespective of all the categories and all the genders.
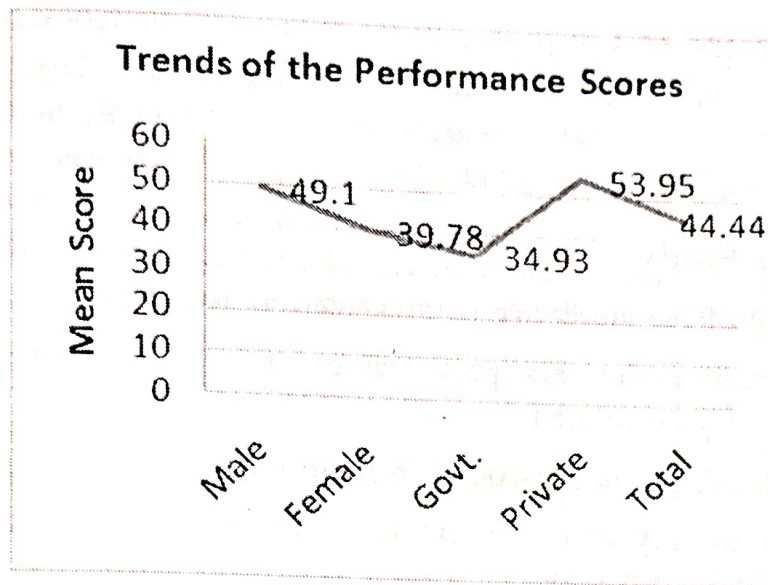
Trends of the Performance Scores

Fig. 15.2 Trends of the Performance Scores

Table 15. 3 Anxiety scores are converted to percentage score

	X	Y
Male	48.71	49.1
Female	51.5	39.78
Govt.	52.07	34.93
Private	48.14	53.95
Total	50.11	44.44

The highest score of MAS is 70 and total scores of the test of Mathematical Literacy (ML) and Curriculum Gap (CG) is 100. Hence, for better comparison anxiety scores are converted to percentage score in Table 15.3.
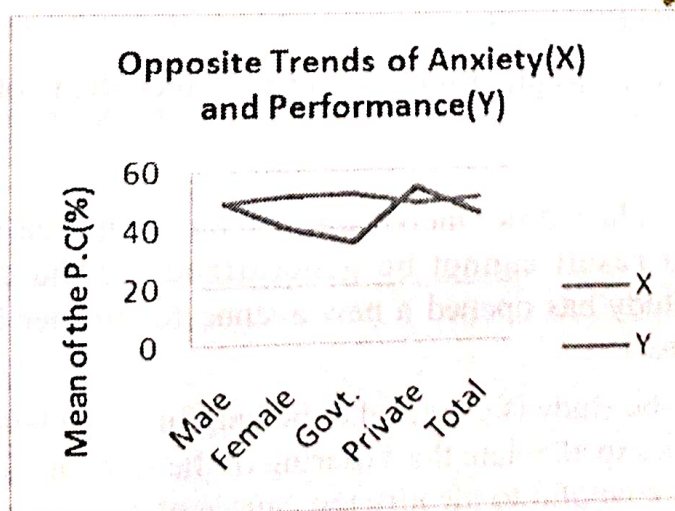
Opposite Trends of Anxiety(X) and Performance(Y)

Fig. 15.3 Opposite Trends of Anxiety (X) and Performance (Y)

From the graph- 15.3, it is clear that variation of anxiety scores is less than the performance score as it counted for male, female, Govt., and private institutions. That is math anxiety is persisting almost equally in all categories of schools as well as in both the genders.

Findings of the Study

The finding of the study are summarized as follows-

1. The math anxiety and performance of the students in mathematics is negatively correlated.

2. Gender difference is found in math anxiety and performance.

3. Math anxiety of males are less than female and female are poor performer than male.

4. Math anxiety of private schools is less than Govt schools and Govt. schools are poor performer than private schools.

5. The average math anxiety score is 35.08 which is 50% of the total anxiety score 70.

Recommendations of the Study

To alleviate math anxiety of the students the study summarized following recommendations

1. The teachers and guardians should not show their self math anxiety to their wards by passing negative comments regarding mathematics.

2. Remedial classes are necessary to minimize the curriculum gap of the students in mathematics.

3. Due importance should be given regarding mathematical literacy so that the students could read, write and understand mathematical symbols and language.

3. Practice of conceptual understanding rather than rote learning.

Conclusion

The study is conducted in Dhupdhara, a semi-town area of small locality. Hence, the present result cannot be generalized for the country. For the generalization the study has opened a new avenue for further broad base study covering state and nation.

The finding of the study is expected to be helpful to the teachers and parents in providing guidelines to alleviate the suffering of the students from math anxiety. Further, this would be helpful to identify the causes of math anxiety so that it can be prevented as early as possible.

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