



# Study Of Academic Achievement And Mathematical Anxiety Among Secondary School Students

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**Abstract:** The present study seeks to compare the Academic Achievement and Mathematical Anxiety among Secondary School Students of district Shimla. In the present study, the descriptive Survey Method was used to collect the required data. The size of the sample was of 180 students of 10<sup>th</sup> class comprising 90 Male and 90 Female students from six Secondary Schools of district Shimla, who were selected through Random Sampling Technique. The Statistical techniques used in the present study were Mean, Standard Deviation, Percentage Analysis and 't'-test to analyse the data. The result of the study showed that majority of the Male and Female secondary school students have a Moderate level of Mathematical Anxiety. Further, it was revealed that majority of the Male Secondary School Students have High Academic Achievement level while majority of Female Secondary School Students have Average Academic Achievement level.

**Keywords:** Mathematical Anxiety, Academic Achievement, Gender, Secondary School Students

## 1. Introduction

Mathematics is one of the most essential subjects ever. Mathematics is a creative discipline, and mathematics is an international language. Mathematics has evolved over time both as a tool for problem-solving and for its own sake. Mathematics is the study of the logical relationships between shape, quantity, and arrangement. Mathematics is present in every aspect of human life. In the current social structure, mathematics is more essential for the average person.

Mathematical anxiety has affected all aspects of mathematics teaching and learning directly or indirectly. Mathematical anxiety could develop as a result of students' prior negative experiences learning mathematics in the classroom or at home (Rossnan, 2006). Mathematical anxiety seemed to be a problem for many learners. Mathematical anxiety is defined as a discomfort state created when students are required to perform mathematical tasks (Cemen, 1987). The main characteristics of this discomfort state include dislike, worry, and fear, with

specific behavioural manifestations such as tension, frustration, distress, helplessness, and mental disorganization when handling mathematical tasks (Richardson & Suinn, 1972). Moreover, feelings of anxiety can lead to panic, tension, helplessness, distress, shame, inability to cope, sweaty palms, nervous stomach, difficulty breathing, and loss of ability to concentrate (Posamentier & Stepelman, 1990).

Thus, teachers should play an important role in reducing the level of mathematical anxiety among their students. Mathematical anxiety is an intense emotional feeling of anxiety that people have about their ability to understand and do mathematics. People who suffer from mathematical anxiety feel that they are incapable of doing activities and classes that involve mathematics. Some mathematics-anxious people even have a fear of mathematics; it's called mathematics phobia.

## 2. Review of Literature

Recher, S. et al., (2018) studied the relationship among seventh grade students' mathematics self-efficacy, mathematics anxiety, attitudes towards mathematics, mathematics achievement, gender and school type. The results revealed a significant gender effect on the mean scores for mathematics self-efficacy, attitude scores, mathematics anxiety, and mathematics achievement.

Srivastava (2019) conducted a study the 'Mathematics anxiety among secondary school students in relation to gender, attitude, parental education, mathematics achievement and school type'. The results showed that there exists significant difference between male and female students so far as their anxiety in mathematics is concerned. Female students have more anxiety level than male students in mathematics.

Xie et al., (2019) examined 'Gender Difference of Chinese High School Students' Math Anxiety: The Effects of Self-Esteem, Test Anxiety and General Anxiety'. The results of this study revealed that young women showed a higher level of math anxiety compared with young men.

Szczygiel (2020) conducted a study on 'Gender, general anxiety, math anxiety and math achievement in early school-age children' and found that young girls have higher levels of general anxiety as well as total and testing math anxiety than boys do.

Assad-us-Samad et al., (2021) studied Mathematics Anxiety: Comparison among Males and Females Students and reported that girls showed higher mathematics anxiety as compared to male students.

C Du et al. (2021) examined the reciprocal relations among mathematics interest, mathematics anxiety, mathematics self-efficacy and mathematics achievement of primary school students. The results indicated that there was a bidirectional relationship between mathematics anxiety and mathematics achievement as well as mathematics self-efficacy and mathematics achievement.

Maghfiroh (2021) conducted a study on 'Analysis of Student Mathematical Anxiety Based on Gender and Educational Infrastructure' and reported that gender does not significantly influence student mathematical anxiety. However, mean mathematical anxiety score of male students is higher than that of female students with a difference of 0.15, which is not significant.

### **3. Methodology**

#### **3.1 Objectives of the study**

- To study the different levels of Academic Achievement of Secondary School Students in relation to their Gender.
- To study the different levels of Mathematical Anxiety of Secondary School Students in relation to their Gender.
- To compare the Academic Achievement of Male and Female Secondary School Students.
- To compare the Mathematical Anxiety of Male and Female Secondary School Students.
- To compare the Academic Achievement of Secondary School Students in relation to their level of Mathematical Anxiety.

#### **3.2 Hypotheses of the study**

- There will be no significant difference in the mean scores on Academic Achievement of Male and Female Secondary School Students.
- There will be no significant difference in the mean scores on Mathematical Anxiety of Male and Female Secondary School Students.
- There will be no significant difference in the mean scores on Academic Achievement of Secondary School Students in relation to their level of Mathematical Anxiety.

#### **3.3 Delimitations of the study**

- The study was delimited to district Shimla of Himachal Pradesh only.
- The study was delimited to 10<sup>th</sup> class Government Secondary School Students only.
- The study was delimited to the independent variable of Gender (male and female) only.

#### **3.4 Research method**

For conducting the present study, descriptive survey method was used by the investigator to collect the data.

#### **3.5 Sampling Technique**

For the present study, the researcher selected six Government Secondary schools of district Shimla randomly. Furthermore, the researcher collected data from 180 secondary school students of 10<sup>th</sup> class comprising 90 male and 90 female students.

#### **3.6 Variables of the study**

For the present study, Gender and Mathematical Anxiety was taken as the independent variable and Academic Achievement was taken as the dependent variable.

#### **3.7 Tools used for data collection**

For collecting desired data for the present study, a Mathematical Anxiety Scale of Mahmood and Khatoon (2012) and Self-developed Achievement test in Mathematics was used.

### 3.8 Statistical techniques

To analyse the data, statistical measures such as Mean, S.D. and Percentage Analysis *and* 't'-test were applied to the raw scores.

## 4. Analysis and Interpretations

**Objective 1: To study the different levels of Academic Achievement of Secondary School Students in relation to their Gender.**

To study the different levels of Academic Achievement of Secondary School Students, the scores obtained by the students on the Academic Achievement are divided into three levels as given below:

Range of Scores	Name of the Level
0-8	Low Academic Achievement
9-16	Average Academic Achievement
17-24	High Academic Achievement

The number and percentage of students falling into each level are given below:

**Table 1.1 Showing the different levels of Academic Achievement of Secondary School Students in relation to their Gender**

Gender	Levels of Academic Achievement						Total
	Low		Average		High		
	N	Percentage	N	Percentage	N	Percentage	
Male	7	7.77	41	45.55	42	46.66	90
Female	1	1.11	71	78.88	18	20	90
<b>Total</b>	<b>8</b>	<b>4.44</b>	<b>112</b>	<b>62.22</b>	<b>60</b>	<b>33.33</b>	<b>180</b>

It is evident from the Table 1.1 that 46.66 percent of the Male, as well as 20 percent of the Female Secondary school students, have High Academic Achievement level. Also, 45.55 percent of Male and 78.88 percent of Female Secondary school students have Average Academic Achievement level, whereas only 7.77 percent of Male and 1.11 percent of Female Secondary school students have Low Academic Achievement level. Therefore, it is clear from the table 1.1 that 33.33 percent of Secondary School Students have High Academic Achievement level and only 4.44 percent of Secondary School Students have Low Academic Achievement level. Majority of the students i.e., 62.22 percent of the Secondary School students have Average Academic Achievement level.

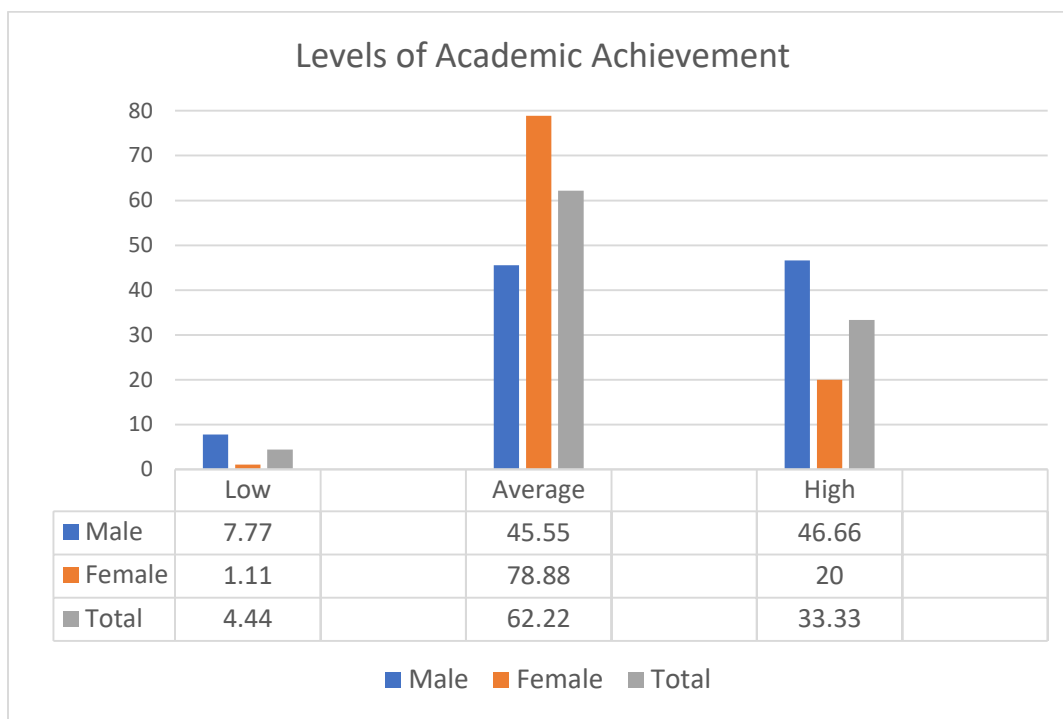
**Fig. 1.1**

Fig. 1.1 reveals that majority of the Male Secondary School Students have High Academic Achievement level while majority of Female Secondary School Students have Average Academic Achievement level.

**Objective 2: To study the different levels of Mathematical Anxiety of Secondary School Students in relation to their Gender.**

To study the different levels of Mathematical Anxiety of Secondary School Students, the scores obtained by the students on the Mathematical Anxiety Scale are divided into three levels as given below:

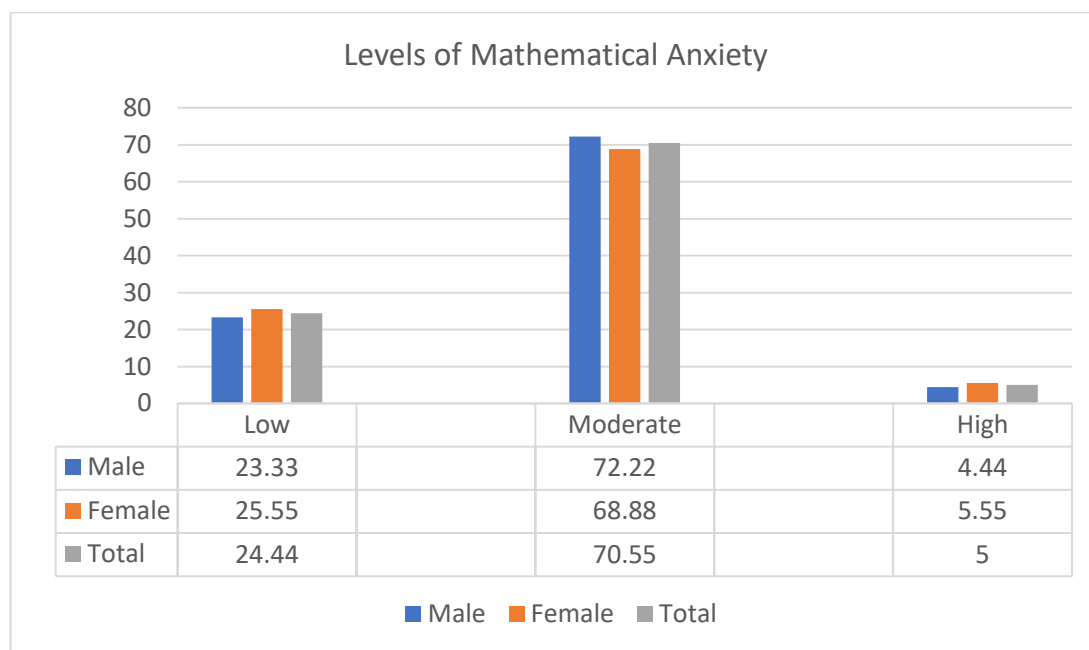
Range of Scores	Name of the Level
14-32	Low Mathematical Anxiety
33-51	Moderate Mathematical Anxiety
52-70	High Mathematical Anxiety

The number and percentage of students falling into each level are given below:

**Table 2.1 Showing the different levels of Mathematical Anxiety of Secondary School Students in relation to their Gender**

Gender	Levels of Mathematical Anxiety						Total
	Low		Moderate		High		
	N	Percentage	N	Percentage	N	Percentage	
Male	21	23.33	65	72.22	4	4.44	90
Female	23	25.55	62	68.88	5	5.55	90
Total	44	24.44	127	70.55	9	5	180

Table 2.1 clearly shows that 23.33 percent of the Male, as well as 25.55 percent of the Female Secondary school students, have Low level of Mathematical Anxiety. Also, 72.22 percent of Male and 68.88 percent of Female Secondary school students have a Moderate level of Mathematical Anxiety, whereas only 4.44 percent of Male and 5.55 percent of Female Secondary school students have a High level of Mathematical Anxiety. Therefore, it is clear from the table that 24.44 percent of Secondary School Students have Low Mathematical Anxiety and only 5 percent of Secondary School Students have High Mathematical Anxiety. The majority of the students i.e., 70.55 percent of the Secondary School students have a Moderate level of Mathematical Anxiety.



**Fig. 2.1**

Fig. 2.1 reveals that majority of the Male and Female Secondary school students have a Moderate level of Mathematical Anxiety.

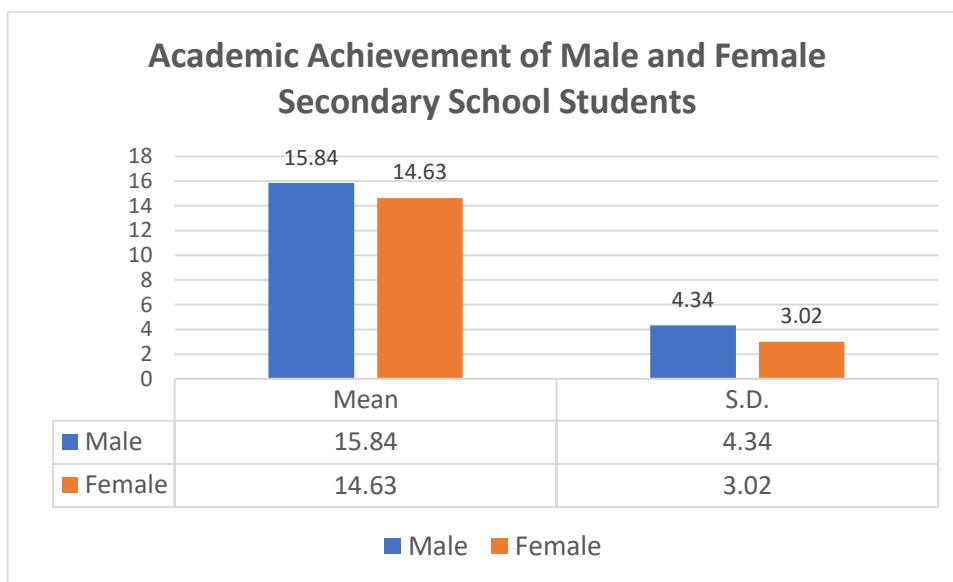
**Objective 3: To compare the Academic Achievement of Male and Female Secondary School Students.**

**Table 3.1 Showing the mean comparison on Academic Achievement between Male and Female Secondary School Students**

Gender	Number	Mean	S.D.	df	t-value	Result
Male	90	15.84	4.34	178	2.17	Significant*
Female	90	14.63	3.02			

Significant\* - Significant at 0.05 level, table value of 't' at 0.05 level of significance with df 178 is 1.97.

Table 3.1 reveals that there is significant difference between the mean scores of the Male and Female Secondary School Students on Academic Achievement at 0.05 level of significance. Therefore, the null hypothesis which states that "There will be no significant difference in the mean scores on Academic Achievement of Male and Female Secondary School Students" stands rejected.

**Fig. 3.1**

Further, on the basis of mean scores, it is clear that Male students have more Academic Achievement than Female students.

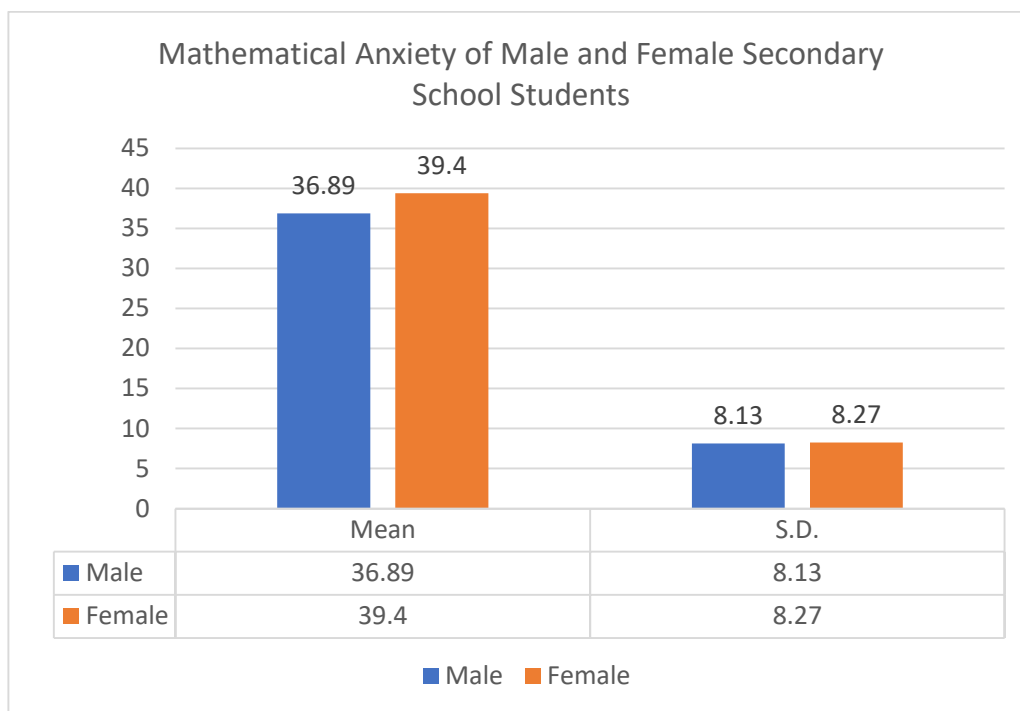
**Objective 4: To compare the Mathematical Anxiety of Male and Female Secondary School Students.**

**Table 4.1 Showing the mean comparison on Mathematical Anxiety between Male and Female Secondary School Students**

Gender	Number	Mean	S.D.	df	t-value	Result
Male	90	36.89	8.13	178	2.06	Significant*
Female	90	39.40	8.27			

Significant\* - Significant at 0.05 level, table value of 't' at 0.05 level of significance with df 178 is 1.97.

Table 4.1 reveals that there is significant difference between the mean scores of the Male and Female Secondary School Students on Mathematical Anxiety at 0.05 level of significance. Therefore, the null hypothesis which states that "There will be no significant difference in the mean scores on Mathematical Anxiety of Male and Female Secondary School Students" stands rejected.

**Fig. 4.1**

Further, on the basis of mean scores, it is clear that Female students have more Mathematical Anxiety than Male students.

**Objective 5: To compare the Academic Achievement of Secondary School Students in relation to their level of Mathematical Anxiety.**

**Table 5.1 Showing the different levels of Academic Achievement of Secondary School Students in relation to their level of Mathematical Anxiety**

Levels of Mathematical Anxiety	Levels of Academic Achievement						Total	
	Low		Average		High			
	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Low	0	0	27	61.36	17	38.63	44	24.44
Moderate	5	3.93	79	62.20	43	33.85	127	70.55
High	3	33.33	6	66.66	0	0	9	5
<b>Total</b>	<b>8</b>	<b>4.44</b>	<b>112</b>	<b>62.22</b>	<b>60</b>	<b>33.33</b>	<b>180</b>	<b>100</b>

Table 5.1 reveals that 0 percent of the Secondary School students having Low level of Mathematical Anxiety, exhibits Low Academic Achievement level whereas majority of the students i.e., 61.36 percent exhibits Average Academic Achievement level. It is clear from the above table that only 38.63 percent of the Secondary School students having Low level of Mathematical Anxiety, exhibits High Academic Achievement level.

Table 5.1 also reveals that only 3.93 percent of the Secondary School students having Moderate level of Mathematical Anxiety, exhibits Low Academic Achievement level whereas the majority i.e., 62.20 percent of the Secondary School students exhibits Average Academic Achievement level. It is also clear from the above table



that 33.85 percent of the Secondary School students having Moderate level of Mathematical Anxiety, exhibits High Academic Achievement level.

It is evident from the Table 5.1 that only 33.33 percent of the Secondary School students having High level of Mathematical Anxiety, exhibits Low Academic Achievement level whereas majority of the students i.e., 66.66 percent exhibits Average Academic Achievement level. It is clear from the above table that 0 percent of the Secondary School students having High level of Mathematical Anxiety, exhibits High Academic Achievement level.

## 5. Conclusion

From the findings of the study, it is evident that the majority of the students i.e., 62.22 percent of Secondary School students have Average Academic Achievement level and 33.33 percent of Secondary School students have High Academic Achievement level. Results of the study also reveals that majority of the Male Secondary School Students have High Academic Achievement level while majority of Female Secondary School Students have Average Academic Achievement level. Also, it can be inferred from the results of the study that Male Secondary School students have significantly higher Mathematical Achievement than the Female Secondary School Students.

Findings of the study also reveals that majority of the students i.e., 70.55 percent of Secondary School students have a Moderate level of Mathematical Anxiety and only 5 percent of Secondary School Students have a High level of Mathematical Anxiety. Results of the study also reveals that majority of the Male and Female Secondary school students have a Moderate level of Mathematical Anxiety. The reason for this low percentage of students having a High level of Mathematical Anxiety may be the improvement in the technology-assisted teaching methods. Nowadays, various new teaching methods are being used in schools. Results of the study also shows that Female Secondary School Students have more Mathematical Anxiety than Male Secondary School Students.

Findings of the study also shows that 33.33 percent of the Secondary School students having High level of Mathematical Anxiety, exhibits Low Academic Achievement whereas majority of the students having High level of Mathematical Anxiety i.e., 66.66 percent exhibits Average Academic Achievement and none of the students having High level of Mathematical Anxiety, exhibits High Academic Achievement. Majority of the students having Low and Moderate level of Mathematical Anxiety exhibits Average Academic Achievement.

Results of the study also show that Female students have more Mathematical Anxiety than Male students and this difference is statistically significant. Srivastava (2019), Xie. et al. (2019), Szezygiel (2020) also found similar results.

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