

# A study of fear of mathematics among students

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**Abstract:** Mathematics is generally considered as the most difficult subject of all subjects. Students find lots of problems and difficulties in this subject in understanding the concepts, remembering the formulas, solving the sums and applying in practical situations. It is seen that as students face difficulties in learning Mathematics they show poor performance in the subject. There can be many reasons for this. One of the reason is the fear and anxiety that a student have towards the subject.

Research proved that not only fear, teachers also play an important role to develop the fear among students, specially school students. Once they start disliking the subject at an early stage, they carry the same phobia throughout their life. In this research paper we will try to find out if there is any relation between Mathematics phobia and different demographic factors, like gender, income inequality, age etc. We can do correlation and regression analysis between these factors. Also we can do different testing of hypothesis like t-test and chi square test to test whether different demographic factors and maths anxiety are interdependent on each other. We can also find out to what extent teaching maths in school in primary classes will play an important role in developing maths phobia in students. We will collect primary data from school and college students in Mumbai to carry out the research work.

**Key Words:** Mathematics, problems, fear, formulas.

## 1. INTRODUCTION:

Mathematics is generally considered as the most difficult subject of all subjects. Students find lots of problems and difficulties in this subject in understanding the concepts, remembering the formulas, solving the sums and applying in practical situations. It is seen that students are doing good in all other subjects but fail to do so in Mathematics. There can be many reasons behind this. One of the reason is fear and anxiety towards the subject. Students generally develop this anxiety in their school life and carry this phobia through out their life.

## 2. LITERATURE REVIEW:

Mathematics anxiety has been 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. There are numerous definitions of Mathematics anxiety. Tobias and Weissbrod (1980), and Fiore (1999) define math anxiety as “the panic, helplessness, paralysis, and mental disorganization that arises among some people when they are required to solve a mathematical problem” (p 403). Pradeep (2006) defined mathematics anxiety is a state of a sinking feeling, uncertainty and despair at doing and understanding mathematics.

A student’s foundation and base of the subject is built in his or her early stage of life. If the foundation is not strong student faces trouble and difficulty in learning higher order mathematics in college level. In that case fear and anxiety develops in student’s mind and it affects in attitude towards the subject. Student starts disliking the subject, don’t study and practice the subject which overall leads to poor performance in exam. In other words this fear and anxiety is also called “Mathematics Phobia”.

Trujillo & Hadfield, (1999) defined mathematics phobia as the level of discomfort that occurs among students in response to situations involving mathematical tasks, which is seen as a threat to their self-ability. Math-phobia has been described to involve cognitive and affective domains of learning. Harper & Daane, 1998; Hembree, 1990; Sloan, (2002) described the construct as related to personality characteristics, negative attitudes toward mathematics, mathematics avoidance, poor mathematics background, poor teaching behaviour, achievement levels, lack of confidence and negative experiences in school

## 3. METHOD:

In this study our null hypothesis is:

1. There is a no significant difference between mathematics anxiety levels and students’ some demographic factors like, gender, socio economic status of family, medium of school.
2. There is a no significant difference between mathematics anxiety levels and students’ academic performance.

The alternative hypothesis are

1.  $H_1$ : There is significant difference between mathematics anxiety levels and students' some demographic factors like, gender, socio economic status of family, medium of school.
2.  $H_2$ : There is significant difference between mathematics anxiety levels and students' academic performance.

Mathematics phobia develops among school children due to many reasons. Research has proved that it depends upon different demographic factors, like, gender, income inequality, socio economic status of the family, age etc. Teachers also play an important role to develop the fear among students, specially school students. Parent's involvement in the child's study reduce anxiety among them. In this study we will take different demographic factors and try to find out how these factors and anxiety towards the subject are related. Correlation and regression analysis will be done to establish relationship between maths phobia and academics performance. This study also seeks to further understand what helps students succeed in this subject so that teachers can implement techniques and strategies that promote success.

1. Questionnaire was prepared and primary data collected from 80 college students of science, commerce, self-financed courses from western Mumbai.
2. Arithmetic mean, Median, Skewness and Kurtosis calculated to understand property of data.
3. Correlation analysis are done to establish relationship between different factors.
4. Different testing of hypothesis like chi square tests are done to test whether different demographic factors and maths anxiety are interdependent on each other or not.

#### 4. HYPOTHESIS:

In this study our null hypothesis is:

3. There is a no significant difference between mathematics anxiety levels and students' some demographic factors like, gender, socio economic status of family, medium of school.
4. There is a no significant difference between mathematics anxiety levels and students' academic performance.

The alternative hypothesis are

3.  $H_1$ : There is significant difference between mathematics anxiety levels and students' some demographic factors like, gender, socio economic status of family, medium of school.
4.  $H_2$ : There is significant difference between mathematics anxiety levels and students' academic performance.

#### 5. ANALYSIS:

A questionnaire was prepared which included different demographic factors to establish relationship between them and the subject phobia to know at what extent the phobia is related to these factors. By this analysis it's not possible to remove the fear but different teaching methods or some other methods can be adopted to at least reduce this anxiety towards the subject at some extent. Other than these factors another few questions related to this study was prepared with the following alternatives: 1= Strongly Agree, 2=Agree, 3=Disagree, 4= Strongly Disagree. The questionnaires were randomly distributed to 80 first year students doing Mathematics at some undergraduate colleges in western suburbs of Mumbai.

##### Analysis 1.

**Question:** "How do you find Mathematics as a subject- Very Good (1), Good (2), Average (3), Poor (4)" -

Mean	2.68
Median	3.00
Skewness	-0.28
Kurtosis	-0.61

Mean is 2.68 and Median is 3 implies most of the students agree that they experience some anxiety, that's why most of them don't like the subject much.

Skewness is -0.28 (negative) means the distribution is left tailed which implies most of the data lies in the right side of mean, indicating more number of students find Mathematics difficult subject.

Kurtosis is -0.61 (negative) means the distribution is light tailed which implies most of the students find the subject good or average rather than very good or poor.

**Question:** “When did u develop fear of Mathematics- Primary school, Secondary school, Junior college”

Mean	2.531646
Median	2.00
Skewness	0.66
Kurtosis	-0.60

Mean is 2.53 and Median is 2 implies most of the students agree that they started experiencing some anxiety, after primary school level, mostly in secondary school and Junior college level.

Skewness is 0.66 (positive) means the distribution is right tailed which implies most of the data lies in the left side of mean, indicating more number of students started developing fear in the subject in secondary school rather than in Junior college.

Kurtosis is -0.60 (negative) means the distribution is light tailed indicating more number of students started developing fear in the subject in secondary school.

**Question:** “Do you feel that the teaching methodology of the teachers have affected your attitude towards Mathematics- Strongly Agree, Agree, Disagree, Strongly Disagree”

Mean	2.25
Median	2
Skewness	0.637909
Kurtosis	0.123678

Mean is 2.25 and Median is 2 implies most of the students agree at some extent that they started experiencing some anxiety due to poor teaching methodology.

Skewness is 0.63 (positive) means the distribution is right tailed which implies most of the data lies in the left side of mean, indicating more number of students strongly agree that teaching methodology of the teachers have affected their attitude towards the subject.

Kurtosis is 0.12 (positive) means the distribution is heavy tailed indicating more number of students strongly agree or disagree that teaching methodology of the teachers have affected their attitude towards the subject.

**Question:** “I am able to understand the concept in class but become blank in exam- Strongly Agree, Agree, Disagree, Strongly Disagree”

Mean	2.1375
Median	2
Skewness	0.155042
Kurtosis	-0.98078

Mean is 2.13 and Median is 2 implies most of the students agree at some extent that they understand the concept in class but become blank in exam.

Skewness is 0.15 (positive) means the distribution is right tailed which implies most of the data lies in the left side of mean, indicating more number of students strongly agree that they understand in class but become blank in exam.

Kurtosis is -0.98 (negative) means the distribution is light tailed indicating more number of students agree that they understand in class but become blank in exam.

**Question:** “I think lack of confidence towards the subject affects the result- Strongly Agree, Agree, Disagree, Strongly Disagree”

Mean	2.1
Median	2
Skewness	0.47479
Kurtosis	-0.20439

Mean is 2.1 and Median is 2 implies most of the students agree at some extent that they think lack of confidence towards the subject affects the result.

Skewness is 0.47 (positive) means the distribution is right tailed which implies most of the data lies in the left side of mean, indicating more number of students strongly agree that lack of confidence towards the subject affects the result.

Kurtosis is -0.20 (negative) means the distribution is light tailed indicating more number of students agree that lack of confidence towards the subject affects the result.

**Question:** “I feel the peer factors while asking questions in class- Strongly Agree, Agree, Disagree, Strongly Disagree”

Mean	2.7625
Median	3
Skewness	-0.68607
Kurtosis	0.056554

Mean is 2.76 and Median is 3 implies most of the students disagree that they feel the peer factors while asking questions in class.

Skewness is -0.68 (negative) means the distribution is left tailed which implies most of the data lies in the right side of mean, indicating more number of students strongly disagree that they feel the peer factors while asking questions in class.

Kurtosis is 0.06 (positive) means the distribution is heavy tailed indicating more number of students strongly agree or disagree that they feel the peer factors while asking questions in class

### Analysis 2

1. Correlation between attitude towards Mathematics or in other words anxiety levels for the subject and students’ academic performance (Mathematics marks in SSC) is -0.3466. (The ratings of percentage of marks are 1 to 4 from lower to higher and the ratings of liking towards the subject is 1 for very good, 2 for good, 3 for average and 4 for poor.)

Negative correlation interprets that less anxiety level and likings towards the subject implies good marks in the subject in secondary level.

2. Correlation between attitude towards Mathematics or in other words anxiety levels for the subject and students’ academic performance (Mathematics marks in HSC) is -0.1945. (The ratings of percentage of marks are 1 to 4 from lower to higher and the ratings of liking towards the subject is 1 for very good, 2 for good, 3 for average and 4 for poor.)  
 Negative correlation interprets that less anxiety level and likings towards the subject implies good marks in the subject in higher secondary level.

3. Correlation between medium of school and students’ academic performance (Mathematics marks in SSC) is -0.1176. (The ratings of percentage of marks are 1 to 4 from lower to higher and the ratings of English medium is 1 and Vernacular medium is 2) Negative correlation interprets that students from English medium schools score good marks in the subject in SSC than vernacular medium.

4. Correlation between medium of school and students’ academic performance (Mathematics marks in HSC) is -0.1115. (The ratings of percentage of marks are 1 to 4 from lower to higher and the ratings of English medium is 1 and Vernacular medium is 2) Negative correlation interprets that students from English medium schools score good marks in the subject in HSC than vernacular medium.

5. Correlation between students’ academic performance (Mathematics marks in SSC) and overall percentage is 0.24. (The ratings of percentage of marks are 1 to 4 from lower to higher) Positive correlation interprets that students who overall does well also get good marks in Mathematics.

6. Correlation between students’ academic performance (Mathematics marks in HSC) and overall percentage is 0.13. (The ratings of percentage of marks are 1 to 4 from lower to higher) Positive correlation interprets that students who overall does well also get good marks in Mathematics.

### Analysis 3

#### Testing of Hypothesis:

1.  $H_0$ : There is no significant difference between mathematics anxiety levels and gender of students.  
 $H_1$ : There is significant difference between mathematics anxiety levels and gender of students.

Affection for Maths			
	Like Maths	Dislike Maths	Total
Male	19	31	50
Female	13	17	30
<b>Total</b>	<b>32</b>	<b>48</b>	<b>80</b>

The calculated chi square is 0.0026998. The tabulated chi square for 1 d. f. at 5% level of significance is 3.841. As calculated chi square is less than tabulated chi square, we accept null hypothesis at 5% level of significance. This implies there is no significant difference between liking and disliking the subject based on male and female.

2.  $H_0$ : There is no significant difference between mathematics anxiety levels and medium of school of students.  
 $H_1$ : There is significant difference between mathematics anxiety levels and medium of school of students.

Medium of Instruction			
	Like Maths	Dislike Maths	Total
Vernacular medium	32	18	50
English medium	14	16	30
<b>Total</b>	<b>46</b>	<b>34</b>	<b>80</b>

The calculated chi square is 0.0015654. The tabulated chi square for 1 d. f. at 5% level of significance is 3.841. As calculated chi square is less than tabulated chi square, we accept null hypothesis at 5% level of significance. This implies there is no significant difference between liking and disliking the subject based on medium of school.

3.  $H_0$ : There is no significant difference between mathematics anxiety levels and income levels of their family.  
 $H_1$ : There is significant difference between mathematics anxiety levels and income levels of their family.

	Like Maths	Dislike Maths
<2Lakh	17	21
2-4 lakhs	9	17
4-6 Lakhs	3	4
>6 lakhs	2	7

The calculated chi square is 3.38095E-07. The tabulated chi square for 3 d. f. at 5% level of significance is 7.815. As calculated chi square is less than tabulated chi square, we accept null hypothesis at 5% level of significance. This implies there is no significant difference between liking and disliking the subject based on income level of family.

## 6. CONCLUSION:

Mathematics is core subject in primary and secondary school throughout the world. It is optional in higher secondary and degree level but still many students opt this subject as it has lots of importance in terms of structuring their carrier. In spite of its importance this subject is considered as one of the most difficult subject. Students develop fear and anxiety towards the subject in their very young age. Research proved that not only fear, teachers also play an important role to develop the fear among students, specially in school students. Once they start disliking the subject at an early stage, they carry the same phobia throughout their life. In this research paper we have tried to find out if there is any relation between Mathematics phobia and different demographic factors, like gender, income inequality, medium of school etc. Using correlation analysis we have got the following results: 1. Less anxiety level and likings towards the subject implies good marks in the subject in secondary and higher secondary level. 2. English medium schools score good marks in the subject in SSC and HSC than vernacular medium. 3. Positive correlation between overall marks and marks in Mathematics interprets that students who overall does well also get good marks in Mathematics.

Using chi square test we have got the results that liking and disliking Mathematics does not depend upon gender, income level of family and vernacular or English medium of school.

Finding mean, median, skewness and kurtosis of different variables which we have framed as questions in the questionnaire, we have studied different properties of those variables. . By this analysis it's not possible to remove the fear but different teaching methods or some other methods can be adopted to at least reduce this anxiety towards the subject at some extent.

## REFERENCES:

1. Julie Whyte, Glenda Anthony, *Massey University*, Maths Anxiety: The Fear Factor in the Mathematics Classroom, *New Zealand Journal of Teachers' Work*, Volume 9, Issue 1, 6-15, 2012
2. Stefan Peter Philip Zabek, Math-Test Anxiety and Test Preparedness, doctoral diss., The university of Columbia

3. CAUSES OF MATHEMATICS PHOBIA AMONG SENIOR SCHOOL STUDENTS: EMPIRICAL EVIDENCE FROM NIGERIA
4. Omoniyi Mathew Olaniyan ,Medinat Folorunso Salman, AUSES OF MATHEMATICS PHOBIA AMONG SENIOR SCHOOL STUDENTS: EMPIRICAL EVIDENCE FROM NIGERIA ,University of Ilorin
5. Megan R. Smith Math Anxiety: Causes, Effects, and Preventative Measures
6. Gbolagade, A.M.,Waheed A.A.Department Of Mathematics, Emmanuel Alayande College Of Education,OyoSangoniyi S.O.Department Of Mathematics, Emmanuel Alayande College Of Education, Oyo, Demystifying Mathematics Phobia in Schools for Transforming Nigeria in Attaining Vision 20:2020
7. Rakhi Banerjee Bharat Ratna Dr. B . R. Ambedkar University, Delhi,Mathematical educational research In India:issues and challenges.