

## **Relationship among Test Anxiety, Academic Achievement and Interest of Students in Senior Secondary School Mathematics in Rivers State**

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### **Abstract**

*The study was designed to investigate the Relationship among Test Anxiety, Academic Achievement and Interest of Students in Senior Secondary School Mathematics in Rivers State. Purpose of this research was to investigate the relationship between test anxiety and academic achievement, test anxiety and interest of students in mathematics. Sample consists of 360 Senior Secondary SSII Mathematics students (180 males and 180 females) randomly selected from twelve public secondary schools that are co-educational. Three research instruments were used to collect data for this study. The reliability coefficients of the instruments established using test-retest technique were 0.85 for Mathematics Test Anxiety Scale, 0.87 for Mathematics Interest Inventory and 0.81 for Mathematics Achievement Test. Two Research Questions in line with the purpose of the study were posed to be answer in the study, while two null hypotheses were formulated based on the research questions and to be tested at 0.05 alpha level. To analyze the data, mean, standard deviation, Pearson (r) and t – test were used. Based on the analysis, the results show that the correlation coefficient obtained for students' test anxiety and their academic achievement was 0.71 indicated a high positive relationship between students' test anxiety and their academic achievement, the relationship is statistically significant. The correlation coefficient obtained for students' test anxiety and interest was 0.79 indicated a very high positive relationship between students' test anxiety and their interest, the relationship is statistically Significant. The implications of these findings is that government, teachers, parents and other stakeholders in education of children should work towards enhancing academic achievement of students in mathematics to meets the required standards in future academic work. Base on the educational implication, the recommendation include that teachers should minimize the way they threaten, embarrass and intimidate their students among others.*

### **INTRODUCTION**

From time immemorial, mathematics has been an important component in the origin of civilization. From the stone ages, farmers and shepherds used device to check their counting e.g pebbles, shells, stones, sticks, knot on rope, etc. In this modern age of technological advancement of counting, calculation and computation, the teaching of mathematics becomes a crucial aspect of the technological age.

One of the broader aims of secondary education is to equip students effectively in this modern age of science and technology. The bedrock subject in science and technology, which makes this possible, is mathematics. It is as a result of the importance accorded to mathematics, that most States grant special educational favour to students who have aptitude for mathematics.

However, there are indication that even with the best of science students, majority have difficulty in basic mathematics tasks essential for studying and understanding science (Seldon, 1998)

One now begins to appreciate the precarious state in which the nation's scientific and technological changes in the development is as a result of deficiencies in mathematics

especially when one takes into cognizance, the finding of Abone (1986), Agwagah (1993) and Harbor- Peters (2000) that there is a significant general decrease in the level of performance of secondary school students in mathematics with increasing class levels. Although recognition is accorded to mathematics at all levels, it is unfortunate that most students exhibit nonchalant attitude towards the subject (Amoo, 2002). A study conducted by Nigeria Educational Research and Development Council (NERDC, 1997) on the performance of students in public examination over some years has confirmed students' poor performance in physical sciences (Mathematics, Physics and Chemistry) which form the foundation of future work in much of technology needed in Nigeria (Amoo, 2002). The implication of this is that only few citizens of the nation will eventually be left with the task of advancing the nation technologically when a majority of the secondary school students dread mathematics.

There have been criticisms in dailies and periodicals as to why Nigeria is falling behind in technology. In the publication under education in Aburime (2003) and Maduabum & Odili (2006), the continued poor performance in senior secondary school examinations may stunt Nigeria's technological growth. At the national level, out of the 50,000 candidates for Joint Matriculation Examination (JME) in the 1985/ 1986 academic session only 1000 (2%) passed the subject (Ogbonnaya, 1986). This implies that the academic Performance of students in WAEC and JME in mathematics is low.

Several conferences have been held by such professional bodies like the Mathematics Association of Nigeria (MAN) and the Science Teachers Association of Nigeria (STAN), on how to improve the teaching and learning of mathematics in Nigeria. One of such conferences was held by STAN during her 45<sup>th</sup> Annual Conference between 15<sup>th</sup> to 21<sup>st</sup> August, 2004 at St. Patrick's college; Asaba, Delta State. It was termed "Refocusing Research in Science, Technology and Mathematics (STAM) Education (Akale, 2004). In like manner, the Mathematics Association of Nigeria (MAN) launched in Kwara State what is called challenge of Mathematics Education for future Mathematics Education during her 33<sup>rd</sup> Annual Conference held at Ilorin between 2<sup>nd</sup> to 6<sup>th</sup> September, 1996, (Agwagah, 1996).

Despite the attention given to mathematics education in Nigeria by the government and some professional bodies, studies and other evidences have continued to reveal low level of Mathematics achievement by Nigeria secondary school students (Amoo, 2001; Bolaji, 2005; Harbor-Peters, 2000; Kurumeh, 2004 and Obodo, 2002). Harbor-Peters (2000); Kurumeh, (2004) and Obodo (2002) found that students have serious problems when symbolic and geometric representation and models are used to express nature. Among the factors suspected to be contributing to the low achievement in Mathematics in secondary schools are method of teaching, sex, interest etc (Ale, 2002; Agwagah, 1993; NMC, 2009 and Obodo, 1991)

According to Adesua (2016), Ezike & Obodo (1991), Kurumeh (2004) and Ogbonnaya (1986), these factors include the over growing complexity of mathematics, its abstractness, scarcity of properly trained mathematics teachers, poor or non-existent facilities in schools for the teaching of Mathematics, poor foundation at the primary schools level and population explosion in the schools which make individual classroom supervision and teaching difficult. Harbor Peters (2000), Bolaji (2005), NMC (2019) and Adesua (2016), all identified these factors, among other factors as the root cause of poor achievement by Nigeria students. Another important factor, which was identified to have been influencing students' poor performance in secondary school mathematics, is anxiety. According to Nwankwo (1996) and Rossman (2006), test anxiety is among other factors why secondary school student play truancy. They pointed out that test anxiety is known to constitute a big nuisance to some students. A study by Denga cited by Nwankwo (1990), showed that 90 percent of the secondary school students from Kano and Kaduna States ranked test anxiety second among the numerous problems confronting them. With these assertions, it seems that, test anxiety can have adverse effect on the academic achievement of some students in mathematics. One therefore assumes that

students who get pre-occupied with worries and task irrelevant thoughts about test especially during the examination period may or may not perform creditably to the best of their abilities. This is so because, their attention has become polarized between worries and looking out for answers to the questions.

The term anxiety is a psychological construct employed in the description of a state of fear, which borders on uncertainty in the individual. In the learning situation, a little dosage of anxiety is beneficial while an excess of it is detrimental. According to Skemps (1971); a certain amount of anxiety can be useful stimulus, and part of the background of education is to learn to use it as such. To him anxiety may increase subjectively the difficulty of understanding with regard to mathematics. Beston (1996) also pointed out that high anxiety levels might result in responses that would impede performance in learning situations. If the state of anxiety for mathematics is allowed to thrive and grow among secondary school students, the attainment of the much desired scientific and technological advancement may fall.

Anxiety, according to Gerow (1992), is general feeling of apprehension or dread accompanied by predictable physiological changes. Anxiety is an aspect of emotions in which there is fear and uncertainty about the future. It is a nervous feeling caused by fear that something bad is going to happen. Gerow (1992), defined anxiety as unpleasant sensation that is usually experienced as feeling of apprehension and general irritability accompanied by restlessness, fatigue and various somatic symptoms such as headaches and stomachache. He continued by saying, that within the classroom setting, there are numerous sources of anxiety for students: Teachers examination, peers, social relations, achievement setting, what boys think of girls, like and dislike of subjects (interest), and distance from home for younger students. Whatever the cause, whatever the level of anxiety, you can be sure of one thing, anxiety can affect students' classroom performance, especially their test taking (Edebor, 2002).

Test is the question structured to elicit behaviour (Ogbonnaya, 1986). Test means a standard set of questions to be answered. It could be regarded as an instrument for evaluating learning in schools (Nworgu, 2015). He went further to say that test is administered to the testee for determining the extent he had attained previously identified objectives. According to Nworgu (2015), tests are instruments/devices for measurement. They are used to find the quality, value or composition of a process or product. She also said that tests are employed to determine the extent a trait or construct is possessed by a person or group of persons.

Test anxiety is the anxiety aroused in evaluative situations, especially by the variety of tests administered in most educational institutions (Ogbonnaya, 1986). Mathematics test anxiety is the feelings of fear, anxiety and nervousness associated with bodily symptoms that interfere with solving mathematical problems in classes, courses, tests, examination and also in daily activities that may involve mathematical calculation e.g. domestic and business budgeting (Ogbonnaya, 1986; Rossman (2006). According to Rossman (2006), Mathematics Test Anxiety cause one to forget and loose one's self confidence.

The construct test anxiety has been used for some time past to describe the behaviour and emotions of students who find preparing for and taking tests stressful. Hence Elliot, Kratochwill, Cook & Travers (2002) stated that test anxiety is anxiety generated by planning for and taking tests. An anxious child therefore is the one who is unduly concerned about his progress in class, who worries about not understanding what his teacher is saying or what his teacher expects of him, who normally experiences tension when called upon to answer questions and who suffers acute distress before and during school examination (Nwankwo, 2001), However, not all anxieties are natural, rational and useful in motivating learning. Stones (1981) referred to this as anxiety generated by the unfulfilled school task. He stated that when a teacher presented his class with a problem, he upsets their state of psychological equilibrium. To restore the equilibrium the children have to solve the problem because as long as the problem remains unsolved the state of disequilibrium exists and this accompanied by anxiety.

Solution to the problem ends this state and it is satisfying to the children. He went on to say that emotional difficulties caused by anxieties would be more serious for the backward than for the normal child. Anxiety caused by fear of the teacher, of being in a strong room for an examination will tend to act as an inhibitor of a child's activity.

Furthermore, school failures causing heightened emotionality could lead some adolescent commit suicide, leave home and sometimes give up education (Edebor, 2002). On the effect of students' emotion in Mathematics, Kuhlen in Chanhan (1985), reported a research study on the effect of emotional tension. In his report, he stated Kuhlen found out that individual cannot reasons, think and concentrate on a problem because of emotional tension, which negatively affect the academic achievement of students in mathematics.

Achievement, according to the New International Webster's Comprehensive Dictionary of the English Language (2003), is the act of accomplishment or attainment of educational goal. It is performance through a standardized test for measuring an individual's progress in the mastery of a subject to be learned. Performance itself is the act of execution, completion and exhibition of feat.

In Nigeria, the Mathematical Association of Nigeria (MAN), has been facing the challenge of improving Mathematics achievement in Nigeria Secondary Schools. At MAN Silver Jubilee conference, Aburime (2003), identified teaching problems, negative attitude and examination difficulties as some of the root causes of poor performance in Mathematics.

The above information shows the degree of blame by students on three main areas for their poor Performance in Mathematics. Indeed, it is believed that secondary schools are important determinants of the quality of students who go into tertiary level of education. It is therefore necessary that the factors that affect the learning of science generally and mathematics in particular be improved upon from year to year to ensure adequate supply of suitable candidates for training in the scientific and technology professions in various institutions of higher learning.

Fakuode and Abata (1988), stated that for the children to enjoy mathematics, the teacher needs to plan a lot of activities for the children to perform as this is the only way by which one can capture their attention and make them interested in learning activity. According to Agwagah (2001), Ali (1994) and Maduabum & Odilli (2006) there are several ways mathematics learners can enjoy mathematics. He gave three of such way as: the use of teaching aids to drive home certain points and concepts, and the drawing of students' attention to the usefulness of mathematics to other subjects and to its everyday practical applications. All these ways involve activities.

Clearly related to achievement in learning activity is interest. Ubulom (1997), defined interest as a feeling of likes and dislike towards an activity. Thus interest concerns preferences for particular types of activities that are the tendency to seek out and participates in certain activities (Agwagah, 1993). According to Harbor-Peters (2001), interest is subjective feeling of concentration of curiosity over something. In reviewing affective factors in mathematics learning, Suydamn and Weaver (1975), wrote, "Teachers and other mathematics educators generally believe that children learn effectively when they are interested in what they learn and they will achieve better in mathematics if they like mathematics".

According to Aburime (2003), in addition to MAN, a good number of researchers and academic authorities have shown interest in improving the persistently low mathematics achievement in Nigeria secondary schools. They include: Agwagah (1993); Aburime (2009); Harbor- Peters (2001); Kurumeh (2004); NMC (2009); Obodo (2002); Ogwoma, Metibemu & Okoye (2016) and Okubodejo (2001), to name only a few ones. Some of them expressed a strong feeling that, important as mathematics in the National curriculum and National development, persistent poor achievement in mathematics ought to be checked as a matter of urgency.



Interest, is regarded as learned responses, which provide set or readiness for behaviour (Nwachukwu, 1999). He classified interest either as a trait or attitude. Trait is explained as an individual characteristic in thought, feeling or act inherited or learned. Attitudes are expressed as desires, needs, opinions, sentiments, prejudices, interest etc. Interest involves a combination of what we would like to achieve and how confident we feel about achieving it, making the competence component of a child's self esteem (Harter, 1988). Stipek (1992), in this way opined that academic components or academic interest is the part of self-esteem involving children's responses of their academic abilities.

A major determinant of children's academic interest is of course, their academic performances. Children who do well in school are likely to develop high opinions of their competence, as poor performances are likely to develop low opinions (Harbor-Peters, 2001 and Ubulom, 1997). They also put more light by saying that when children are unsuccessful at a task they may attribute their failure to lack of effort, a lack of ability or both, which attribution they make can be very significant. When children attribute their failure to lack of effort, the failure usually has little impact on their feelings of academic competence and academic interest. An important component of interest is a feeling of competence while academic interest represents the child's feeling of competence in the classroom and it can be affected by feedback regarding failure (Elliot *et al*, 2002). They finalized by saying that academic interest influences children's academic achievement.

It is equally reported that academic achievement affects interest of adolescent. Children's academic interest generally is highest in Kindergarten and steadily decline through at least fourth grade (Edebor, 2002). This probably could be as a result of the fact that older children resort to bragging (Ruble and Frey, 1987), probably because of their maturity in solving mathematical problems. Academic interest is affected by feedback that leads children to attribute failure to insufficient effort. This may have little effect on their subsequent motivation. But feedback leading children to attribute failure to insufficient ability can lower their expectation of success to such an extent that they may eventually fail even in easy task - a phenomenon called learned helplessness (Nwachukwu, 1999 & Rossman, 2006).

### **Statement of the Problem**

The influence of some variables in the propagation of students' phobia and anxiety for mathematics seem not to be clear to mathematics teachers and educators with the result that such variables continues to contribute to the development of test anxiety as the students are given test on the subject. It has been reported that slight anxiety in relation to the solving of a problem may keep learning, while anxiety produced by other factors such as fear will tend to act as inhibitor to learning. Such negative anxiety could lower the academic achievement of students and decrease their self-esteem. Children with anxiety are helpless, uncertain and afraid of failure.

It is established by research that students do not perform well in mathematics. They do not show more interest in mathematics. Many researchers like Aburime (2009), Aburime (2003), Agwagah (2001), Amoo (2002), NMC (2009), Okubodejo (2001) and Rossman (2006) employed various methods of interest in solving the problem of poor performance in mathematics. These include games, simulation and other activity methods of teaching that will make students develop interest in mathematics which can help to solve the problem of low performance in mathematics. Some students perform fairly well in their continuous assessment and show positive interest in mathematics. Some show interest in mathematics during final examination but their performance is poorly low.

The problem of the study is, could it be Mathematic test anxiety that is influencing the students' poor performance in mathematics (or test anxiety and interest in examination)? The provision of the answer to this question is therefore the major concern of this research. There is therefore

the need to find out the relationship among Mathematics test anxiety, academic achievement and interest of students in Senior Secondary School Mathematics in Rivers State.

### **Purpose of the Study**

The purpose of this study was to determine the “Relationship among Test Anxiety, Academic Achievement and Interest of Students in Senior Secondary School Mathematics in Rivers State”. Specifically the researcher seeks to:

- (1) Find out the relationship between test anxiety and academic achievement of students in senior secondary school mathematics in Rivers State.
- (2) Determine relationship between test anxiety and interest of the students in senior secondary school mathematics.

### **Research Questions**

In this study, the researcher will attempt to provide answers to the following research questions:

1. What is the relationship between test anxiety and academic achievement of students in senior secondary school mathematics?
2. What is the relationship between test anxiety and interest of students in senior secondary school mathematics?

### **Null Hypothesis**

Two null hypotheses were tested at 0.05 alpha levels in order to make decision in the issues investigated.

1. There is no significant relationship between test anxiety and academic achievement of students in Senior Secondary School Mathematics.
2. There is no significant relationship between test anxiety and interest of students in senior secondary school mathematics.

### **Method**

The design for the research was purely correlational survey. The study established the nature of relationship between the criteria variable (students’ test anxiety) and the predictor variables, which are the academic achievement, and interests of senior secondary school mathematics students. To support this Nworgu (2015), stated that correlational survey study is the type of study that seeks to establish what relationship exists between two or more variables. He further said that it indicate the direction and magnitude of the relationship between the variables. They employ a special group of statistics known as correlational coefficient for data analysis.

### **Area of Study**

The study was conducted in Rivers State of Nigeria. This State consists of 23 local Government Area, which are Abua/Odual, Ahoada-East, Ahoada-West, Akuku-Toru, Andoni, Asari-Toru, Bonny, Degema, Emohua, Eleme, Etche, Gokana, Ikwerre, Khana, Obio/Akpor, Ogba/Egbema/Ndoni, Ogu/Bolo, Okirika, Omumma, Opobo/Nkoro, Oyigbo, Port Harcourt and Tai Local Government Areas. The justification of choosing the areas was informed by the fact that the researcher is quite conversant with the area.

### **Population for the Study**

The population for this study consisted of all the male and female students in senior secondary two (SSII) in all the public secondary schools in Rivers State. They were three thousand, one hundred twenty (3120) in number in the year 2005 when the study was conducted.

### **Samples and Sampling Techniques**

A sample of three hundred and sixty (360) Senior Secondary Two (SSII) mathematics students (180 males and 180 females) was used for the study. The simple random sampling technique through simple balloting was used to draw samples for the study. Out of the 23 Local Government Areas (LGAs) in Rivers State, the researcher randomly selected only 6 LGAs where 3 of such LGAs were from the urban areas and the other 3 LGAs are from the rural areas. In each of these LGAs, two public secondary schools that are co-educational were randomly chosen. From each school, 30 SSII mathematics students (15 males and 15 females) were also selected because the researcher was interested in the correlation between the anxiety and interest and academic achievement of male and female students. The researcher used the simple random sampling through simple balloting because all the LGAs, secondary schools and students have the characteristics of the population, and secondly to avoid selection bias.

### **Instrument for Data Collection**

The three major instruments used in gathering data for the study were: Mathematics Test Anxiety Scale (MTAS), Mathematics Interest Inventory (MII) and Mathematics Achievement Test (MAT). The Mathematics Test Anxiety Scale is a 20 items questionnaire constructed by the researcher to measure mathematics test anxiety. This was a 4-points of likert type scale. For the MTAS, the students were requested to indicate their level of agreement or disagreement with various items. The MTAS comprised two sections. Section A elicits the personal data of the students while section B measured the students' anxiety. The scoring of the instrument were in this order: Strongly Agree (SA) - 4, Agree (A) - 3, Disagree (D) – 2 and Strongly Disagree (SD)- 1. The mean score is 2.50. Values from 2.50 and above show high anxiety, which leads to low academic performance. The total scores obtained by each student were considered as an index of this students' anxiety level for mathematics.

The Mathematics Interest Inventory (MII) is a 20 items questionnaire developed by the researcher for the establishment of the index of each student's interest to mathematics. The MII is four points likert type of scale ranging from Strongly Disagree (SA) to Strongly Disagree (SD). The positive Interest were given scores of 4, 3, 2 and 1 for SA, A, D and SD respectively. While the order were reversed for negative interest statement that is; SD, D, A and SA, for 4, 3, 2 and 1 respectively.

The Mathematics Achievement Tests (MAT) is a 20 items test of mathematics ability. This instrument was constructed by the researcher and used for this study. The instrument is a 5-points rating scale ranging from Outstanding (Excellent) to Not-satisfactory (fail). The scoring of the instrument is as follows: 70% -100%: 5-Outstanding (Excellent), 60%-69%: 4- Above Average (Very Good), 50% - 59%: 3- Average (Good), 40% - 49%: 2- Below Average (Pass) and 0% - 39%: 1- Not- satisfactory (Fail). All the percentage scores were converted to 5- points rating scale. The mean score is 3. A value from 3 and above implies high academic achievement and scores below 3 implies low academic performance.

### **Validation of the Instrument**

Copies of the Mathematics Test Anxiety (MTAS), Mathematics Interest Inventory (MII) and Mathematics Achievement Test (MAT) were sent to two specialists in Mathematics and two experts in measurement and evaluation of the Department of Science Education University of Nigeria, Nsukka for face and contents validation. These resource persons were requested to vet items of the instrument in terms of clarity of items (words), simplicity of vocabulary and relevance of items to the study. The mathematics teachers vetted items of MAT in term of difficulty and plausibility of the distracters in addition. All their comments and recommendations were incorporated in the final version of MTAS, MII and MAT.

### **Reliability of the Instrument**

On the reliability of the instruments used in gathering data for the study, reliability coefficients of the MTAS, MII and MAT were established with the use of test-retest techniques. The researcher administered copies of the instrument to 30 SSII mathematics students in public secondary schools, which were not used in the main study. After two weeks, these students were re-administered with the same instruments. The data generated in these two administrations of the instruments were respectively used in computing test-retest reliability coefficients for them. Pearson's Product Moment Correlation( $r$ ) was used and the coefficients obtained for anxiety section was 0.84 while that for interest section was 0.87. For Mathematics Achievement Test, the instrument is considered to have high construct validity because its content is composed of mathematics exercise. The instrument also passed through my supervisor. The test-retest reliability coefficient of the instruments was computed by employing the Pearson's Product Moment Correlation Coefficient ( $r$ ). The value obtained from this computation was 0.81 and therefore the research instrument was considered to be reliable in eliciting of the students' aptitude and ability for mathematics.

### **Method of Data Collection**

In collecting data for this study, the researcher went personally to the 12 secondary schools involved in the study and administered copies of the MTAS, MII and MAT to the students. The Mathematics Test Anxiety Scale (MTAS) was administered first, followed immediately by Mathematics Interest Inventory (MII) and finally by Mathematics Achievement Test (MAT). The reason for this is that the achievement test with its content is likely to arouse anxiety in the students thus increasing the chances of students' objective report of their level of anxiety-feelings. All the copies administered were collected back at the spot. The students' responses were then scored and the data generated were collected for statistical analysis.

### **Method of Data Analysis**

The methods of Data Analysis for the study were analyzed as follows;

- (1) Research questions 1 and 2 were analyzed with Pearson's Product Moment Correlation Coefficient ( $r$ )
- (2) The two null hypotheses were tested at 0.05 alpha-level with t-test (all the correlation coefficient i.e. value were transformed to the t-statistics) in order to test for significant.

### **Results**

**Research Question One:** *What is the relationship between Test Anxiety and Academic Achievement of Students in Senior Secondary School Mathematics?* Data collected for this research question were analyzed using Pearson Product Moment Correlation ( $r$ ) and results obtained were summarized in Table 1.

Table 1 showed that the correlation coefficient obtained for the students' test anxiety ( $x$ ) and the academic achievement ( $y_1$ ) was 0.71. This means that the relationship between students' test anxiety and their academic achievement was high and positive one.



**Table 1:** Test of significance of the relationship between students' Test Anxiety (x) and Academic Achievement (y<sub>1</sub>).

Variable	$y_1$ x	$y_1$ $\bar{x}$	Sdy <sub>1</sub> sdx	Se	r-cal	t-cal	t-crit	Result	Decision
Academic Achievement (y <sub>1</sub> )	18438	51.13	16.09						
Versus (x, y <sub>1</sub> )				1.6703	0.71	2.22	1.960	Sign	Rejected
Students' Anxiety (x)	17074.8	47.43	27.30						

Sample (n) = 360      ( $\alpha$ ) = 0.05      Df = 718

**H<sub>0</sub>1:** *There is no significant relationship between test anxiety and academic achievement of students in secondary school mathematics.* The data collected for testing the null hypothesis were analyzed using Pearson Product Moment Correlation (r) and the correction coefficient obtained was converted to a t-test statistics in order to test for its statistical significance. The means and standard deviations of each available was also obtained as summarized in Table 1 above:

Table 1 showed that the correlation coefficient (r) obtained for the students' test anxiety and their academic achievement was 0.71. This means that there is a high positive relationship between the two variables (anxiety and academic achievement). In order to determine whether there was a significant relationship, the correlation co-efficient value of r = 0.71 was converted to a t-test statistic. The t- value of 2.22 was obtained which was greater than the critical t- value of 1.96 at degree of freedoms (df) = 718 and 0.05 level of significance. The null hypothesis was rejected. This means that there was a significant relationship existing between students' test anxiety and their academic achievement

**Research Question Two:** *What is the relationship between test anxiety and interest of the students in senior secondary school mathematics?* The data collected for this research question were analyzed using Pearson Product Moment Correlation (r) and the results obtained were summarized in Table 2 below.

Table 2 showed that the correlation coefficient obtained for students' test anxiety and interest was 0.79. The result therefore showed that there is a very high positives relationship between students' test anxiety and students' interest in mathematics.

**Table 2:** Test of Significance of the relationship between Students' Test anxiety (x) and interest (y<sub>2</sub>)

Variable	y <sub>2</sub> x	$\bar{y}_2$ $\bar{x}$	Sdy <sub>2</sub> Sdx	S <sub>e</sub>	Cal r	t-cal	t-crit	Result	Decision
Students' interest [(y) <sub>2</sub> ]	26344.8	73.18	22.02						
Version(x, y <sub>2</sub> )				1.8436	0.79	13.93	1.960	Sign	Rejected
Students anxiety (x)	17074.8	47.43	27.30						

Sample (n) = 360, ( $\alpha$ ) = 0.05, Df = 718

**Ho. 2:** *There is no significant relation between test anxiety and interest of students in Senior Secondary School Mathematics.* The data collected for testing this null hypothesis were analyzed using Pearson Product Moment Correlation (r) and the results obtained was converted to a t-test statistic to determine its statistical significance. The result of the analysis was summarized in Table 2 above. As showed in Table 2 above, the calculated r-value 0.79 was converted to t-test statistic to test the statistical significance. The calculated t-value was 13.93 which was greater than the critical t-value of 1.96 at degree of freedom (df) = 718 and 0.05 level of significance. The null hypothesis was rejected. This means that significant relationship exist between the students' test anxiety and students' interest.

## Discussion

*Relationship between test anxiety and academic achievement of student in Senior Secondary School mathematics:* The result of this study showed that there was a significant relationship between test anxiety and academic achievement of students in senior secondary school mathematics. This means that there is a high positive relationship between students' test anxiety and their academic achievement. The positive relationship between the students' test anxiety and their academic achievement means that as scores on test anxiety increases there is corresponding increases in academic achievement. This is an indication that the high anxiety person is hungry for success.

Nevertheless, the degree of association between students' test anxiety and academic achievement was found to be 0.71 while percentage of association ( $r^2 \times 100$ ) was found to be 50.4%. The coefficient of alienation ( $1-r^2$ ) was found to be 0.50. This represents the degree of lack of association between students' test anxiety and the academic achievement. Indeed the relationship between students' test anxiety and academic achievement was statistically significant. Their magnitude of relationship was high and percentage of predication of the one variable from other was also high.

The finding of this present study was in agreement with the conception of Mgbajiaka (1998) who conducted a researched in mathematics using a sample of 600 SSII mathematics students. After analysis, she found out that there is a positive and significant relationship between students' academic achievement, in mathematics test and their mathematics test anxiety. The higher students' are in their mathematics achievement, the greater their mathematics test anxiety. The result of the study was in line with that of Adesua (2016) who investigated the relationship between school facilities and teachers job performance in selected Secondary Schools in Shomolu LGA in Lagos State. A total of 120 respondents comprising of 60 male

and 60 female teachers were sample for the study. The result shows that there was a significant relationship between school facilities and teachers job performance in the schools.

The result of the study is contrary to the finding of Spielberg and Katzenmeyer and Korchin and Levine in Mgbajiaka (1998). There was a consensus among these investigators that there is a negative correlation between test anxiety and academic achievement. High scores on test anxiety scale were associated with low academic achievement, while low test anxiety scores associated significantly with high academic achievement.

It should be noted here however, that these researchers' samples much have been composed of subjects with debilitating (excessively high) test anxiety and those with facilitating (very low) test anxiety. This is different from the sample of the present work in which subject have relatively low test anxiety.

The first result also disagrees with the finding of Denga in Mgbajiaka (1998). Denga in his study found that test anxiety is negatively related with students' academic achievement. Denga observed that excessive anxiety turns students off and make them to keep postponing study. Rather than thinking of solutions to the test items, the over anxious students wonder and worry about the consequences of failure. This make them to perform poorer when compared with those who are not over- anxious.

*Relationship between test anxiety and interest of Senior Secondary School Students' in Mathematics:* There was a positive relationship between test anxiety and interest of students in Senior Secondary School Mathematics. When a t-test statistic was applied it was found to be statistically significant. This means that students' who has high anxiety in mathematics tend to increase their interest as well. This means that students' with higher (positive) interest to mathematics scores have higher mathematics test anxiety scores than those with lower (negative) interest to the subject. Nevertheless, the degree of association or linkage between anxiety and interest was found to be 0.79 and the percentage of association ( $r^2 \times 100$ ) was 62.41%. This indicates the magnitude of their association showing a very high relationship between the two variables anxiety and interest. The degree of their lack of association is 0.38 while the percentage reduction in error of prediction ( $r^2$ ) for anxiety and interest was found to be 0.62. In a nutshell, the relationship between anxiety and interest was statistically significant. The magnitude of the relationship was high, and percentage of prediction of the variable from another was also high. This finding has clearly shown that students' with positive interest to mathematics are more anxious than those with negative interest to the subject with respect to mathematics test anxiety. The result surprised the researcher because ordinarily one would expect students' with positive interest to a particular subject to be less anxious during test on that subject when compared to students' who have negative interest to the subject.

The result is in line with some theoretical propositions and empirical discoveries of Freud (1936) and Liebert and Morris (1967). They postulated that anxiety is composed of physiological (Worry or Cognitive) and emotional responses. A student with positive interest to mathematics tends to view mathematics test as external worry or threat. An exhibition of anxiety is an internal emotional response, which the students' adapts to compact with the threat worry or danger (mathematics tests) in order to maintain his positive (good) interest for the subject. On the contrarily, a students' with negative interest to mathematics does not see mathematics tests as threatening stimulus, which calls for the expression of anxiety in order to solve. Passing or failing mathematics test is of little or no value to this type of students. This accounts for why students with higher positive (better) interest to mathematics have higher mathematics test anxiety, vis-à-vis their counterparts with negative interest to mathematics.

The findings was however similar to Ubulom (1997), who establish a magnitude of correlation coefficient between anxiety and interest using a sample of 150 students' (75 females and 75 males) from the Department of Business/Secretarial studies who are Bachelor of Secretarial Education (B.Ed) options. According to him anxiety is aroused in a child by any social

situation, which tends to make them fearful. Mathematics test is a greater fear inducing and anxiety eliciting social influence or situations with positive interest to mathematics than children with negative interest to mathematics. Students who have high positive interest to mathematics show high facilitating anxiety for mathematics test. He also found that a child who is not rewarded, appreciated and made to feel confident early in life would develop a negative interest in him and invariably have a high anxiety trait. According to Mgbajiaka (1998) students who have positive (good) interest to mathematics show high facilitating anxiety for mathematics test. In other words, children with good interest to mathematics fear whatever that could smear their good interest for the subject. Such fear arouses mathematics test anxiety in mathematics.

The result under discussion is contrary to the work to Skemps (1971). Skemps review some literature on the relationship between mathematics anxiety and interest to mathematics. He concluded that students' with positive interest to mathematics have less anxiety on the subject, and that anxiety has negative correlation with mathematics achievement.

### **Conclusion**

It has been established that there is a positive relationship among test anxiety, academic achievement and interest of students' in Senior Secondary School Mathematics in Rivers State. The implication of the findings is that government, teachers, parents and all other stakeholders in education of children should work together towards enhancing the academic achievement of student in mathematics to meet the required standards in future academic work and the scientific and technological development of Nigeria.

Based on results and findings of this research work, the researcher therefore advocates that adequate career education should be given to the general public so that further positive interest towards mathematics would be developed. The career education will also assist the general public to avoid discriminating among careers or programme of studies.

Government should employ qualified teachers, train more teachers, and provide facilities for better teaching and learning and some challenging environment for both teachers and students' to exhibit their competences. Parents should provide adequately for effective and efficient achievement in mathematics.

Mathematics teachers as well as the students' of mathematics should always to be confident of themselves and therefore develop high level of interest. They should not feel inferiors before others so that they would be able to improve their standard of academic achievement.

Mathematics teachers should see themselves as the makers or trainers of qualify standard graduates as products. They should adopt appropriate teaching strategies to encourage students to study mathematics. The curriculum of mathematics should be made integrative, such that all aspects of mathematics are reflected fully. Books should be equally written to reflect these contents. If these graduates should have high level of academic achievements, the implication is that they have received high level of quality training. By so doing, they will be able to contribute significantly towards the development of our national economy.

### **Recommendation**

1. Based on the educational implications of the findings of this study, the researcher had made the following recommendations:-  
Since the result of the study reveals that majority of mathematics students have high-test anxiety with high level of academic achievement, it is recommended that teachers should minimize the way they threaten, embarrass and intimidate their students. They should create good rapport within the students.
2. Based on the result that majority of students have positive interest towards mathematics with high level of academic achievements scores, it is recommended that campaign

should be intensified so that more people would be aware of the importance of course of the study.

3. The state government and professional bodies should regularly organize seminars, symposia and workshop for mathematics students in other to minimize their anxiety rate so as to achieve high standard of education.

### Limitations of the Study

This study has some limitations:-

- (1) Inadequate sample: Out of 3120 SS II mathematics students only 360 students were used as respondents for the study.
- (2) The use of students' self-rating inventory. This may probably leads to the introduction of error responses, which may be different from the opinions of the respondents.

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