THE EFFECT OF ANXIETY ON PUPILS LEARNING AND RETENTION OF MATHEMATICAL CONCEPTS IN SOME SELECTED PRIMARY SCHOOLS IN BOSSO LGA OF NIGER STATE

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Abstract
This study investigated the effect of anxiety on pupils learning and retention of mathematical concepts in Bosso local government area of Niger State. The sample for the study consists of one hundred and fifty primary five pupils (80 male and 70 females) randomly selected from three primary schools in Bosso local government. The study adopted a survey research design. The instrument used for data collection were Mathematic Achievement Test (MAT) and Mathematics Anxiety Questionnaire (MAQ). The mathematics Achievement Test (MAT) consists of forty items multiple choice in selected topics in geometry and trignometry. The Mathematics Anxiety Questionnaire (MAQ) consists of fifteen items on modified likert four-point scale. Two weeks of instruction using a carefully prepared lesson plan on selected mathematical concepts. The data collected from the study were analyzed using the mean, standard deviation. The result obtained showed that there was no significant difference in mathematics achievement level of boys and girls arising from anxiety related factors. Also, there was a significant difference in the retention ability of male than in female. Recommendations were made for training of mathematics teachers through adequate funding and support by major stakeholders to boast their morale that will lead to high commitment to duties.

Keywords: Anxiety, Pupils' Learning, Retention, Mathematical Concepts, Primary Schools.

Introduction
The role of science and technology in the modern world cannot be overemphasized. Science and technology has become critical factors of economic and social development. Learning science requires the learner to have certain abilities in using mathematics. It is not only used by scientists but by bankers, architects, market women, tailors, surveyors to mention but a few. Due to the importance of mathematics to man and society at large, the teaching of the subject was made compulsory from primary to tertiary level in Nigeria. This is reflected in the National Policy on Education (FRN, 2004) where it states that "teaching mathematics is compulsory at both primary and secondary school levels.

Mathematics was made a core subject of science curricular, yet students performance in the subject continue to worsens as years go by (Segun, 2011 and Hussaini, 2013). An appraisal of pupils' achievement at common entrance and other local examinations revealed a sympathetic situation of poor performance in science and mathematics in particular (Nathaniel, 2009). Obodo (1999) stated that the nature of mathematics demands a lot of thinking and time from pupils. These thinking processes are in three levels they are critical, postulation and analytical thinking, that all these requires considerable energy and patience. Research findings by Bayo (2008) and Segun (2009) show that 52% of failure rate recorded in mathematics across the globe is traced to anxiety related factors especially at the primary school level.

Anxiety is an unpleasant, complex and varied pattern of behavior which individuals show when reaching to internal and external stimuli (Femi, 2012). It is a psychological construct that is inferred from verbal report, physiological indicator, general behavior or combinations of some of these factors. Shadow (2002) identified some of the symptoms of anxiety to include nervousness, restlessness, heart pounding, panic, trembling and feeling that familiar things are strange. Several studies have identified anxiety as one of the most serious problems impending pupils' performance in science, mathematics and technology especially in external examinations (segun, 2011, & Hussaini, 2013). Anxiety is a state of confusion, disorder and usually cause as a result of over-reaction of somebody hormones. This psychological disorder often resulted into high blood pressure, stress and memory failure. It is deduced that pupils' poor performance in mathematics may be attributed to their high anxiety level during and after classroom instructions. Segun (2011) stated that anxiety has factors that determine what pupils can do and to what extent. Also, teaching methods and availability of instructional materials had significance impact on how much learners can acquires in mathematics. Clearly, the researcher is prompted to carry out this research after reading this study by (Ken, 2005).

Research finding by (Adam, 2009 & Eze, 2013) revealed that anxiety poses a threat to a positive character manifestation and acquisition of knowledge either on individual bases or group. Anxiety is seen to have negative impact on attention and poor attention resulted to low assimilation, hence decline achievement. This present study is designed to assess and investigate the effect of anxiety on pupils' achievement in mathematics.

A student's overall mathematics anxiety is, for example, a composite of his intellectual appreciation of mathematics and his emotional reaction to it. Those who suffer from mathematics anxiety report a range of emotional responses when confronted with numbers: increased heart rate, increased perspiration, a feeling of light-headedness and dry mouth, a mind that "goes blank" among others. In short, mathematics anxiety is not some hysteria, or tactics used to get out of doing school work, mathematics anxiety is a real physiological response set off by the thought of doing mathematics. Individuals with this anxiety become extremely nervous and go to great lengths to get away from the sources of their fear. These persons learn about mathematics under duress, which further increases their anxiety, and may immediately forget whatsoever facts they were forced to learn.

The concept of anxiety offers an example of how patterns of behavior can range from those anxiety moments before an individual goes into problem solving state, to those manifested in degrees, at one end it may just prevent the individual from performing to his full capacity and at the other end it may evolve panic. In a severe state of anxiety, the individual enters a state of stress because of some internal conflict which he has been unable to resolve.

Statement of the Problem

Most previous studies of mathematics anxiety have focused on high school students or adults, while mathematics may also provoke strong and adverse reactions in children (Adam, 2005). Ages 9 to 11 seems to be in a critical stage for the development of attitudes and emotional reactions towards mathematics (Hussaini 2013). In addition, childhood, being a period of rapid change, may be a time when anxiety is especially evident. Although, attitudes may deepen or change throughout schools, generally, negative attitudes and anxiety are difficult to change and may persist into adult life, with far-reaching consequences.

Some of these consequence include avoidance of mathematics (Ken 2005), distress (Deji, 2010) and interference with conceptual thinking and memory processes (Segun, 2011).

Some researchers expanded the concept of mathematics anxiety to include both facilitative and debilitative anxiety. Deji (2010), for example, claimed that the negative affective reactions component of mathematics anxiety may be debilitating while the cognitive component might actually have some positive motivational consequences for the amount of effort pupils put into mathematics and thus for mathematics performance. Depending on the individual and the task, a moderate amount of anxiety may thus actually facilitate performance. Beyond a certain point, however, anxiety becomes debilitating in terms of performance, particularly in the case of higher mental activities and conceptual processes (Femi, 2012). Although, mathematics anxiety may in some cases have positive effects, it is perhaps more important for educationalists to focus on its possible negative consequences for performance. The present study investigated the effect of anxiety on pupils' achievement and retention of mathematical concepts in some selected primary schools in Bosso local government area Niger State.

Objective of the Study

Specifically, the study was conceived on the following objectives which include among others to:

(i) Determine the effect of anxiety on male and female pupils' achievement in mathematics
(ii) Investigate extent of retention among pupils of different academic level
(iii) Assess factors that generate and promote anxiety among school children in Bosso local government area

Research Questions

The following research questions were developed to guide the study.

(i) Do the male and female pupils differ in their mathematical achievement as a result of anxiety?
(ii) Are there difference in the male and female pupils' retention capability based on anxiety?
(iii) What are those factors that promote mathematical anxiety among school children in Bosso local government area?

Methodology

This study adopted a survey research design. This design allows respondents to be selected from vast area of the population. The result from the sampled schools of varied characteristics can be generalized. The population of the study consisted of all primary five pupils in Bosso local government area of Niger State. However, the sample made up of one hundred and fifty (150) consisting of 80 females and 70 males were randomly selected from three primary schools in Bosso local government. A simple random sampling using lucky dip method was used to select the one hundred and fifty primary five pupils used for the study.

The instrument for data collection were (i) Mathematics Achievement Test (MAT). (ii) Mathematics Anxiety questionnaire (MAQ). The MAT and MAQ were constructed based on the subject matter and the objective of the study. The instruments were validated by two senior lecturers from Ahmadu Bello University Zaria and one educational psychology expert from the College of Education Minna. The advice of the validation helped in the final selection of the items from both instruments. To determine the reliability coefficient of both instrument, test-retest method using person moment correlation formula and Cronbach alpha formula for the MAT and MAQ respectively. A coefficient of 0.78 and 0.92 were obtained for MAT and MAQ respectively.

To collect data for the study, the pupils from the three schools were pretested to determine their entry level equivalence of the group. The researchers carried out two weeks of classroom instruction using carefully prepared lesson plan on selected mathematical concepts. The pupils were then subjected to a post test using the two instruments. The scores from both instruments were used to answered the research questions. Scores from MAT were used to answer the research question 1 and 2, while MAQ was used to answered research question 3.

Mean and standard deviation were statistical tool used to analyzed data collected from MAT and MAQ.

Results

The data collected from both instrumetns were analyzed and presented in tables below:

Research Question 1: Do the male and female pupil differ in their mathematics achievement as a result of anxiety?

Table 1: Mean and standard deviation of male and female pupil in MAT

Gender	N	Mean ($\bar{x}$)	S.D
Male	70	56.24	0.784
Female	80	55.76	0.923

Table 1 above revealed the mean and standard deviation of male and female pupils in the mathematics achievement test. An examination of the figures on the table 1.1 above show the mean and standard deviation values of 56.24, 0.784 and 55.76, 0.923for male and female pupils respectively were not significantly different. Similarly, the standard deviation values of 0.784 and 0.923 were not significantly different. This result indicates that the male and female perform nearly the same in mathematics irrespective of the anxiety manifestation.

Research Question 2: Are there difference in the male and female pupils' retention, capabilities in mathematics used on anxiety?

Table 2: Mean and standard deviation of male and female pupils relation

Gender	N	P/mean$\bar{(x)}$	R/mean$\bar{(x)}$	PS.D	RS.D
Male	70	56.24	55.28	0.784	0.862
Female	80	55.76	50.94	0.923	0.708

Keys: P = Previous; R = Retention

Table 2 above revealed the mean and standard deviation values in the retention of male and female pupils in selected primary schools in Bosso local government area. The mean difference of male and female pupils are, 0.96 and 4.82 respectively. This result indicated that female had higher mean depreciation of 4.82 compared to the male with 0.96. This show that the female gender easily forgets learned mathematical concepts compared to their male counterparts. Hence, retention is higher in male than female.

Research Question 3: What are those factors that promote mathematical anxiety among school children in Bosso local government area?

Table 3: Mean and standard deviation of respondents on factors that promote mathematical anxiety among school children

S/N	Items	Mean (x)	S.D
1	I hate mathematics because of addition and subtraction.	2.43	0.562
2	Learning mathematics is not interesting.	3.98	0.764
3	Mathematics is a difficult subject.	4.22	1.147
4	No textbooks for teaching mathematics.	2.76	0.994
5	Maths teachers are wicked.	3.76	0.456
6	Reasoning is key to success in mathematics.	4.15	1.248
7	Mathematics if for lazy pupils	2.62	0.762
8	No calculator to solve problem.	244	0.889
9	My mind beep when it is time for maths lesson.	4.33	2.140
10	Maths teachers are not patient.	3.66	1.365
11	Teaching methods adopted by teachers.	2.87	0.621
12	Abstract nature of some concept in mathematics.	3.04	1.412
13	Mathematics teachers mark only correct answer.	2.21	0.871
14	Mathematics curriculum is wide.	3.92	2.249
15	No pleasure in solving mathematics.	2.50	1.333

Table 3 revealed the mean and standard deviation values of questionnaire items 1-15 on factors that promote mathematical anxiety among primary school pupils in Bosso local government. Items 3,5,9,10,11,12 and 14 with their respective means values as 4.22, 3.76, 4.33, 3.66, 2.87, 3.04 and 3.92. These figures indicated among others which mathematics associated with anxiety. They include mathematics is a difficult subject, no adequate textbooks for teaching the subject, requires a lot of reasoning, mathematics teachers are not patient enough, poor instrumental strategies adopted by teachers, wide curriculum and abstract nature of the subject.

Discussion

From the findings, it revealed that mathematics anxiety had profound effect on pupils achievement because it hinders their learning of mathematics. Pupils' with mathematics anxiety are psychological disorder earn little mathematics.

The finding on table 2 agreed with research finding by (Adam 2005) & Ladoke 2008) which indicated low academic achievement in mathematics and science by pupils with psychological problems arising from anxiety and related threats while those that are free from these threat performed better. It however, revealed that pupils with low anxiety level are found to achieve better in mathematics than pupils with higher level of mathematics anxiety.

Similarly, the finding in table 2 is in support of James (2009) research on gender influence in mathematics and science achievement of primary schools in Nasarawa local government of Nasarawa state. Also, table 3 shows comparison of various anxiety symptoms and manifestation with their corresponding relative effect on the learning of mathematics which was supported by Bayo (2005) that panicking and restlessness are the most top list on the learning of mathematics.

Conclusion

The study examined the effect of anxiety on pupils' achievement in mathematics especially at the middle basic. It was observed that several factors accounted for the high anxiety rate of primary school pupils and consequent failure in the subject. Anxiety is an act that generates tense and degenerate performance among school children. The findings of the study, the following conclusion was drawn:

It was observed from the mean and standard deviation values that there is no difference in mathematics achievement level of boys and girls arising from anxiety related factors such as panicking. Panicking, restlessness among other are the sign and symptoms of anxiety manifestation in mathematics instructions.

Recommendations

In the light of findings of this study, the following recommendations were made:

(i) Mathematics teacher should be more friendly with their pupils and more committed to their work
(ii) Provision of learning materials and appropriate counseling activities by government and other stakeholders will reduce the difficulty and abstraction of some mathematical concepts.
(iii) Paying special attention by sharing love and care by teacher during classroom teaching and scoring of pupils' work.
(iv) Adequate funding and support by major stakeholders to boast the morale of mathematics teachers leading to high commitment to duties.

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