International Journal of Academic Research
ISSN: 2348-7666 Vol.1 Issue-3(1), October-December, 2014

Mathematics Anxiety among the Secondary School Students

Dr. J. V. Rama Chandra Rao, Lecturer in Psychology, Vikas College of Education, Vissanna Peta, Krishna Dist,AP

Abstract: *Mathematics anxiety is common issue among students. Much of this anxiety happens in the classroom due to the lack of consideration of different learning styles of students. The study results show that among the students of mathematics anxiety differ significantly according to gender and medium of Instruction. Female students are reported significantly higher mathematics anxiety than males. English medium students are reported significantly higher mathematics anxiety than Telugu medium students. However, results did not show any significant difference in student's mathematics anxiety with respect to their grade level and school environment. X grade students reported significantly higher mathematics anxiety than IX grade students. Urban area students reported significantly higher mathematics anxiety than rural area students.*

Keywords: *Mathematics anxiety, achievement, secondary school*

1. Introduction:

Mathematics is a core subject in secondary schools. The study of mathematics was established to produce a competent person who is able to apply knowledge of mathematics in everyday life effectively and responsibly in solving problems and making decisions. Mathematics anxiety is a psychological dimension of learning that is important for educators to identify.

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 mathematics anxiety can cause one to forget and lose one's self-confidence (Tobias, S., 1993).

Mathematics anxiety was defined 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 (Trujillo and Hadfield, 1999). It is described as a construct that involves cognitive and affective behaviours. This construct is related to personality type, negative attitudes toward mathematics, math avoidance, math background, teaching behaviour, achievement levels, lack of confidence and negative experiences in school

Tobias (1995) defined mathematics anxiety as a feeling of tension and anxiety that appears when someone is engaged in the manipulation of figures to solve mathematical problems in both academic and daily-life situations. It is easy to forget math equations and to lose confidence when one is experiencing mathematics anxiety. Mathematics anxiety is found to be associated with beliefs. The research of Tobias revealed that there are many female students at the university level who change their

majors to avoid mathematics. This has happened not because these women have a lower intellectual level than men, but because of the belief factor among female students in mathematics. Female students reported that they were not able to understand and solve mathematical problems that they had previously studied.

2. Review of related Literature:

Much research has been done to investigate the extent of mathematics anxiety in primary school (Sherman and Wither, 2003; Jackson and Leffingwell, 1999; Steele and Arth, 1998; Yuksel-Sahin, 2008) and at the secondary level (Mohamed and Tarmizi, 2010; Karimi and Venkatesan, 2009; Khatoon and Mahmood, 2010). Research has shown that mathematics achievement in students is influenced by psychological factors such as mathematics anxiety.

(Harper and Daane, 1998; Hembree, 1990; Sloan 2002) describes mathematics anxiety as a repetitive process that is based on information gathered by individuals from their surroundings. This information is accumulated and becomes the personal experience of individuals, which finally informs their beliefs toward mathematics. These beliefs produce behavioral situations to escape mathematics because of an overriding fear of being unable to master mathematics.

Puteh(2002) stated that teachers, peers and parents are responsible for triggering anxiety among students of mathematics if students perceive that "mathematics is difficult" during their formative years, mathematics anxiety will be triggered. Due to the presence of mathematics anxiety, such students will strive to escape from any situation that involves mathematics. This will strengthen their belief that they are not capable and lack the knowledge to engage in mathematics and they will continue to lose confidence in their math skills as a result. Although these students will continue their course of study in mathematics, most likely failure will again occur because of their prescribed belief system.

Arem (2003), mathematics anxiety is an emotional, mental and physical act related to the mathematical thinking and problem-solving process and resulting from uncomfortable past experiences related to mathematics. Feelings and experiences like this will further affect a student's ability to learn mathematics. Based on the study, students who have experienced disappointment in their mathematical abilities will have difficulty believing in their abilities in the future.

Arem (2009) found that contributing factors to mathematics anxiety are bitter experiences in mathematics, social pressure and the expectation to achieve outstanding results, the desire to excel, myths about the study of mathematics, societal gender stereotypes and negative self-talk. These factors give rise to feelings of deep shame for the student experiencing mathematics anxiety in the classroom setting. According to Arem, students with mathematics anxiety will often appear preoccupied with something else to avoid meeting face-to-face with their teachers. They are afraid to look up in class and quickly panic when their name is called. They are also afraid to raise their hands and when the teacher is waiting for an answer from them, they become even more afraid.

In the mathematical context, it appears that many students who are weak in mathematics worry while attempting to use mathematics skills to solve problems (Mohamed and Tarmizi,

2010; Arem, 2003; Rahim, 2002; Tobias, 1995). The findings of Marsh and Tapia (2002) indicate that students with low levels of mathematics anxiety feel more excited, more confident and highly motivated to learn mathematics when compared to students who have high anxiety levels. Math anxiety is loosely regarded as feelings of fear, avoidance and dread when dealing with any situation relating to mathematics.

Therefore, this is an attempt to study student's anxiety towards mathematics which may be one of the important reasons of average level of favourable attitude of the students towards mathematics. The investigator anticipates that the results of this study would have its far reaching implications for both teachers and students at secondary level.

3. Objectives:

To find out the influence of variables (Gender, Grade level, School Environment, Medium of instruction) on mathematics anxiety among secondary school students

4. Hypothesis:

1. Secondary school students do not differ significantly in their anxiety towards mathematics with respect to their gender
2. Secondary school students do not differ significantly in their anxiety towards mathematics with respect to their grade level.
3. Secondary school students do not differ significantly in their anxiety towards mathematics with respect to the varying environment.
4. Secondary school students do not differ significantly in their anxiety towards mathematics due to the difference of the medium of instruction.

5. Limitations

The study was delimited to the following:

1. The study was limited to Government secondary school students only.

2. The study was limited secondary schools of rural and urban Vijayawada only.

3. The study was limited to IX and X standards secondary school students only.

6. Methodology:

Simple survey method was used in this study. In order to achieve the above-cited objective, the various aspects of the methodology followed were: Sample, tools, procedure of data collection and statistical techniques, scoring procedure.

a) Population and sample: All the students of IX and X standards studying in different secondary schools of Vijayawada constitute the population of the study. A sample consisting of 200 students belonging to different communities which includes males, females; rural-urban; studying in English medium and Telugu medium schools were selected on stratified random sampling basis from 20 schools i.e. 10 government and 10 private schools spreaded in and around the Vijayawada of Andhra Pradesh.

b) Tools Used: Mathematics anxiety scale (MAS -MKST) developed by Dr (Mrs.) Sadia Mahmood (Aligarh) and Dr Tahira Katoon (Aligarh) published by the National Psychological Corporation was adopted by the Investigator for collecting data required for the present study. The scale consists of 14 items designed to

measure the anxiety of students towards Mathematics. The scale contains 7 positive items and 7 negative items.

c) Procedure of data collection: After selecting 200 students of the selected schools, the investigator approached them individually and requested them to fill up the Mathematics Anxiety Scale (MAS). Though the tool was self administering, the investigator explained the students how to fill up the tool. After the collecting the filled in tool, it was scored and tabulated systematically for statistical calculation.

d) Statistical techniques used: The investigator used the statistical techniques like Mean, standard deviation, t-test, etc for analyzing and interpretation of the data collected for the study.

Hypothesis 1: Secondary school students do not differ significantly in their anxiety towards mathematics with respect to their gender

7. Results and discussions:

Table-1: Significant level on students' by gender anxiety towards mathematics

Sr. No.	Variable (Gender)	N	Mean	S.D	t-test	level of significance
1	Male	100	132.30	11.84	2.33	Significant
2	Female	100	136.01	10.58		

From the table 1, it is clear that the obtained t values with respect gender of secondary school students differ significantly. Hence the formulated null hypothesis is rejected. It means there is significant difference in secondary school students' anxiety in mathematics with respect to the gender. Female students are reported significantly higher mathematics anxiety than males.

Hypothesis 2: Secondary school students do not differ significantly in their anxiety towards mathematics with respect to their grade level.

Table-2 Significant level on students' by grade anxiety towards mathematics

Sr. No.	Variable (Grade)	N	Mean	S.D	t-test	level of significance
1	IX	100	132.7	12.78	1.82	Not Significant
2	X	100	135.6	9.8		

It is inferred from the table no 2 that students of secondary schools do not differ significantly with respect to their grade levels. Hence the formulated null

hypothesis is accepted. It means there is no significant difference in secondary school students' anxiety in mathematics with respect to the grade level. X grade students reported significantly higher mathematics anxiety than IX grade students.

Hypothesis 3: Secondary school students do not differ significantly in their anxiety towards mathematics due to the variation of school environment.

Table-32 Students' by grade anxiety towards mathematics due to the variation of school environment

Sr. No.	Variable (School Environment)	N	Mean	S.D	t-test	level of significance
1	Urban	100	134.3	10.37	0.58	Not Significant
2	Rural	100	133.1	11.76		

It is inferred from the table no 3 that students of secondary schools do not differ significantly with respect to their grade levels. Hence the formulated null hypothesis is accepted. It means there is no significant difference in secondary school students' anxiety in mathematics due to the variation of school environment. Urban area students reported significantly higher mathematics anxiety than rural area students.

Hypothesis 4: Secondary school students do not differ significantly in their anxiety towards mathematics due to the difference of the medium of instruction.

Table-4 Students' by grade anxiety towards mathematics due to the difference of the medium of instruction

Sr. No.	Variable (Medium of Instruction)	N	Mean	S.D	t-test	level of significance
1	English	100	131.30	10.84	2.18	Significant
2	Telugu	100	135.01	9.58		

Table 4 showed that students of secondary schools differ significantly due to the difference of the medium of instruction. Hence the formulated null hypothesis is rejected. It means there is significant difference in secondary school students' anxiety in mathematics due to the difference of the medium of instruction. English medium students reported significantly higher mathematics anxiety than Telugu medium students.

7. Conclusion:

Results showed that students' mathematics anxiety differ significantly according to gender and medium of Instruction. Female students reported

significantly higher mathematics anxiety than males. English medium students reported significantly higher mathematics anxiety than Telugu medium students. However, results did not show any significant difference in students' mathematics anxiety with respect to their grade level and school environment. X grade students reported significantly higher mathematics anxiety than IX grade students. Urban area students reported significantly higher mathematics anxiety than rural area students.

Therefore, teachers must re-examine traditional teaching methods which often do not match students learning styles and skills needed in society. Lessons must be presented in a variety of ways. For instance, a new concept can be taught through play acting, cooperative groups, visual aids, hands on activities and technology. As a result once young children see mathematics as fun, they will enjoy it, and, the joy of mathematics could remain with them throughout the rest of their lives.

References

1. A.Baron (2008). Psychology. Fifth Edition. Dorling Kindersley (India). Pvt. Ltd.
2. Arem, C.A., 2003. Conquering Math Anxiety. 2nd Edn., Brooks/Cole-Thomson Learning, Pacific Grove, ISBN-10: 0534386342, pp: 193.
3. Arem, C.A., 2009. Conquering Math Anxiety. 3rd Edn., Cengage Learning, Belmont, ISBN-10: 0495829404, pp: 215.
4. Best, John W. & Kahn, J.V. (1962). Research in education. New Delhi: Prentice Hall of India.
5. Bhatnagar, S. & Saxena, A. (2000). Advanced Educational Psychology. Meerut: Surya Publications.
6. Harper, N.W. and C.J. Daane, 1998. Causes and reduction of math anxiety in preservice elementary teachers. Action Teacher Educ., 19: 29-38.
7. Jackson, C.D. and R.J. Leffingwell, 1999. The role of instructors in creating math anxiety in students from kindergarten through college. National Council Teachers Math., 92: 583-586.
8. Mohamed, S.H. and R.A. Tarmizi, 2010. Anxiety in mathematics learning among secondary school learners: A comparative study between Tanzania and Malaysia. Proc. Soc. Behav. Sci., 8: 498-504. DOI: 10.1016/j.sbspro.2010.12.068
9. Puteh, M., 2002. Qualitative research approach towards factors associated with mathematics anxiety.Proceeding of the 3rd International Mathematics Education and Society Conference, (MESC' 02), Centre of Research in Learning Mathematics, Copenhagen, pp: 1-5.
10. Rahim, M., 2002. Kajian kerisauan matematik dikalangan pelajar-pelajar diploma di kolej yayasan melaka. M.Sc Thesis, Universiti Kebangsaan Malaysia.
11. Tobias, S., 1995. Overcoming Math Anxiety. 1st Edn., W.W. Norton, ISBN-10: 0393313077, New York, pp: 260.
12. Trujillo, K.M. and O.D. Hadfield, 1999. Tracing the roots of mathematics anxiety through in-depth interviews with pre service elementary teachers. College Student J., 33: 219-219.