



A STUDY ON THE LEVEL OF PREVAILING MATHEMATICS ANXIETY AMONG SECONDARY SCHOOL STUDENTS

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Abstract:

The noxious effect of Mathematics Anxiety has been revealed empirically in India, although little is known of its influence on Secondary School Students. This study thus examined the level of Mathematics Anxiety among Secondary School Students. Mathematics Anxiety is known to be an annoying emotional state, where the students have a lot of stress and anxiety that affects their ability to manipulate the numbers and participation in mathematical learning process. Mathematics Anxiety is a prevalent issue in education that requires attention from teachers, parents and researchers to help Students reach their full academic potential. The study concluded that the level of Anxiety among Male and Female Secondary School Students did not differ and also VI and VII Standard School Students had the same level of Anxiety. A large numbers of students are suffering from Mathematics Anxiety around the world.

Keywords: Mathematical Anxiety, Gender, Secondary School Students.

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Introduction:

Learning is a permanent influence on behaviour, knowledge, and thinking skills acquired through experience (Santrock, 2018; Slavin, 2006). Positive learning outcomes are followed by positive feelings while negative learning outcomes are followed by negative feelings. This has become a very common feature among the elementary and even the college students (Akbayır, 2019; Peker & Şentürk, 2012). Mathematics is one of the main branches of knowledge that studies quantity, structure, and problem solving which requires skills in calculations and critical thinking (Koesmaryono, Gufron, & Rusdiantoro, 2020). In general, mathematics plays a very important role in every aspect of life, but the main contribution of mathematics is in the field of education. It is said that Mathematics is one of the most important subjects in secondary schools. It helps to makes the person so efficient that he can apply his knowledge of mathematics in his day to day life which helps him to act responsibly and adequately in all his decision making and problem solving which he comes across everyday. (Azizah & Suhendra, 2020; Haase, Guimarães, & Wood, 2019). Mathematics is taught in school from the pre-primary section. At this stage, the child starts exploring, counting and sorting. It has great practical and educational importance which shows the increasing importance of subjects in school and in social life.

Anxiety is closely related to restlessness, fear, and contemplation caused by conditions around the Students (Akbayır, 2019; Namkung et al., 2019). It is said that Mathematics anxiety is a psychological aspect of learning which is very important for educators to find out. Mathematics Anxiety (MA) is generally defined as a state of discomfort caused by performing mathematical tasks. It can be manifested as feelings of apprehension, dislike, tension, worry, frustration, and fear. It is not clear what factors result in the appearance of Mathematics Anxiety. It is usually considered as a feeling where a person faces a lot of fear, avoidance and worry when dealing with any circumstances which are



related to mathematics. Tobias (1995) has stated in his study that Mathematics Anxiety is a feeling of stress and anxiety that a person faces when he or she is occupied in the manipulation of figures to solve problems related to mathematical calculations in both academic and everyday situations. So it is said that when someone is experiencing Mathematics Anxiety they tend to forget mathematics equations and thus lose their confidence in Mathematics.

The teachers are one of the main reasons behind Students stress and this is identified by Foong(1987). It is found out that Students who are highly stressed fear when presenting their solutions in front of their classmates (Ashcraft, 2002). Teachers complained that they have less instructional time and thus they prepare their Students for assessment rather than for understanding. So, it results in creating more tension when Students tackle difficult problems or when the maths becomes more advanced for the Students. The anxious teachers are more likely to pass their phobia to the Students and spend less time teaching mathematics. This is claimed by researchers. (Hembree, 1990; Ma, 1999). Along with teachers, it is found out that parents may also pass their fear of mathematics to their children. (Hembree, 1990). It is found that parents who are overly concerned about the results of their children during their examinations end up pressuring them more in Asian countries. According to Godbey, there exists a myth that mathematical ability in a child is inborn or hereditary while some others believed that Females are weaker in mathematics even though researchers (Hembree, 1990; Ho et al., 2000) have found that though Females tend to be more anxious but they are not necessarily weaker in mathematics. However, studies on the impact of teaching methods have been uncertain. Norwood (1994, as cited in Preston, 2008) has stated in his studies that college Students who were weak in mathematics were more comfortable with lecture-based teaching than the traditional method which resulted in anxiety. Newstead has (1998) claimed that Students who were working in groups were more nervous. Preston added up to this by saying that most teachers were the followers of direct instruction, the reason may be that they might not enjoy teaching in the constructivist approach thus they adopt the traditional method of teaching. Also, mathematics has been viewed as an inherently difficult subject. Many Students fail to see the practicality in Mathematics and the teachers hardly attempt to make the connections. Foong (1987) explained that as Mathematics has sequential and cumulative nature, when Students missed something while studying it, it is likely that they might never fully apprehend it.

Literature Review:

Anxiety is said to be a feeling of worry, nervousness or uneasy about some thing or a situation with an uncertain outcome (Oxford Dictionary, 2020). MA can be manifested as feelings of apprehension, dislike, tension, worry, frustration, and fear (Ashcraft, Ridley, 2005) By understanding the meaning of gender, men and women will think, feel, and act as they should. Many have researched and debated the thinking and learning abilities of men and women, but, until now, no researcher has been responsible for conveying that men and women have different intellectual skills (Slavin, 2006). Anatomically, the Male and Female brain is similar, and it does not determine differences in behaviour and attitudes from gender (Santrock, 2018). But the studies conducted among secondary school learners and adults have mostly shown that Females have a higher level of Mathematics Anxiety than Males (Núñez-Peña, Suárez-Pellicioni & Bono, 2016). However, other researchers observed no gender gap in this regard (Birgin, Baloglu, Catlioglu & Gurbuz, 2010; Ma & Xu, 2004; Newstead, 1995, 1998). Same results have been observed in elementary school children. Girls exhibited a higher level of Mathematics Anxiety than boys in some studies (Carey et al., 2017; Griggs, Rimm-Kaufman, Merritt & Patton, 2013; Hill et al., 2016; Szczygieł, 2019), but a lack of gender differences was observed in other studies (Gierl & Bisanz, 1995; Harari et al., 2013; Kucian et al., 2018; Ramirez et al., 2013; Young et al., 2012). Although some studies have revealed no MA gender differences (e.g. Birgin et al., 2010, Dede, 2008, Kytälä and Björn, 2014), more have

revealed higher MA in girls than boys (e.g. Devine et al., 2012,). gender differences are a recurrent theme in academic studies in general and in math studies in particular (Mata, Monteiro, & Peixoto, 2012). Research on the relationship between ability level, sex and ethnicity shows that the development of Mathematics Anxiety is motivated mainly by the findings that Female Students display higher levels of Mathematics Anxiety than Males throughout their entire schooling (Hembree, 1990, 40). Hill, Mammarella, Devine and Caviola (2016, 46) and Devine, Fawcett, Szűcs and Dowker (2012, 7) both agreed that girls tend to have more Mathematics Anxiety than boys at both educational levels. Tapia and Marsh II (2004) noticed that gender did not influence students towards mathematics and levels of Mathematics Anxiety affects the Mathematics Anxiety of Students independent of gender. Also, Men tend to have better maths and science skills than women (DeZolt & Hull, 2001; Koch, 2003; Santrock, 2018). Even though most Male Students were found to have an excellent achievement, 50% of the Students with lousy performance were Male (DeZolt & Hull, 2001). Women were found to have better verbal skills, such as writing and reading, than men (DeZolt & Hull, 2001; Halpern, 2012; Lindsey, 2016). The results of this research cannot be generalised as it is related to the socio-cultural environment and student learning facilities (Santrock, 2018; Slavin, 2006).

Sample, Tool and Methodology:

A Descriptive survey was carried out in order to study the level of Mathematics Anxiety among School Students. The sampling technique used here for data collection was convenient sampling. For the purpose of this study, data was collected from 108 Students of VI^{and} VII Standard School Students. A questionnaire designed by Zakariya (2018) was used to collect data which was scored on a 5-point rating scale starting from Strongly agree, Agree, Neutral, Disagree to Strongly Disagree. The reliability coefficient of the instrument was 0.90, which was high. Out of total Students, 57 were Male Students and 51 were Female Students. The following table depicts the sample size.

Table 1.1: Sample Size for Present Study

	N	Percentage
All Students	106	100
Males	57	53
Females	51	47

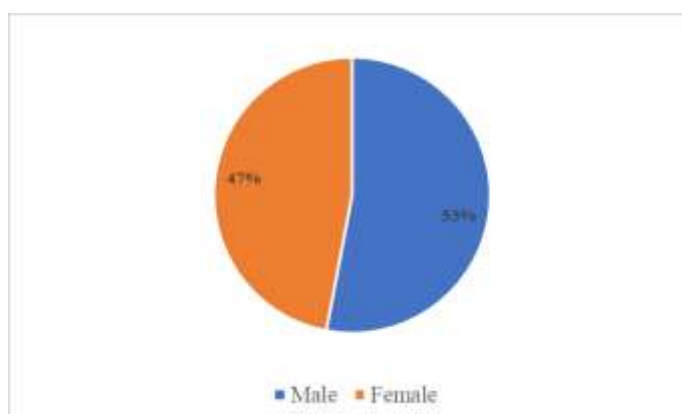


Figure 1.1: Pie-Chart Depicting Students from VI and VII Standard

The total sample consisted of 108 Students out of which 53% Students were Male and 47% Students were Female.

Hypothesis Testing and Interpretation of Data:

The following null hypothesis was framed for the present study

1. There is no significant difference in Mathematics Anxiety Level among Secondary School Students.
2. There is no significant difference in Mathematics Anxiety Level among Secondary School Students based on Gender.
3. There is no significant difference in Mathematics Anxiety Level among VI and VII Standard School Students.

Table 1. 2: Relevant Descriptive Statistics

	Mean	Median	Mode	SD	Skewness	Kurtosis
Students	66.30	72.5	97	23.21	-0.13	-1.30

The above table shows relevant descriptive statistical measures that were used to test

Hypothesis 1: The mean for all Secondary School Students was found to be 66.30, median was found to be 72.50, mode was found to be 97 and Standard Deviation was found to be 23.21. The values of Mean, Median and Mode are in ascending order therefore, the distribution is negatively skewed. The Skewness is found to be -0.13. The Kurtosis is found to be -1.30 which is negative and thus the distribution is platykurtic.

Table 1.3 represents the relevant inferential statistical measures used to test Hypothesis 2 and 3.

Table 1.3: Inferential Data Analysis

		N	Mean	t value	p value	LoS
Gender	Female Secondary School Students	57	63.63	1.1	0.27	NS
	Male Secondary School Students	51	68.58			
Standard	VI STD	41	66.51	0.12	0.9	NS
	VII STD	65	65.96			

Hypothesis 2: The t value of all Male and Female Students was found to be 1.1 and the p value was found to be 0.27 which is greater than 0.01 and 0.05, thus it is not significant. Therefore, null hypothesis is accepted. There is no significant difference between the level of Mathematics Anxiety faced by the Male and Female Students.

Hypothesis 3: The t value of all VI th and VIIth std Students was found to be 0.12 and the p value was found to be 0.9 which is greater than 0.01 and 0.05, thus it is not significant. Therefore, null hypothesis is accepted. There is no significant difference between the level of Mathematics Anxiety among the VI th and VIIth Standard School Students.

Results and Conclusion:

The results from the present study reflected that there was no difference in the Mathematics Anxiety level of VI and VII Standard Students and also, gender did not have any effect. This finding reinforces previous research studies that gender differences do not influence Students Mathematics Anxiety (Adal & Yavuz, 2017; Eskici & Ilgaz, 2019; Hopkins et al., 2017; Ilomo & Mlavi, 2016; Küçük et al., 2016; James P. Spillane et al., 2018). Male and Female cannot be distinguished according to intellectual factors but cognitive areas (Halpern, 2012; Santrock, 2018). Theoretically, Male Students have better science and mathematics than Female Students (DeZolt & Hull, 2001; Koch, 2003; Santrock, 2018), but this theory is about mathematics skills, not Mathematics Anxiety, as the two are related to each other (Carey et al.,



2019). This may be due to similarities in Students' basic knowledge of mathematics and their academic background. This finding is consistent with studies by Zettle and Raines (2000) and Rahim (2002), which determined that there is no relationship between gender and maths anxiety. However, these findings contradict the findings of Woodard (2004); Bidin et al. (2003); Salwani (2001); Yüksel-Şahin (2008) and Karimi and Venkatesan (2009), all were noted significant differences in Mathematics Anxiety according to the gender, with Female Students exhibiting higher Mathematics Anxiety than Male students.

Mathematics Anxiety has consistently been proven to be weakening in mathematics achievement. Research has found out that maths anxiety is a learned behaviour, often arises early in one's educational experience and once it lays roots, its damaging effects will last throughout the school years. Mathematics is an important and compulsory subject for all students from primary to high school in the educational system. At different grade level, the knowledge of maths is continuously advancing. Thus, the pressure easily arises among students when they have to acquire lots of mathematics knowledge, take and prepare for mathematics exams. Mathematics is a compulsory subject in graduation and entrance exams. These have increased more pressure on higher Secondary School Students when dealing with mathematics problems in the classroom to perform better in mathematics and prepare for the school and graduation exams at the same time. For these reasons, the authors were interested in Mathematics Anxiety levels of Secondary School Students in Mumbai.

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