

# GENDER DIFFERENCES IN MATHEMATICAL ACHIEVEMENTS OF HONORS STUDENTS IN WEST BENGAL

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**Abstract:** Mathematics considered as a 'male domain' and there were large gender difference favoring males in mathematics achievement. The researcher tried to evaluate Gender Differences and Mathematics Achievement at different level of study of Mathematics Honors Students in West Bengal. The result revealed that Mathematics is not a 'male domain'. However, females do not participate in advanced mathematics courses or in mathematics-related career at the same level as male do but there exist no difference in performance between boys and girls at honors level. Both positive and negative gender stereotypes can affect people's beliefs, values, attitudes and academic achievement. We have to avoid the activity that negatively affect on mathematical achievement of girls.

**Index Terms - Gender Differences, Mathematics, Mathematical Achievement.**

## I. INTRODUCTION

In human society gender is a complex, dynamic force that affects every social interaction, including interactions in educational settings. Its effects are weaving into educational outcomes, and at times contribute to complicated disparities, specifically in the field of mathematics education.

The review of related literature reveals that there are many papers about gender difference in mathematics education. In some papers, they showed great gender difference, and in the other papers, they did not show the gender difference.

Abiam & Odok (2006) found no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. They however found the existence of a weak significant relationship in Geometry and Trigonometry.

Women choose careers in mathematics-related fields in lower proportions than do males, even if they are equally qualified (Forgasz *et.al.*, 2010).

Girls often have lower math self-concepts as well as lower mathematics scores on standardized achievement tests, despite having higher math school grades (Marsh & Yeung, 1998).

Most current research is in agreement about the existence of a gap between males and females in the areas of math achievement and attitudes towards mathematics. Early research cited biological differences as the reason for the gender gap, but since the 1970s, the research has generally attributed the disparity to societal and cultural forces that affect females' belief systems, confidence levels, and desire to learn math (Forgasz *et.al.*, 2010).

Girls have inferior spatial skills when it comes to visualizing movements of geometric figures (Maccoby & Jacklin, 1974; Fennema & Tartre, 1985). Cooperative activities are preferred by many girls in mathematics whereas many boys prefer to work in a 'traditional' competitive environment (Forgasz & Leder, 1996; Fox & Soller, 2001). Teachers tend to initiate 'analytical models of instruction which tend to favour males more than females' (Fox & Soller, 2001).

In class girls ask fewer questions than boys, and a small percentage of those questions that are asked demand higher-level thinking (Fennema & Peterson, 1986). Girls receive less attention from their teachers and are less likely than boys to receive either praise or criticism for their work (Fennema & Peterson, 1986). Girls attribute their mathematical success to effort whereas boys attribute their success to ability (Walden & Walkerdine, 1986; Meyer & Koehler, 1990). Girls are connected thinkers whose ways of mathematical knowing are quite different from boys who tend to view mathematics in terms of their separate autonomy (Becker, 1995).

Boys who consider themselves weak at mathematics are more likely to view mathematics as a female domain, whereas girls who rate their mathematical achievement highly are more likely to view mathematics as a female domain (Leder & Forgasz, 2003). Boys assume control of technological apparatus when mathematics classes are working at computers. Boys tend to distract others from their computer work and receive more help from the teacher during the lesson (Forgasz, 2002).

Girls' characteristic experiences are different to boys' and hence those experiences do not provide equal grounds for reliable knowledge claims (Burton, 1995). Girls 'seem to be more concerned than boys in trying to remember what the teacher has said and following her instructions' (Lucey *et.al.*, 2003).

The claim that boys are currently underachieving has been challenged widely in many western countries (Skelton & Francis, 2003). A 'disproportionate number of girls opts out of powerful areas of curriculum' (Mendick, 2003).

## II. OBJECTIVE

To examine the significant difference between the Mathematical achievement of girls and boys in West Bengal at honors level

## III. HYPOTHESES

The following null hypotheses are hereby stated:

$H_1$ : There is no significant difference between the Mathematical achievement of girls and boys in West Bengal at secondary level.

$H_2$ : There is no significant difference between the Mathematical achievement of girls and boys in West Bengal at higher secondary level.

$H_3$ : There is no significant difference between the Mathematical achievement of girls and boys in West Bengal at honors level.

## IV. METHODOLOGY

### 4.1 Population

All students, passed B.Sc. with Mathematics Honors from different universities of West Bengal constituted the population of the study.

### 4.2 Sample

Number of Sample (N) is 162 in between 42 are Girls and 120 are Boys.

### 4.3 Tools Use of the Study

The researcher in the study used three types of tools as follows:

1. Marks obtained in Mathematics at secondary level final examination.
2. Marks obtained in Mathematics at high secondary level final examination.
3. Marks obtained in Mathematics at honors level final examination.

### 4.4 Statistical Calculation

For analyzing the students' achievement, the students' scores are converted into percentages. Basic statistical calculations are mean, standard deviation as descriptive statistics and t-test as inferential statistics.

## V. RESULTS

Table 5.1: Showing Number of student (N), Mean and Standard Deviation (S.D.) of marks obtained in Mathematics at different level

Sample	N	Secondary		Higher Secondary		Honors	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	120	79.54	9.81	72.91	9.32	56.05	7.70
Girls	42	85.10	10.38	76.50	9.11	57.45	7.00

Table 5.1 stated that, the mean and S.D. of marks obtained in Mathematics at secondary level by girls were greater. The mean of marks obtained in Mathematics at higher secondary level by girls was greater, but S.D. of marks obtained in Mathematics at higher secondary level by girls was less. The mean of marks obtained in Mathematics at honors level by girls was greater, but S.D. of marks obtained in Mathematics at honors level by girls was less.

Table 5.2: Showing t value between the Mathematical achievement of girls and boys in West Bengal at secondary level

Secondary Level	N	Mean	S.D.	df	t	Significant at 0.05 level
Girls	42	85.10	10.38	160	3.090	Significant
Boys	120	79.54	9.81			

Table 5.2 stated that there is significant difference between the Mathematical achievement of girls and boys in West Bengal at secondary level. The mean of girls is found significantly higher than Boys.

Table 5.3: Showing t value between the Mathematical achievement of girls and boys in West Bengal at higher secondary level

Higher Secondary Level	N	Mean	S.D.	df	t	Significant at 0.05 level
Girls	42	76.50	9.11	160	2.149	Significant
Boys	120	72.91	9.32			

Table 5.3 stated that there is significant difference between the Mathematical achievement of girls and boys in West Bengal at higher secondary level. The mean of girls is found significantly higher than Boys.

Table 5.4: Showing t value between the Mathematical achievement of girls and boys in West Bengal at honors level

Honors Level	N	Mean	S.D.	df	t	Significant at 0.05 level
Girls	42	57.45	7.00	160	1.033	Not Significant
Boys	120	56.05	7.70			

Table 5.4 stated that there is no significant difference between the Mathematical achievement of girls and boys in West Bengal at honors level.

Table 5.5: Null Hypotheses testing based on t test at 5% significant level

Null Hypotheses	$H_1$	$H_2$	$H_3$
Null Hypotheses Testing	Rejected	Rejected	Retained

## VI. FINDINGS

Males are generally finds to hold more positive attitude towards mathematics than females. Females do not participate in advanced mathematics courses or in mathematics-related career at the same level as male do.

It is true that Females do not participate in advanced mathematics courses at the same level as male do. However, it is not true that Mathematics is a 'male domain'.

This research shown that, there exist no difference in performance of mathematics between boys and girls at higher level of education.

## VII. RECOMMENDATIONS AND CONCLUSION

Internationally and domestically, gender gaps in math achievement are getting smaller, but they are still widespread (Forgasz *et.al.*, 2010). In school and home, there is different treatment of boys and girls by their parents and teachers. Many teachers believe that the most prominent gender difference is concerned with working. They believe that girls are conscientious, painstaking and diligent and boys are lazy. In addition, cognitive skills were emphasized, girls tend to routines and boys use their power of reason. The third difference was found in attitudes, boys are self-confident and venturesome but girls lack self-confidence (Li, 1999; Soro, 2004). Unfortunately, gender inequality in education has remained a perennial problem of global scope (Bordo, 2001; UNESCO, 2003; Reid, 2003).

These gender roles are perpetuated through social interaction, and every person plays a part in constructing them. Both positive and negative gender stereotypes can affect people's beliefs, values, and attitudes, which in turn can positively or negatively affect achievement. As students, parents, teachers, administrators, or policy makers, "We must recognize and shed fixed mindsets about their and our mathematics abilities based on gender, and replace them with our beliefs in the continuing growth and development of the mathematics ability of all".

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