RELATIONSHIP BETWEEN ANXIETY DISORDERS AND ACADEMIC ACHIEVEMENT IN MATHEMATICS AMONG SENIOR SECONDARY SCHOOL STUDENTS' IN NASARAWA WEST SENATORIAL ZONE, NASARAWA STATE, NIGERIA

by

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Abstract
The study investigated the relationship between anxiety disorders and academic achievement in mathematics among senior secondary school students' in Nasarawa State. The study adopted correlational survey research design. The sample for the study consisted of 361 students randomly selected from two randomly selected secondary schools in each of the five local government areas that make up of West Senatorial Zone of Nasarawa State, Nigeria. Two research instruments were used by the researchers to collect data for the study. The Anxiety Disorder Questionnaire(ADQ) constructed by the researchers and Mathematics Achievement Test (MAT). Three hypotheses were postulated to guide the study. Data collected were analyzed with Pearson Product Moment Correlation Coefficient statistical tool and the results held significant at 0.05 alpha level. The findings revealed that anxiety disorder, generalized anxiety disorder and social anxiety disorders had significant relationship with students' academic achievement in mathematics. On the basis of the findings, it was recommended that teachers should employ different strategies that would reduce anxiety disorder toward students' academic achievement in mathematics. Students-centered techniques such as frequent testing and assignments should be given to reduce students test anxiety in mathematics.

Key words: *Anxiety disorders, Social anxiety, Generalized anxiety and Academic achievement*

Background to the Study

Test and examinations at all stages of education, especially at the secondary education level, have been considered an important and powerful tool for decision-making in our competitive society, with students of all ages being evaluated with respect to their achievement, skills and abilities. Zollar and Ben-chain (2010) posited that the era in which we live is a test-conscious age in which the lives of many people are not only greatly influenced, but are also determined by their test achievement. Students consistently perceive examination as a source of increased anxiety and a situation engulfed with uncertainty/unfairness in letting them demonstrate their true achievement (Spielberger, 2005). Such feelings among students limit their potential achievement during the test situation, resulting to higher test anxiety and directly causing a drop in the students' achievements.

Over the years, research effort had been focused on the factors that influence academic achievement of students at the secondary level of education in Nigeria. The performance of students at public examination has always been used to indicate the level of effectiveness and quality of schools in Nigeria. Such feelings among students limit their potential achievement during the test situation, resulting to higher test anxiety and directly causing a drop in the student achievements. Therefore, test anxiety can be seen as a measurement error that accompanies the assessment of students achievements since tests are not meant to measure students achievement under intimidating situation but to know their level of achievement in an environment fair enough to let them demonstrate their abilities to the fullest.Test anxiety is bound to manifest among students anytime a test is sequenced. Indeed, moderate anxiety is necessary to motivate excellent performance, but anxiety prompted by lack of preparedness for test has damaging effects on learners (Robinson, 2015). When individuals are pressurized to make high scores in a test, their anxiety is bound to increase (Simpson, Parker, & Harrison, 2013). Nelson and Harwood (2011) found that individuals with high levels of anxiety tend to do worse on cognitive Mathematics tests.

Mathematics is a key subject in the school curriculum, because knowledge gained becomes indispensable to man. Any educational programme designed to meet the demands of the current educational philosophy that omit mathematics from its content will be fundamentally incomplete (Lawani, 2006). Surprisingly, despite the great importance of mathematics coupled with the efforts by the government to improve students' academic achievement in this key subject (through the provision of school materials, and employment of more qualified teachers among others), the external and internal school examination results in the subject in the last two decades reveals poor performance of secondary school students.

The future role of mathematics for science, engineering and technology is indisputable as it is the foundation upon which breakthrough is based. This is illustrated by dramatic advances in communications, bioinformatics, the understanding of uncertainty and dealing with large data sets. (Chen, 2003). The 21st century is going to witness greater opportunities for mathematical sciences, Mathematical thought and concepts will become the primary navigational tools in the data driven world (Chen, 2003). As a result of the technological advancement in today's societies, mathematical knowledge has become essential for the success of individuals and for the progress and security of nations.

Despite the importance of mathematics in life and in the study of other science subjects, there has been a decline in achievement of students especially at external examinations. This implies that it is only an average of 38.33% percent of candidates that sat for West African senior school certificate examination (WASSCE) annually that would have opportunity of competing for placement in higher institution, provided they possess necessary subject combination.The West African Examination Council Chief Examiners Report (2007-2015) as well as the statistics of WAEC

results (2007-2015) buttress this point. For instance, among 1,275,330 students that sat for the May/June West Africa Senior School Certificate Examination (WASSCE) in 2007, only 325,754 candidates obtained credit and above in Mathematics and three other subjects, thus representing 25.54% of the total number of candidates that sat for the examination. These are the only candidates who could use the result to advance to higher level, provided they had other relevant requirements.

The report presented by Adenipekun, (2018) revealed that the percentage of failure in mathematics in the past seven years exceed that of the percentage of credit level. The revelation of Adenipekun(2018) indicates that Mathematics had the lowest performance in Senior Secondary School Certificate Examination results. This is an indicator of decline in quality.

The poor performance of students in mathematics is a source of concern to many stakeholders. Many factors have been identified to be responsible such as students' attitudes, teachers' method of teaching, inadequate teaching and learning facilities among others. However, some students perform poorly in mathematics not because of lack of understanding but as a result of anxiety disorders manifests in individuals and interfere in the school performance, especially, in mathematics.

Anxiety disorder is a mental disorder characterized by significant feeling of anxiety and fear as the main underlying disorder which affects students' academic achievement in mathematics. Anxiety is said to be abnormal, when it interferes with the individual's normal productive activities. It should be noted that fear and stress is beneficial to students because it is a necessity for the survival of academic rigours. Anxiety becomes a disorder when there is excessive or inappropriate state of arousal characterized by feeling of apprehension, uncertainty or fear.

Generalized Anxiety Disorder is a condition where individual students live each day in a state of high tension, feeling uneasy and tends to overreact even in mild stresses. Students with this generalized anxiety disorder finds it difficult to concentrate, instead worries about potential problems in performing very good in Mathematics achievement in schools. Data from the Early Developmental Stages of Psychopathology (EDSP) study revealed a cumulative incidence for GAD as 4.3% at age 35years with relatively few onsets observed in childhood, and the core incidence period being in adolescence and young adulthood. This is very common to adolescents especially on tasks that required figure and calculation. Difficulty in concentration and high state of worry among the anxious student will reduce their academic in mathematics, since mathematics is the subject that deal with manipulation of numbers and solving mathematics problem in variety of life and academics situation, GAD cause one to forget and lost concentration and self-confidence these will contribute a vital role in poor academic achievement in mathematics among secondary school students. It is against this background that this study is interested in determining the relationship between anxiety disorder and students' academic achievement in mathematics among senior secondary students in Nasarawa West Senatorial Zone of Nasarawa state, Nigeria.

Statement of the Problem

Pressure of scoring high in tests, fear of passing/failing a course, environment of the examination hall and lack of clarity in instruction for students are some of the reasons for test anxiety in students. High level of anxiety disorder has a damaging effect on students" academic achievement in Mathematics. Over the years the student's achievement in mathematics is increasingly ridiculous, worrisome and discouraging. This poor performance has been a source of serious concern to all and sundry since no meaningful technological breakthrough can be achieved without mathematics. Despite all the noble efforts by the mathematics teachers/parents, the academic performance of students in Mathematics is still poor. Many reasons have been advanced for this occurrence such as students' negative interest and attitude towards mathematics, poor motivation on the part of mathematics teachers resulting into poor method of teaching to lack of parental monitoring. In relation to these alarming problems resulting to poor performance in SSCE Mathematics thus: Report by WAEC Chief Examiner's Report, May/June 2012 to 2018 WASSCE result, showed massive failure in Mathematics for the period. 6,356,981 candidates sum total for six years.In summary, the percentage of students with credit passes and above in Mathematics between 2012 and 2018 did not exceed 25.99%, 125,754 (25.5%) passed Mathematics subjects while in 2013, 188,442 (13.76%) passed Mathematics out of 1,369,442. In 2014-2015, out of 1,373,009 candidates, 356,981 (25.9%) passed.This implies that it is only an average of 38.33% percent of candidates that sat for West African senior school certificate examination (WASSCE) annually that would have opportunity of competing for placement in higher institution of learning, provided they possess necessary subject combination. Most researches focused on test anxiety as a determinant of students' achievement, others examined mathematics anxiety as the determining factor of student's academic achievement in general. No concerted efforts have been done on how anxiety disorders contribute to students' academic achievement in mathematics in senior secondary schools. Consequently, it is against this background that this study investigatedthe relationship between anxiety disorders and students' academic achievementin mathematics among senior secondary students in Nasarawa West Senatorial Zone of Nasarawa state, Nigeria.

Objectives of the Study

The main objective of the study is to find out the relationship between anxiety disorders and students' academic achievement in mathematics among senior secondary school in Nasarawa west senatorial zone, Nasarawa State. Specifically, the objectives are to:

1. Find the relationship between anxiety disorder and students' academic achievement in mathematics
2. Find the relationship between generalized anxiety disorder and students' academic achievement in mathematics
3. Determine the relationship between social anxiety disorder and students' academic achievement in mathematics

Research Questions

The following questions were raised for the study:

1. What is the relationship between anxiety disorder and students' academic achievement in mathematics?
2. What is the relationship between generalized anxiety disorder and students' academic achievement in mathematics?
3. What is the relationship between social anxiety disorder and students' academic achievement in mathematics?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. Thereis no significant relationship between anxiety disorder and students' academic achievement in mathematics
2. There is no significant relationship between generalized anxiety disorder and students' academic achievement in mathematics.
3. Thereis no significant relationship between social anxiety disorder and students' academic achievement in mathematics

Methodology

Research Design: The study adopted correlation survey research design. Correlational survey according to Emaikwu (2012) is one in which a group of people or items are studied by collecting and analyzing data from a few people considered to be a representative sample of the entire population. This design is considered suitable because data was collected from Ss1students on anxiety disorder and correlated with their academic achievement in mathematics.

Population, Sample and Sampling Techniques: The population of the study comprised of senior secondary (SS1) students totaling 4520 in Nasarawa West Senatorial Zone (Karu, Keffi, Kokona, Nasarawa and Toto local Government) of Nasarawa State, Nigeria. SS1 students have been chosen for this study because the class is the beginning of another system of education after completion of upper basic education. This class is the foundation of the senior secondary classes and it is expected that it is at this level that the students normally develop anxiety disorders for mathematics because of the calculations.

The sample size consisted of 361 students randomly selected from two randomly selected secondary schools in each of the five local government area that make up Nasarawa west senatorial zone of Nasarawa state, Nigeria.

Instruments: Two instruments were used by the researchers for data collection. A questionnaire designed by the researchers tagged: Anxiety Disorders Questionnaire(ADQ). The ADQ has two sections A and B. Section A sought for biographic information of the respondents,while section B has 20statements. Items 1-10 dealt with generalized anxiety disorders; items 11-20 sought information on

social anxiety disorders. All the 20 items measured anxiety disorders as a whole. All the items were patterned on a 4points scale ranging from always, sometimes, rarely to not at all.To determine the student's academic achievement in mathematics, the researchers constructed 20 multi choice objective items in mathematics in line with the syllabus and scheme of work of SS1 third term mathematics. The items were selected from past WAEC questions, at the same time; item analysis of test refinement was conducted to determine both the difficulty index and discriminating power.Chronbach alpha was used to determine the reliability of the instrument which yielded coefficient .850. This means that the instrument is reliable for the study. The test re-test reliability of achievement test in mathematics was 0.82.

Results

$H_0$1: there is no significant relationship between anxiety disorder and students' academic achievement in mathematics.

Table 1: Relationship between anxiety disorder and students' academic achievement in mathematics

		Anxiety disorder	Mathematics achievement
Anxiety disorder	Pearson correlation		0.48
	Sig (2-tailed)		.02
	N	361	361
Mathematics achievement	Pearson correlation	0.2	1
	Sig (2-tailed)	0.48	
	N	361	361

Table 1 indicates that the results is significant (r=0.48,P=.02< 0.05). Hence the null hypothesis is rejected while the alternate hypothesis is accepted. This means that there was a significant relationship between anxiety disorder and students' academic achievement in mathematics.

$H_0$2: there is no significant relationship between generalized anxiety disorder and students' academic achievement in mathematics

Table 2: Relationship between generalized anxiety disorder and students' academic achievement in mathematics

		GAD	Mathematics achievement
GAD	Pearson correlation	1	0.70
	Sig (2-tailed)		000
	N	361	361
Mathematics achievement	Pearson correlation	0.070	1
	Sig (2-tailed)	0.000	
	N	361	361

Table 2 indicates that the results is significant (r=0.70, P=0.00 < 0.05). Hence the null hypothesis is rejected while the alternate hypothesis is accepted. This means that there was a significant relationship between General anxiety disorder and students' academic achievement in mathematics.

$H_0$3: there is no significant relationship between social anxiety disorder and students' academic achievement in mathematics

Table 3: Relationship between social anxiety disorder and students' academic achievement in mathematics

		SAD	Mathematics achievement
SAD	Pearson correlation	1	**.37**
	Sig (2-tailed)		**.011**
	N	361	**361**
Mathematics achievement	Pearson correlation	0 .37	**1**
	Sig (2-tailed)	0 .011	
	N	361	**361**

Table 3 indicates that the results is significant (r=0.37, P=0.011 < 0.05). Hence the null hypothesis is rejected while the alternate hypothesis is accepted. This means that there was a significant relation between social anxiety disorder and students' academic achievement in mathematics

Discussion of the Findings

The result of the first hypothesis showed that there was a significant relationship between anxiety disorder and students' academic achievement in mathematics. This finding agrees with the findings of Ahmed, Minnaert, Kuyper, and van der Werf, **(2011)**who reported a significant, relationship between anxiety and mathematics achievement. In general, the students with the lowest degrees of anxiety had the highest levels of mathematics achievement. This result is so because it is expected that those that are anxious are not likely to do well more so with mathematics that are dreaded by many students.

The result of the second hypothesisshows that there was a significant relationship between generalized anxiety disorder and students' academic achievement. This finding corroborates the findings of Cassady and Johnson **(2007)**that the generalized anxiety disorder significantly influenced academic achievement. Also, this finding is in line with the findings of Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi and McCann (2016) that generally, anxious individuals find it harder to avoid distractions and take more time to turn their attention from one task to the next than their less anxious peers. This makes learning, reading, remembering and writing difficult thus affecting academic achievement in mathematics. Driscoll (2017) added that since, the anxious individuals achieved at a comparable level to the non-anxious ones with a greater cost in terms of effort or perhaps long-term stress; it is believed

that students with high anxiety as well as those with low anxiety will have lower academic achievement in mathematics. Therefore, those with moderate levels of anxiety will perform the best. They conclude that generalized anxiety is positively related to students' academic achievement in mathematics.

The result of the last hypothesis showed that there was a significant relationship between social anxiety disorder and students' academic achievement in mathematics. This finding corroborated the findings of Eysenck & Derkshen (2009), Robinson (2010), Swanson and Howell (2015) and Vockell (2017) that the effect of social anxiety disorder and academic achievement is not always obvious and new research funded by the Economic and Social Research Council (2012) suggests that there may be hidden costs. The research found that anxious individuals find it harder to avoid distractions and take more time to turn their attention from one task to the next than their less anxious peers. They further stated that a lot of the negative effects of social anxiety disorder appear to be caused by difficulties with controlling attention. This suggests that training techniques designed to enhance attention; control the ability of students to ignore distractions and prevent the switching of their attention from one task to another could help social anxious students to achieve their academic achievement.

Conclusion

In view of the findings of this study, it is hereby concluded that anxiety disorder, generalized anxiety disorders, and social anxiety disorder all contributed to students' academic achievement in mathematics of the students in senior secondary schools in Nasarawa west

Recommendations

Based on the findings of this study, the following are recommended:

1. Teachers should employ different strategies that would reduce anxiety disorder toward students' academic achievement in mathematics. Students-centered techniques such as frequent testing, assignments should be given to reduce students test anxiety in mathematics test.
2. Teachers should announce every test and give students enough time to prepare so as reduce Generalized anxiety disorders, both physically and mentally.
3. Teachers should help students develop positive attitude towards tests and examinations by advising them to be self- confident, counteracting every negative self-talk with a positive statement on social anxiety disorder.

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