A STUDY OF THE ATTITUDE TOWARDS MATHEMATICS AND ACHIEVEMENT IN MATHEMATICS OF STUDENTS IN RELATION TO GENDER, LOCALE AND TYPE OF FAMILY

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Mathematics being a compulsory subject in school curriculum undergoes a problem of low achievement in the subject. Out of the other psychological factors, attitude towards mathematics is considered as a main factor that ultimately affects the achievement level of mathematics. In this light, this study investigated the mathematics achievement in relation to attitude towards mathematics, gender, locale and type of family. The sample consisted of 200students studying in IX class both boys and girls from rural and urban area of Kapurthala district which were selected randomly. The Attitude Towards Mathematics scale by Sharma(2009) and Achievement in Mathematics scale by Singh & Kumar(2009) was used for the collection of data. Descriptive survey method of investigation was employed in this study. The findings of the study revealed that there was influence of attitude towards mathematics on achievement in mathematics of students. No significant difference in attitude towards mathematics of students was found in case of boys and girls, rural and urban & single and joint family.

Keywords: *Attitude towards mathematics, Achievement in mathematics.*

Introduction

At the secondary stage, mathematics is considered as an important subject because they play an important role in the development of critical reasoning in the minds of the people. The study of mathematics as a subject has a unique position in any school curriculum. Thus mathematics forms not only a compulsory part of the school curriculum up to the secondary stage, it is often necessary in the following tertiary stages. While mathematics is associated with enjoyment and pleasure by a few aficionados of the subject, it is regarded more as a utilitarian tool by others, and regarded with fear and aversion by others (Kundu and Ghose,2016). Though mathematics occupies a place of importance all over the country but the achievement of students in mathematics is low. In Punjab also the achievement of students in mathematics is always low in comparison to other subjects. It is clear that our efforts to improve the status of mathematics at school levels over the past decades have been largely ineffective. This is because attitudinal and other aspects of mathematics learning are to a large extent ignored. Therefore there has been increased interest in the role of affective factors like attitude in learning and teaching mathematics. Attitudes of the students affect their cognitive activities. By having a positive attitude towards

mathematics, the students will feel that mathematics is important so that they will try to improve their mathematics learning achievement. Students who have negative attitudes tend to be difficult to pay attention in math.

Attitude can be simply regarded as a positive or negative degree of sentiment associated with certain experiences. Obviously, it is manifest in a student's outlook on particular subjects of study. Attitudes are defined as positive or negative emotional dispositions (Aiken, 2000; McLeod,1992). Allport (1935) defined attitude as a 'mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related'. Eagly and Chaiken (1993) defined attitude as "A psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor. Student attitude thus plays a central role in mathematics learning and achievement (McLeod, 1992). Thus attitude towards mathematics may be seen as just a positive or negative emotional predication towards mathematics (Haladyna, Shaughnessy, & Shaughnessy, 1983; McLeod, 1992).Attitude towards mathematics has three components. i) Cognitive component, the cognitive component refers to what an individual knows or thinks about mathematics. The affective component refers to the emotional aspects with regard to mathematics. iii) Conative component. The conative component refers to an individual's behavioral intentions or behavioral tendency with regard to mathematics. Many studies in education tend to show that attitudes affect student's persistence and performance. Generally, a positive attitude towards is valued for the following two prime reasons: (i) Favorable attitude is often positively related to achievement and (ii) A positive attitude increases one's tendency to elect courses in schools and colleges and to elect careers in or related fields. Therefore, identification and influence attitudes towards mathematics become an essential part of educational research. Attitude towards mathematics is a personal disposition towards mathematics, but individual possessed at varying degrees, that impel them to react to mathematics. According to Hart (Zan & Di Martino, 2007), student's attitudes towards mathematics is defined as the emotional response either positive or negative associated to mathematics, confidence to succeed in studying mathematics, and strategies in coping with mathematical problems.

As attitude is associated with academic achievement, it is often considered as a significant variable in educational research. Previous studies on mathematics reported that attitudes towards mathematics have important role in determining learning achievement on mathematics, and students with positive attitudes towards mathematics will have high scores in mathematics achievement (Tapia & Marsh, 2004; Zan & Di Martino, 2007; Guner, 2012). Yet, studies also reported that many students have poor attitudes towards mathematics (Goodykoontz, 2008).Several studies indicated a strong relationship between positive attitudes and beliefs about mathematics and academic success in mathematics (Ashcraft & Kirk, 2001; Sandt, 2007; Schenkel, 2009; Sherman & Christian, 1999; Tapia & Marsh II, 2004).

Review on Attitude towards Mathematics

Simegn, E.M.,& Asfaw, Z.G.(2017)

Conducted a study on attitude towards mathematics on achievement in mathematics. Positive correlation of attitude and achievement in mathematics was found. Gender difference in achievement in mathematics was found. Boys were having high achievement in mathematics than girls. No gender difference in attitude towards mathematics was found.

Kundu,A. & Ghose, A. (2016)

Study was conducted to see the effect of attitude towards mathematics and achievement in mathematics. There was effect of attitude towards mathematics on achievement in mathematics. There was difference in attitude towards mathematics and achievement in mathematics.

Ramana, M.V.(2016)

Conducted a study to make comparison of attitude towards mathematics of private school students. No significant difference in attitude towards mathematics of boys and girls was found.

Michelli, M.P. (2013)

Conducted a study on attitude towards mathematics and achievement in mathematics. It was found that there was relationship between attitude towards mathematics and achievement in mathematics. There was difference in attitude of towards mathematics of boys and girls. Boys were having more positive attitude comparatively to girls. No gender difference was observed in respect of achievement in mathematics.

Mahanta, S. & Islam, M. (2012)

Study was conducted to see the relationship of attitude and achievement in mathematics with respect to gender. There was positive correlation between attitude and achievement in mathematics. Gender differences were found in attitude towards mathematics with respect to gender.

Mohamed, L. & Waheed, H.(2011)

Conducted a study the gender differences in attitude towards mathematics. There was no significant difference in attitude towards mathematics of boys and girls.

Farooq, M.S.& Shah, U.S.Z.(2008)

Conducted a study on attitude towards mathematics with respect to gender. Findings revealed that boys and girls have different type of attitude towards mathematics.

Saha,S. (2007)

Conducted a study on attitude to mathematics and achievement in mathematics. Significant difference in achievement in mathematics was found with respect to gender, cognitive style and attitude in mathematics.

X. Ma & J. Xu. (2004)

Conducted study on attitude and achievement in mathematics. No direct relationship between attitude towards mathematics and achievement in mathematics was found. There was no difference in achievement of boys and girls.

Ma and Kishore (1997)

Study was conducted to see the relationship between attitude towards mathematics and achievement in mathematics with respect to gender, grade and ethnic background. No significant effect of gender was found on the relationship of attitude and achievement in mathematics.

To sum up, studies with respect to attitude towards mathematics stressed that There was significant influence of attitude towards mathematics on achievement in mathematics(Ma & Kishore, 1997: Saha,S ,2007; Mahanta, S. & Islam, M. ;2012, Michelli, M.P. ;2013, Kundu,A. & Ghose, A. 2016;Simegn, E.M.& Asfaw, Z.G.2017. There was no difference in attitude towards mathematics with respect to gender (Ma and Kishore 1997; X. Ma & J. Xu. 2004; Farooq, M.S.& Shah, U.S.Z. 2008 ; Simegn, E.M.& Asfaw, Z.G.2017).

Statement of the problem

A study of the attitude towards mathematics and achievement in mathematics of students in relation to gender, locale and type of family.

Delimitations of the study

The present study was delimited to 200 (IX th class) secondary school students (110 boys and 90 girls) belonging to rural and urban area of Kapurthala district only.

Objectives of the study

1) To study the influence of attitude towards mathematics on achievement in mathematics of students.
2) To study the significant difference in attitude towards mathematics of students with respect to gender.
3) To study the significant difference in attitude towards mathematics of students with respect to locale.
4) To study the significant difference in attitude towards mathematics of students with respect to type of family.

Hypotheses

H_{01} : There is no influence of attitude towards mathematics on achievement in mathematics of students.

H_{02}: There is no significant difference in attitude towards mathematics of boys and girls.

H_{03} : There is no significant difference in attitude towards mathematics of rural and urban students.

H_{04}: There is no significant difference in attitude towards mathematics of students of single and joint family.

Methodology

Variables

Independent variable: Attitude towards mathematics.

Dependent variable: Achievement in mathematics.

Design of the study

In this study survey research design was employed in this study. This study was descriptive in the sense that it aims at describing the nature and distributions of variables under study i.e. achievement in mathematics and attitude towards mathematics. The survey research is one of the most important areas of measurement in applied social research.

Sample

Total sample of 200 secondary school students, both boys and girls from rural and urban area Kapurthala district were randomly selected.

Table- Distribution of sample

Boys	**Girls**	**Total Students**
110	90	200
Rural students	**Urban students**	**Total**
52	148	200
Single family	**Joint family**	**Total**
111	89	200

Research tool used

Achievement in Mathematics of the students was measured by the Achievement in Mathematics scale by Singh,A. and Kumar, M. (2009) consisting of 58 questions in the scale. Attitude of students towards Mathematics was measured by Attitude Towards Mathematics Scale by Sharma. Y.(2009).

Data Collection Procedure

Both the scales Achievement in Mathematics scale and Attitude towards Mathematics scales were administered on all the 200 participants of Kapurthala district. Instructions were read to all the participants. Rapport was established with the participants. They were encouraged to give true and correct responses. Data collection was done and answer sheets were retrieved from the students.

Statistical Techniques Used

In order to see the significant difference in achievement of students in mathematics with respect to attitude towards mathematics, t-test was used. Chi-Square was used to find the significant difference in attitude of students towards mathematics with respect to gender, locale and type of family.

Analysis and Interpretation of Data

Hypothesis-1

H_{01}: There is no influence of favorable and unfavorable attitude of students towards mathematics on achievement in mathematics.

In order to test this hypothesis, Mean, Standard deviation, t-test was used.

Table 1: Descriptive statistics and t-test value showing influence of Attitude towards Mathematics on Achievement in Mathematics

Attitude towards Mathematics	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Unfavorable	68	25.1471	7.71172	.93518	-1.97	198	.049
Favorable	132	30.0758	8.25789	.71876			

From table-1, it is inferred that significant difference in the achievement of students in mathematics was found with respect to attitude towards mathematics, as t- value was found to be -1.97 with p-value = .049 which was significant at .05 level of significance. Therefore there was influence of favorable and unfavorable of attitude of students towards mathematics on achievement in mathematics and hypothesis 'H_{01} : There is no influence of favorable and unfavorable attitude of students towards mathematics on achievement in mathematics' stands rejected**.**

Hypothesis-2

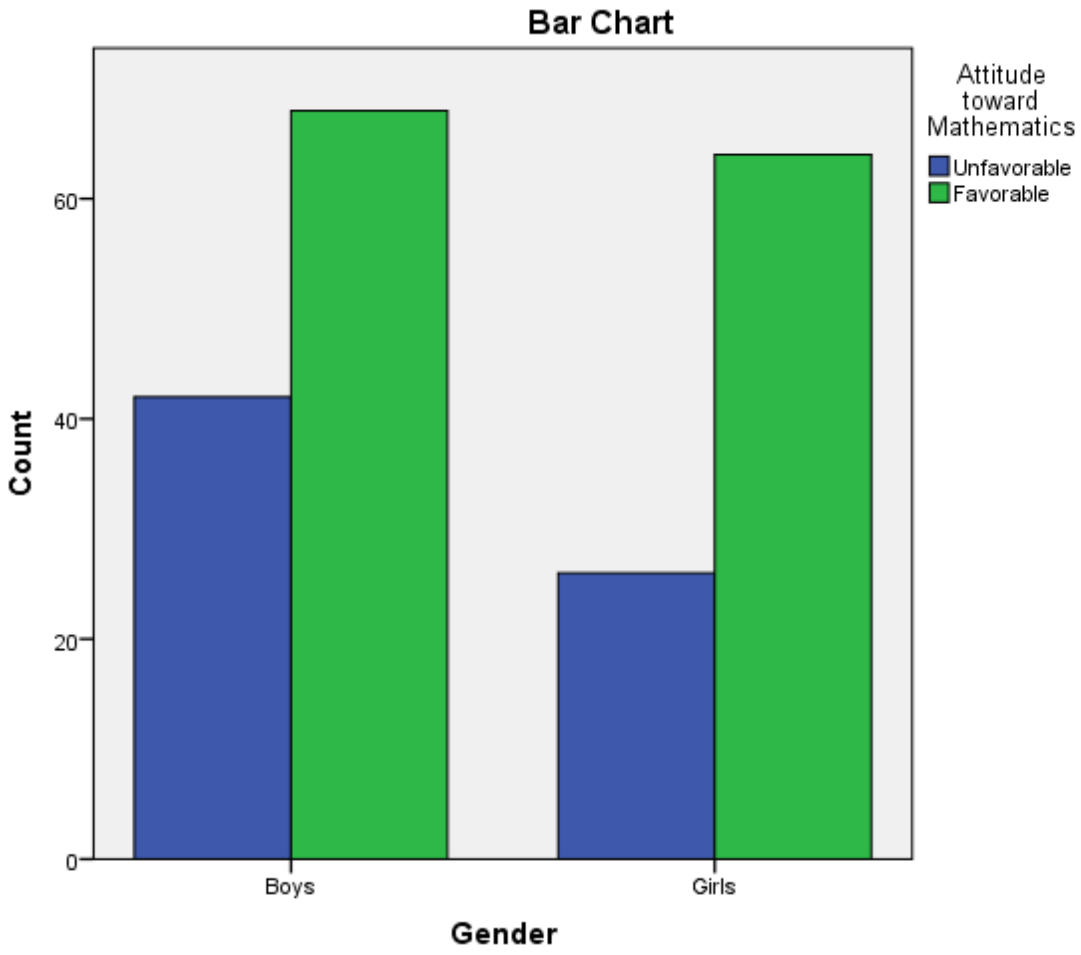
H_{02}: There is no significant difference in attitude towards mathematics of boys and girls.

In order to test this hypothesis, Chi-Square value was used.

Table 2: Chi- square statistics showing difference in attitude towards mathematics of students with respect to gender.

			Attitude towards Mathematics		Total	Chi-Square	Sig. (2-tailed)
			Unfavorable	Favorable			
Gender	Boys	Count	42	68	110	1.905	.168
		%	38.2%	61.8%	100.0%		
	Girls	Count	26	64	90		
		%	28.9%	71.1%	100.0%		
Total		Count	68	132	200		
		%	34.0%	66.0%	100.0%		

From table-2, it is inferred that no significant difference in the attitude of students towards mathematics with respect to gender was found, as Chi-Square value was found to be 1.905 with p-value = .168 which was not significant at .05 level of significance. Therefore there was no significant difference in the attitude of students towards mathematics of boys and girls and hypothesis 'H_{02} : There is no significant difference in attitude towards mathematics of boys and girls' stands accepted.



Hypothesis-3

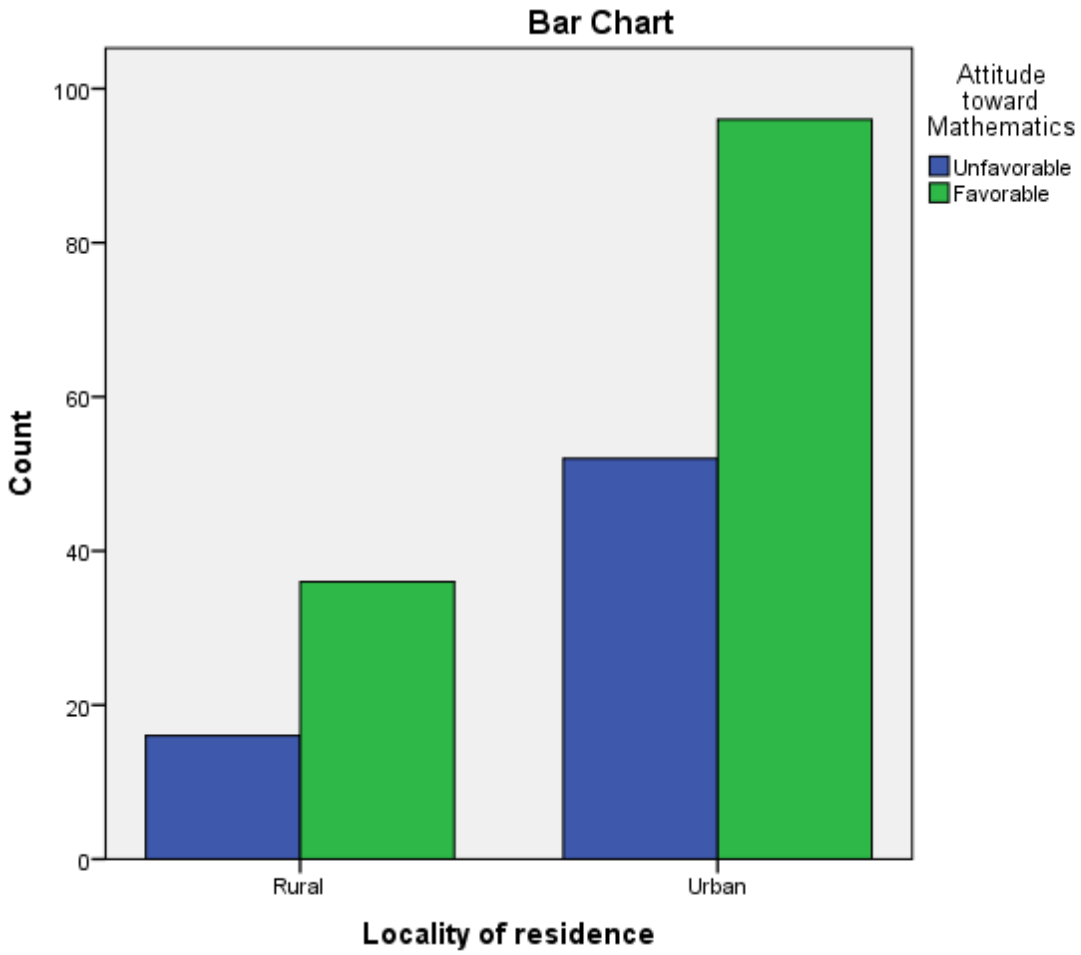
H_{03} : There is no significant difference in attitude towards mathematics of rural and urban students.

In order to test this hypothesis, Chi-Square value was used.

Table 3: Chi- square statistics showing difference in attitude towards mathematics of students with respect to locale.

			Attitude towards Mathematics		Total	Chi-Square	Sig. (2-tailed)
			Unfavorable	Favorable			
Locality of Residence	Rural	Count	16	36	52	.327	.568
		%	30.8%	69.2%	100.0%		
	Urban	Count	52	96	148		
		%	35.1%	64.9%	100.0%		
Total		Count	68	132	200		
			34.0%	66.0%	100.0%		

From table-3, it is inferred that no significant difference in the attitude of students towards mathematics with respect to locale was found, as Chi-Square value was found to be 0.327 with p-value = .568 which was not significant at .05 level of significance. Therefore there was no significant difference in the attitude of students towards mathematics of rural and urban students and hypothesis 'H_{03} : There is no significant difference in attitude towards mathematics of rural and urban students' stands accepted.



Hypothesis-4

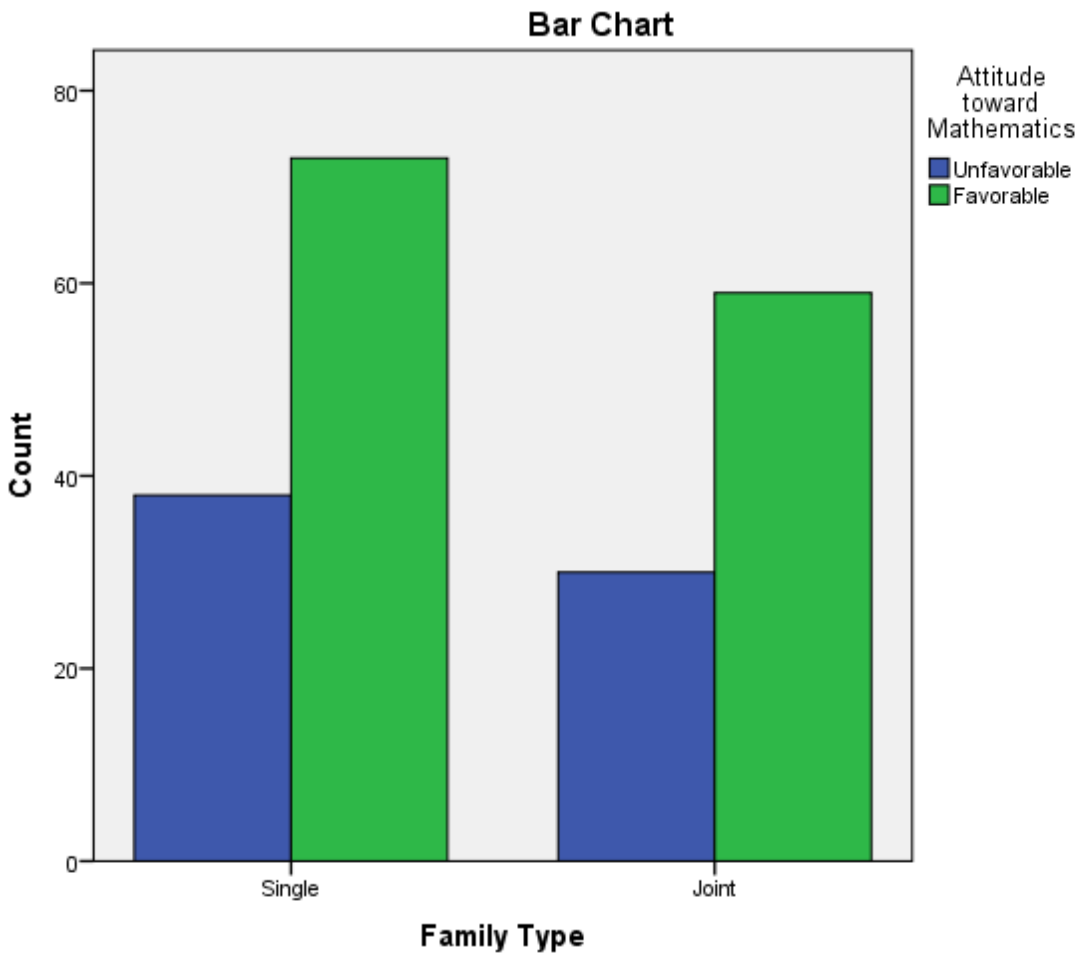
H_{04}: There is no significant difference in attitude towards mathematics of students of single and joint family.

In order to test this hypothesis, Chi-Square value was used.

Table 4: Chi- square statistics showing difference in attitude towards mathematics of students with respect to type of family

			Attitude towards Mathematics		Total	Chi-Square	Sig. (2-tailed)
			Unfavorable	Favorable			
Family Type	Single	Count	38	73	111	.006	.938
		%	34.2%	65.8%	100.0%		
	Joint	Count	30	59	89		
		%	33.7%	66.3%	100.0%		
Total		Count	68	132	200		
		%	34.0%	66.0%	100.0%		

From table-4, it is inferred that no significant difference in the attitude of students towards mathematics with respect to type of family was found, as Chi-Square value was found to be 0.006 with p-value = .938 which was not significant at .05 level of significance. Therefore there was no significant difference in the attitude of students towards mathematics of students from single and joint family and hypothesis 'There is no significant difference in attitude towards mathematics of students of single and joint family' stands accepted.



Major findings of the study

- There was influence of attitude towards mathematics of students on achievement in mathematics.
- There was no significant difference in attitude towards mathematics of boys and girls.
- There was no significant difference in attitude towards mathematics of students from rural and urban area.
- There was no significant difference in attitude towards mathematics of students from single and joint family.

Conclusion

It was concluded from above results that significant difference was found in the achievement of students with respect to attitude of students towards mathematics. There was no significant difference in attitude towards mathematics of boys and girls. No significant difference in attitude towards mathematics of rural and urban students was found Also there was no significant difference in attitude towards mathematics of students from single and joint family. As there was influence of attitude towards mathematics on achievement in mathematics. Thus the present study reveals that students with favorable attitude towards mathematics may perform better in mathematics subject as compared to the students with unfavorable attitude towards mathematics. So it is the duty of the administrators and teachers to develop positive attitude among learners for their better achievement in mathematics.

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