

# Relationship between Mathematics Test Anxiety and Achievement of Senior Secondary Three Students in Kafanchan Educational Zone, Kaduna State

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**Abstract:** - The study was designed to investigate the relationship between Mathematics test anxiety and achievement of SS3 students in Kafanchan Educational Zone, Kaduna state. The research was guided by two research questions and two hypotheses. These hypotheses were formulated based on the two research questions and were tested at 0.05alpha level of significance. Correlational survey research design was adopted for the study. A sample of 420 senior school three students, comprising 210 male students and 210 female students were used for the study. A simple random Sampling technique was used to select the sample. Two instruments were used in gathering data, for the study. The instruments were; the Mathematics Test Anxiety Scale (MTAS) and Mathematics Achievement Scores (MAS). The instruments are 4-point Likert type Scales. The data collected were analyzed using Pearson's Product Moment Coefficient (r), mean and standard deviation. Test of significance difference in hypotheses was tested, using t-test with SPSS software. The results from the data analyzed revealed that; there was a negative relationship between test anxiety and achievement of students in Mathematics and there was no significant difference in the mean achievement scores of male and female students. The educational implications were pointed out and the following recommendations were made; teachers should always find ways of creating and sustaining moderate test anxiety on the students, it is worthwhile to find out the source and level of test anxiety these students have and if they are not really interested in acquiring knowledge but in passing their test, among others.

**Keywords:** Senior secondary school, Mathematics, Anxiety, Mathematics achievement.

## I. INTRODUCTION

Mathematics Test Anxiety is a subjective feeling of tension, apprehension, nervousness, fear and worry when faced with a Mathematics test/examination (Spielberger, 1996). Anxiety is one of the wide varieties of emotional and behaviour disorders (Aknen, 2000). Students with anxiety disorder exhibit a passive attitude in their studies such as lack of interest in learning, poor performance in Mathematics examinations, and assignments. The anxiety's psychological symptoms among students include feeling nervous before a tutorial class, panicking, going blank during a Mathematics

test, feeling helpless while doing assignments, or lack interest in Mathematics as a subject whereas the physiological symptoms include sweaty palms, cold, nervousness, panic, fast pace of breathing, racing heartbeat, or an upset stomach (Ruffin, 2007). The prevalence of Mathematics test anxiety among secondary school students has been acknowledged by students and educators. However, study anxiety is a real phenomena, the importance of study anxiety is particularly related to the sources of anxiety and how to handle them.

Anxiety, while studying Mathematics, is a major predictor of academic achievement in the subject (McCraty, 2007). Little is known that there exist a possible association between high level of anxiety and low academic performance among students. Researchers such as (Gitome, 2003, Aronen, 2007 & McCraty, 2007) revealed that high levels of anxiety influence on the decrease of working memory, distraction, and reasoning in students. Tobias (2006) has recognized that anxiety plays significant role in student's learning and academic performance; moreover anxiety has been known to have both facilitating and debilitating effects on academic achievement. Researchers like McCraty, (2007) and Luigi, (2007) have been looking at the correlation between Mathematics anxiety and academic performance among secondary school students, they found that students with higher level of Mathematics test anxiety have lower academic achievement and greater anxiety would be associated with poorer academic achievement.

Students with high level of test anxiety tend to lose concentration, lack confidence, and have a poor reasoning power (Sena, Whitaker, Lowe, Patricia, Lu, and Steven, 2007).

Richardson and Suinn, (2002) created a 98-item Mathematics Anxiety Rating Scale (MARS), which is the most used instrument to measure Mathematics anxiety. Suinn (2010) used the MARS in a study to measure Mathematics anxiety in students.

As a factor in Mathematics achievement, sex has remained inconclusive because Reyes and Stanic cited by

Jahun and Mommoh (2001) reported that male students achieved at higher level in Mathematics than the female students; that is gender differences in favour of boys. Another study by Jahun in Jahun and Mommoh as cited above, girls performed better than boys in a Mathematics achievement test that is gender differences in favour of girls.

It is therefore in a bid to authenticate the beliefs and support existing findings by aforementioned researchers that this present study is geared towards establishing relationship among test anxiety and academic achievement of students in Mathematics.

## II. STATEMENT OF THE PROBLEM

There is generally poor achievement by students in Mathematics and this has been a thing of great concern to Mathematics educators, parents and government. This is in line with the observation of the Mathematical Association of Nigeria in Umar (2011). The association expressed concern over the continual poor performance of candidates in Senior School Mathematics Examinations. The examinations are those conducted by West African Examinations Council (WAEC), National Examination Council (NECO), National Business and Technical Examination Board (NABTEB) and Joint Admission Matriculation Board (JAMB). The association's position is contained in a communiqué issued at the end of its 50<sup>th</sup> Annual Conference in Asaba on Friday, signed by the President of the association, (Agwagah, 2013). Mathematics educators have put in efforts aimed at identifying the major problems associated with poor achievement in secondary school Mathematics. Despite all these noble efforts, the academic achievement of students in Mathematics is still poor. This assertion is backed up by the Third International Mathematics and Science Study (TIMSS) which was the largest study of educational achievement ever undertaken. The study, in 1994 revealed that "there had been a decline in students' achievement in Mathematics and that many senior school students are scared of the subject".

The second problem is that most of the students experience some level of anxiety whenever test in the area of Mathematics in particular is given to them or during a Mathematics examination. However when anxiety begins to affect performance in examination, it has become a problem. The test situation is experienced by almost all members of our society and more over the academic lives of people are very frequently affected by their test performance. We live in a test giving and test conscious culture.

Mkaoro (2006) carried out a study on Mathematics test anxiety, interest and achievement of private senior school students in Nsuka and find out that there was a positive relationship between test anxiety and achievement of senior school students in Mathematics. The problem of this study is to find out if the results of the above study can be seen to be same in other locations or states in Nigeria when considering

co-educational public senior secondary schools for generalization purposes. Hence the researcher stated the problem in question form as: what is the relationship between Mathematics test anxiety and achievement of senior secondary three students in Kafanchan Educational Zone, Kaduna State?

### 2.1 Purpose of the Study

The main purpose of this study was to determine the relationship between Mathematics test anxiety and achievement of Senior Secondary three students in Kafanchan educational zone of Kaduna State.

The specific objectives are:

1. To determine the relationship between test anxiety and achievement of students in senior secondary Mathematics.
2. To examine the mean achievement scores of male and female students in senior secondary Mathematics.

### 2.2 Research Questions

The following questions have been raised to direct the study and answers will be provided for the questions.

1. What is the relationship between test anxiety and achievement of students in senior secondary Mathematics?
2. What is the mean achievement score of male and female students in senior secondary Mathematics?

### Hypotheses

The following hypotheses are analysed at a significant level of 0.05.

**Ho<sub>1</sub>:** There is no significant relationship between test anxiety and achievement of students in senior secondary Mathematics.

**Ho<sub>2</sub>:** There is no significant difference in the mean achievement scores of male and female students in senior secondary Mathematics.

## III. METHODS AND PROCEDURE

The study adopted a correlational research design to enable the researcher established the nature of relationship among the predictor variable (students' Mathematics test anxiety) and the criterion variable (Achievement of senior secondary school Mathematics students).

The targeted group for this study comprised of the fifteen co-educational Governments owned senior secondary schools in Kafanchan Educational Zone of Kaduna State. The population for the study was all Senior Secondary three students with two thousand one hundred and one (2101) students. The sample for this study was 420 randomly selected students from the sampled schools to represent the population which is 20% of the population.

The researcher randomly select six Schools as sampled schools, three schools from the urban area and three schools from the rural area. The researcher used simple random method to pick 20% of the population which gave four hundred and twenty (420) students from the six selected senior secondary three, by randomly selecting seventy (70) SS3 students from each school with thirty-five (35) to represent each gender, two hundred and ten (210) students were selected from the three urban schools, while two hundred and ten (210) were also selected randomly from rural schools.

A Mathematics Test Anxiety Scale (MTAS) adopted from Driscoll was administered to the participants to assess prevalence of test anxiety. The data on achievement was obtained from existing school records. Achievements were

measured by using scores already awarded for the students' mock examination.

### 3.1 Data Analysis

The data collected for the study were analysed using mean, t-test and Pearson Product Moment Correlation statistics was used to answer research question, while mean was used to answer research question two. Research hypothesis one was analysed using Pearson Product Moment Correlation (PPMC), while t-test was used to analyse hypothesis two. All analysis was done using SPSS package.

#### 3.1.1 Result

**Research question 1:** What is the relationship between test anxiety and achievement of students in senior secondary school Mathematics?

Table 1: Pearson product moment correlation between Mathematics test anxiety and achievement scores of SS3 students

Test Variables	N	DF	r-cal	r-critical
Test Anxiety	420	418	-0.620	0.195
Achievement	420	418		

Level of significant at 0.05 (2-tailed)

The analysis of data in Table 1 shows the bivariate correlation between test anxiety and achievement of students in Mathematics. The analysis implies that the correlation coefficient between the two variables is  $-0.620$ . This by implication shows that there is a high negative relationship

between test anxiety and achievement of students in Mathematics.

**Hypothesis 1:** There is no significant relationship between Mathematics test anxiety and students achievement of SS 3 students.

Table 2: Pearson product moment correlation between Mathematics test anxiety and achievement scores of SS3 students

Test Variables	N	DF	r-cal	r-critical	Decision
Test Anxiety	420	418	-0.620	0.195	Reject $H_0$
Achievement	420	418			

Level of significant at 0.05 (2-tailed)

Table 2 shows an analysis of the relationship between Mathematics anxiety and achievement scores which was done using SPSS with the following results:  $r_{cal} = -0.620$  and  $r_{crit} = 0.195$ . Since  $r_{cal}$  ( $-0.620$ ) is less than  $r_{critical}$  ( $0.195$ ), the null hypothesis is rejected, this implication shows that there is

a high negative relationship between test anxiety and achievement of students in Mathematics.

**Research question 2:** What are the mean achievement scores of male and female students in senior secondary school mathematics?

Table 3: Comparative results of male and female respondents mean achievement scores

GENDER	N	MEAN	SD
MALE	210	46.20	23.39
FEMALE	210	42.98	18.44

Table 3 shows that the mean achievement score of male students 46.20 with a standard deviation of 23.39 while the female students had mean achievement score of 42.98 with a standard deviation of 18.44.

**Hypothesis 2:** There is no significant difference in the mean achievement scores of male and female students in senior secondary school Mathematics.

Table 4: t- test of difference of male and female students Mathematics achievement scores

VARIABLE	GROUP	N	MEAN	SD	DF	$\alpha$	t - c a l
sig (2-tailed) Achievement	Male	210	46.20	23.39	418	0.05	43.30
	Female	210	42.98	18.44			

The results of table 4, by SPSS interpretation indicate that there is no significant difference in the mean achievement scores of male and female students in senior secondary school Mathematics since sig. (2-tailed) = 0.119 is greater than 0.05. Thus the differences in means are likely due to chance and not likely to the manipulation.

#### IV. DISCUSSION OF FINDINGS

The study revealed that there was a high negative significant relationship between test anxiety and achievement of students in Mathematics. The negative relationship between the students' test anxiety and achievement means that as test anxiety increases, there is a corresponding decrease in achievement. This is an indication that the higher the test anxiety, the lower the achievement of students in Mathematics. This is in agreement with Cassady and Johnson, (2002) according to their findings a moderate physiological arousal is associated with high examination performance. At this point it is worthwhile to state that an over anxious students always struggle to success.

Nevertheless, the degree of association between students' test anxiety and achievement was found to be -0.620 while the percentage of association ( $r^2 \times 100$ ) was found to be at 38%. The coefficient of alienation ( $1-r^2$ ) was found to be 0.62. This represents the degree of lack of association between students' test anxiety and the achievement. Indeed the relationship between students' test anxiety and achievement was statistically significant. Their magnitude of the relationship was high and percentage of prediction of one variable from other was high.

However, the first result of this study agree to the findings of Nadeem et al., (2012) who in the in depth investigation of their findings obtained results that revealed that anxiety has its very high impact on students' achievement. They concluded that there is negative relationship between anxiety and achievement, which means that if one factor increases, the other will decrease. In other words, when anxiety test increases, achievement decreases and vice versa.

There is no significant difference in the mean achievement scores of male and female students in favour of male students. Thus by SPSS interpretation the differences in means are likely due to chance and not likely to the manipulation. This finding agreed with the first finding of this study which had it that, as the test anxiety increases the achievement decreases. These gender differences in the performance of male and female students have been attributed

to environmental and psychological factors (Etukudo, 2002) without paying any attention to pedagogical factors which include method and media of constructions. However not minding the above, this present research with a mean achievement of 46.20 for male students and 42.98 for female students showed clearly from its findings, that the male students performed significantly better than their female counterparts in Mathematics.

#### V. CONCLUSION

The purpose of this research was to determine, 'relationship between Mathematics test anxiety and achievement of senior secondary students in Kafanchan educational Zone, Kaduna state. The following conclusions were arrived at; that test anxiety is highly and negatively related with achievement by this, the researcher means that the presence of high test anxiety entails low achievement.

This means that students who have high Mathematics test anxiety tend to achieve low in Mathematics and vice versa. Furthermore it was concluded that the male students because they had less test anxiety than the female students, their achievement were better than that of their female counter part.

##### 5.1 Recommendations

The recommendations the study is therefore as follows:

1. Students' Mathematics anxiety levels correlated highly negative with their achievement. This tends to show that students with low to moderate Mathematics anxiety levels will perform significantly better than those with high Mathematics anxiety levels. This calls for the attention of counseling units of secondary schools to provide counseling services for students with a view to promoting positive attitudes among students.
2. There was no significant difference in the Mathematics achievement of the respondents. This means both groups can perform equally well in Mathematics courses. This indicates that the Mathematics anxiety level manifested in the females may be triggered by only selected aspects of mathematics teaching, and did not in any way, hampered their studying hard to get good grades so Mathematics teachers should do their best to motivate students to build up positive attitude toward Mathematics so as to eradicate high anxiety levels among students.

3. Students should get equipped with knowledge on anxiety and effective anxiety management skills for their own benefit while in school and elsewhere. Students should take responsibility to seek for anxiety management help from teacher counsellors, other teachers or from the peer counselling clubs within their schools in order to ensure that their anxiety levels do not escalate to levels that impact negatively on their academic results.
4. Students should be encouraged to use all available opportunities to raise issues that cause them anxiety so that enlightening discussions could be organized either amongst themselves or with the teacher counsellors to facilitate positive resolutions to the problems raised.
5. Teachers also ought to understand the nature of student's anxiety causing factors so that they are able to address the same as part of anxiety management skill acquisition process. The developmental process and especially during teenage poses many anxiety causing challenges to the students.
6. Teacher counsellors and Head teachers therefore should help students to learn to take positive responsibility to seek counselling help when need be.

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