

EFFECT OF PHOBIA MANAGEMENT PROGRAMME ON THE MATHEMATICS ANXIETY OF SECONDARY SCHOOL STUDENTS

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ABSTRACT

The purpose of this quasi experimental study was to investigate the effect of behavioral phobia management intervention programme on the two dimensions of the Mathematics Anxiety (Maths Test Anxiety and Numerical Test Anxiety). This paper critically investigated the causes and symptoms of mathematical anxiety among the secondary school students and to give the behavioral remedies through Phobia Management Intervention Program. It was conducted on the small sample among secondary school students. Only experimental group was taken on which two weeks intervention programme which includes knowing your maths anxiety, techniques for coping Mathematics Anxiety, positive self-talk, how to manage time in mathematics exams and how to make use of effective study habits, giving pleasant experiences in mathematics etc. was tried out. The pre and post test analysis of the hypotheses revealed that there is a significant difference in pre and post test scores of females, low achievers and high achiever secondary school students. On the other hand there is no significant difference in pre and post test scores of the Numerical Anxiety among male secondary school students. This research paper recommends that if behavioral motivation has to be given along with the good method of teaching the mathematics anxiety would to be reduced among the secondary school students.

Keywords: Mathematics Anxiety, Maths Test Anxiety, Phobia Management Intervention Programme

INTRODUCTION

Education is the basic part of everyone's life and it is required for the holistic development of the individual. It is vital for the progress of the society. From home to work place, mathematics tools have become a part of our day-to-day life. Despite of its importance, in daily life, mathematics is often viewed as a difficult subject. Mathematics is truly the gateway of engineering and all other scientific and technological fields. In spite of the importance of mathematics, many intellectually capable students avoid taking mathematics courses in high school and college level, which consequently restrict the range of carrier from which they may choose to those, which do not require quantitative skills.

CONCEPT OF MATHEMATICS ANXIETY

The term phobia originated from the word 'Phobus' with its root in Greek, meaning fear, terror or panic, but a phobia is more than this, since all persons experience fear of terror occasionally. Phobia is the fear or anxiety disorder, which causes avoidance and panic, whereas Robinson and Simone (1976) defined math anxiety as "feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of problems in a wide variety of ordinary life and academic situations." This may be due to fear of failure and loss of self-concept in school activities so that the problems at the beginning of learning act like an obstacle in applying skills and math abilities or using knowledge when trying to display information.

It can be concluded from the above mention definitions that mathematics anxiety is such a situation before anxious student to dealt with the two problems simultaneously i.e.



first to solve the mathematics problem and secondly to deal with the worries about the mathematics which includes about getting wrong solutions, looking foolish and what others may think of them. This lead to have less working memory to devote to the mathematics, and their mathematics performance suffers.

SYMPTOMS OF MATHEMATICS ANXIETY

Different persons according to his or her own perception about mathematics anxiety can manifest mathematics anxiety in many different ways. A student may believe he or she is incapable of doing mathematics problems before attempting the problem or even before the teacher explains the problem. A student may have a bad attitude about mathematics. When he or she in mathematics class, he or she may be nervous and unable to sit still or focus on the lecture. Mathematics anxious students may dread even going to mathematics class because there is a great fear of answering a teacher's question incorrectly in mathematics class than other classes. They also tend to compare their grades to their peers' more and worry more about how their peers will react to them if they give a wrong answer in mathematics class. Not all of these symptoms are external, so the teacher should try to know his students as best he can so he can tell if any of the students have the negative feelings about mathematics in his or her class. The teacher does this by being aware of the student's facial expressions and body language, among other indicators. Students may experience mathematics anxiety because they have never experienced success in their mathematics classes.

If the teacher does not teach well, the average student will most likely not do well in his class that also leads to develop a mathematics anxiety among the students. This could especially be a problem in schools where teachers are very strongly discouraged from failing their students. It is possible for students to be in a mathematics class that they should not be in because they did not pass the previous class. A student with mathematics anxiety has added difficulty working a problem such as long division that requires one to continually keep track of the different calculations being performed. This happens because he or she is unable to focus solely on performing the calculations, and has to deal with negative thoughts and feelings toward mathematics. If a student has mathematics anxiety, it is also more likely that he or she has test and social anxiety as well (Perina, 2002). There are some physical symptoms such as dry mouth, shakiness, headache, increased heart beat etc and psychological symptoms like panic or fear, feeling of failure, negative self talk, mental disorganization etc. of the mathematics anxiety.

CAUSES OF MATHEMATICS ANXIETY

It is not easy task to determine the causes of mathematics anxiety, where and how it begins and grows. There has been a large variety of hypothesized reasons for why students develop anxiety in mathematics. Mathematics anxiety is a multi-sided structure and is tangled with the terms of fear, worry and tenseness that may be developed among the individual. The teachers and parents could do so by projecting their own fears of mathematics, giving mixed messages about mathematics, and by having high expectations for mathematics achievement from their children. These factors might lead to overly sensitive attitudes of the children toward mathematics for instance, no one can solve every mathematics problem and it is quite normal that children would at times make mistakes while dealing with mathematics. Effective use of counselling and guidance services could have preventive functions by aiding children with effective study skills and helping them cope with feelings such as fear of failure. However, it also has to do with preconceived notions or we can say that some of the myth related to the

mathematics, which are: Myth 1 – You have to be born with a mathematical brain. Myth 2 – You cannot be creative and be good at mathematics. Myth 3 – Women are not as good at mathematics as men. If this issue is not dealt with sincere efforts, it could have a terrible effect in many areas of our education system, which in turn leads to major consequences. For mathematics anxiety to be avert as mentioned earlier, mathematics avoidance, distress, and interference with conceptual thinking and memory processes, which may create deficiency of workers in the field of today's high-tech world.

JUSTIFICATION OF THE STUDY

Learning mathematics can be challenging, however not all mathematics difficulties are result of cognitive difficulties. Some children and adult have mathematics anxiety (MA) which severely disrupts their performances. This rose to the development of feeling of fear and tension, which leads to the poor performance in the mathematics. The negative experience in the mathematics also makes an individual to avoid the mathematics and developed a phobia in mathematics; it ultimately forced the students to choose such a profession, which do not require the mathematics ability.

Mathematics anxiety is debilitating emotional reaction to the mathematics that is increasingly recognized in the psychology and education. It has been defined as a feeling of tension and anxiety that interfere with the manipulation of numbers and solving mathematical problems in ordinary life and academic situation. Mathematics anxiety ranges from feeling of mild tension to a strong fear of mathematics of an individual in his or her life. Mathematics anxiety is not restricted to the test or classroom setting, with the result that those affected developed a severe avoidance of situations involving any kind of mathematics. Some commonly held but mistaken, beliefs about learning math. This study will enable to identify the triggers of mathematics anxiety and to understand coping mechanism in mathematics anxiety. This study will be helpful in determining how mathematics anxiety can be avoided, how existing mathematics can be alleviated and how positive attitude towards can be promoted. The investigator herself feels this problem being a student of mathematics that mathematics anxiety or phobia is due to the orthodox notion that mathematics is a difficult subject and only intellectually gifted persons can do mathematics and become successful. It may be defined as a feeling of anxiety that stops one from efficiently tackling mathematical problems. Many people thought that mathematics as an extremely tough subject that they cannot master. This negative attitude stops them from focusing on the subject or problem, which they are tackling. Just before exam or tests, they start to get nervous; as they are not prepared. Mathematics anxiety is an outcome of both the cognitive and psychological problem in the students.

Alamo & Adeleke (2003) critically investigated the causes and effects of math phobia: mathophobics born or made and revealed that conduct of teachers and their teaching methodology, the nature of assessment that some teachers give in mathematics lesson and some others factors that cannot be explained such as age long notion that mathematics is a difficult subject. The study also pointed out that that hatred or fear for the mathematics affects the decision of a student to aspire for the carrier that requires mathematics or not. In addition, such fear or hatred for mathematics affects performances in mathematics.

Zakaria & Nordin (2008) has conducted "a study on the effects of mathematics anxiety on matriculation students as related to motivation and achievement". The study investigated the effects of mathematics anxiety on matriculation students as related to motivation and achievement. Subjects included 88 students who were at the end of their



second semester of study. The ANOVA results showed that the mean achievement scores and motivation scores of low, moderate and high anxiety groups were significantly different. In addition, the findings also revealed a low ($r = -0.32$) but significant ($p < 0.05$) negative correlation between mathematics anxiety and achievement and also a strong ($r = -0.72$) significant ($p < 0.05$) negative correlation between mathematics anxiety and motivation. The study also revealed a significant low positive correlation ($r = 0.31$) between motivation and achievement.

Mutodi & Ngirande (2014) had investigated "The Exploring Mathematics Anxiety: Mathematics Students' Experiences". The purpose of this research was to explore students' mathematics anxiety levels at a selected tertiary institution in South Africa. The results also show high levels of mathematics anxiety among female students. The t-test showed that the mean difference between mathematics anxiety and gender is significant. Based on the findings of this study, it is worth noting that mathematics anxiety is one psychological factor that affects students' achievement and their general practices.

The investigator after reviewing the related literature and being a mathematics student has decided to take up this piece of research having title "Effect of the Phobia Management Program on the Mathematics Anxiety of the Secondary School Students."

OPERATIONAL DEFINITION OF THE KEY TERMS

The key terms which has been used in the statement of the problem under study may operationally defined as

Mathematics Anxiety: Mathematics Anxiety is defined as the fear and tension in doing mathematical problems. It is such a situation before anxious student to dealt with the two problems simultaneously i.e. first to solve the mathematics problem and secondly to deal with the worries about the mathematics which includes about getting wrong solutions, looking foolish and what others may think of them.

Phobia management program (PMP): It is a structured programme having some relaxation techniques for coping mathematics anxiety, positive self-talk, how to manage time in mathematics exams and how to make use of effective study habits, giving pleasant experiences in mathematics etc.

OBJECTIVE OF THE STUDY

To study the impact of phobia management program on the mathematics anxiety of secondary school students.

HYPOTHESES OF THE STUDY

The investigator has formulated the following hypotheses for the present study:

- a) There will be no significant difference in the pre and post test scores of Maths Test Anxiety of :
 - Male secondary school students after given a Phobia Management Intervention Program.
 - Female secondary school students after given a Phobia Management Intervention Program.
 - Low achievers secondary school students after given a Phobia Management Intervention Program.
 - High achievers secondary school students after given a Phobia Management Intervention Program.
- b) There will be no significant difference in the pre and post test scores of Numerical Anxiety of :

- Male secondary school students after given a Phobia Management Intervention Program.
- Female secondary school students after given a Phobia Management Intervention Program.
- Low achievers secondary school students after given a Phobia Management Intervention Program.
- High achievers secondary school students after given a Phobia Management Intervention Program.

DELIMITATIONS OF THE STUDY

The study has been delimited in terms of the following areas of the investigation

1. The study has been delimited to one secondary school of District Samba only.
2. The study has confined to 23 secondary school students of 10th class.
3. The intervention program has been restricted for two weeks only.

DESIGN OF THE STUDY

The research design is the blueprint of the research and describes the methods used for the data collection, measurement and analysis of the data. The present study was experimental in nature and was based upon a single group experimental research design. It involved one group of students as experimental group.

Table 3.1 : RESEARCH DESIGN

Research Design			
Experimental Group	Pre-Test	Treatment	Post-Test

POPULATION

For the present research work population of the sample comprised of all the secondary school students Samba district of Jammu and Kashmir.

SELECTION OF SCHOOL AND SAMPLING

Out of five educational zone one educational zone, i.e. Zone Ramgarh was selected randomly through lottery method. The investigation has carried out on the 23 students of class 10th, age ranging between 14-16 years. Student's level of academic performance in mathematics has been taken a variable so that a group of mixed ability students to be participated in the experiment.

TOOLS USED

The investigator for measuring the mathematics anxiety in pre and post-test situation used the following tools

- Mathematics Anxiety Scale by karini and venkatesha.
- Academic Achievement

VARIABLE STUDIED

For the present study following variables can be used

- Dependent Variable: Mathematics anxiety
- Independent Variable: Phobia Management Program

CONDUCTING THE EXPERIMENT

Experiment was conducted in three phases as given below:

The first phase began with permission of school principal and involved the administration of the Mathematical anxiety scale to the students of experimental group. After the conduction of the pre test, the investigator on the next day launched the intervention program. On very first day, the investigator helps the student to recognize



whether he or she have mathematics anxiety or not by applying a self-test, which include the statements like I fear mathematics test more than any test, I am always worried about being called on in the mathematics class etc. The investigator continued the experiment for two weeks with different topics.

In the final phase, after the completion of instructional treatments of two weeks, the subjects were administered the post-tests of mathematics anxiety.

STATISTICAL TECHNIQUES EMPLOYED

In order to analyze the data the investigator used the following statistical techniques

Descriptive Statistics

- Mean and Standard Deviation of the raw scores of the mathematics anxiety are to be calculated.

Inferential Statistics

- Correlation of the Pearson Coefficient was also calculated.
- CR was calculated in order to test the hypotheses made for the undertaken study.

ANALYSIS AND INTERPRETATION OF DATA

Analysis of data means studying the tabulated material in order to determine inherent facts or meanings. Proper editing, intelligent interpretation, systematic classification and scientific analysis is must so as to enable to researcher's to make conclusion or interpretation from invalid or sufficient data.

Dimension 1 – Math Test Anxiety

	Situation	Mean	S.D	r	t value	Result
Male	Pre test	50.88	2.09	0.17	9.04**	Hypothesis 1(a) rejected
	Post test	34.50	4.56			
Female	Pre test	54.13	4.55	0.38	9.56**	Hypothesis 1(b) rejected
	Post test	38.07	6.40			
Low achievers	Pretest	54.29	4.68	0.72	13.16**	Hypothesis 1(c) rejected
	Posttest	36.00	4.37			
High achievers	Pretest	52.00	3.43	-0.53	6.48**	Hypothesis 1(d) rejected
	Posttest	34.25	4.86			

* significant at 0.05 level

** significant at 0.01 level

Dimension 2 – Numerical Anxiety

	Situation	Mean	S.D	r	t value	Result
Male	Pretest	29.87	5.63	0.25	1.37	Hypothesis 2(a) accepted
	Posttest	26.63	4.51			
Female	Pretest	47.7	6.61	0.15	7.47**	Hypothesis 2(b) rejected
	Posttest	31.33	5.89			
Low achievers	Situation	Mean	S.D	r	t value	Result

	Pretest	43.14	7.90	0.66	5.13**	Hypothesis 2(c) rejected
	Posttest	30.71	5.62			

High achievers	Situation	Mean	S.D	r	t value	Result
	Pretest	43.25	9.62			
	Posttest	17.5	8.25	0.71	6.70**	Hypothesis 2(d) rejected

*Significant at 0.05 level

**Significant at 0.01 level

GENERAL CONCLUSIONS

Based on the interpretation of the results drawn in the present study, as discussed in the previous chapter, the investigator lays down the following conclusions:

- There was a significant difference in the mean score of mathematics anxiety of male secondary school students after the intervention of Phobia Management Program.
- There was a significant difference in the mean scores of the mathematics anxiety of female secondary school students after the intervention of Phobia Management Program.
- There was significant difference in the mean scores of the mathematics anxiety of low achievers secondary school students after the intervention of Phobia Management Program.
- There was a significant difference in the mean scores of the mathematics anxiety high achievers after the intervention of the Phobia Management Program.

RECOMMENDATIONS

Following educational implications or recommendations are evolved as outcome of the experimentation done by the investigator on overcoming the mathematics anxiety:

SPECIFIC RECOMMENDATIONS

- Through this study, the investigator tried to find out that the impact of the intervention program for the phobia management in the mathematics helps in decreasing the mathematics anxiety among the students of the experimental group.
- The findings of the study revealed that along with the good methods of teaching of mathematics, PMP i.e. behaviour intervention toward the mathematics phobia helps in developing the positive attitude towards the mathematics.
- The findings of the study discovered that there is need to focus on the mathematics anxiety of females as compared to males.
- A teacher of mathematics is not only responsible for the instruction of mathematical concepts, but is also responsible for helping students 'learn to learn mathematics'.
- A teacher can offer relaxation techniques to control the physiological reactions of math anxiety.

GENERAL RECOMMENDATIONS

- The teachers should also change their general attitude towards the mathematics subject in their regular classroom teaching.
- The teachers should also help the students to manage their mathematics anxiety by making effective daily routine for the mathematics subject and using various coping strategies.
- Parents should engage their children in math activities that are meaningful, encourage their children's interest in mathematics, and let them know they can succeed.



- From the findings of the study, it is recommended that teacher should also make the students to be skilled and efficient in the basic mathematics.
- Teacher should also be trained and focused in those mathematics concepts, which was most effective in addressing the mathematics anxiety.
- Teacher should elaborate the reasons for the mathematics anxiety so that students are able to understand the causes of the anxiety and find out the solution of his or her mathematics anxiety.
- Teacher should provide students alternative ways of participating in class until their confidence level improves.

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