

**STUDENTS PERCEPTION ON THE CAUSES AND EFFECTS OF  
MATHEMATICS ANXIETY IN SENIOR SECONDARY SCHOOL IN BOSSO  
LOCAL GOVERNMENT AREA OF NIGER STATE**

**BY**

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## ABSTRACT

*This study investigated the students Perception on the causes and effects of mathematics anxiety in senior secondary schools in Bosso Local Government Area, Niger State. This study was guided by the following objectives; to examine the student's perception on the causes and effects of mathematics anxiety in senior secondary schools and to determine the causes and effects of mathematics anxiety among students based on Gender in senior secondary schools. The study employed the survey research design. A five point Likert scale structured questionnaires was applied in order to collect data from the sample of three hundred and seventy-five (375) out of the total population of fifteen thousand, six hundred and thirty four (15,634). The research questions were answered using a descriptive statistics while the hypothesis was tested using the Chi-square correlation statistical tool at 5% level of significance. The study findings revealed that society, school, teacher and even the students as factors that causes mathematics anxiety to senior secondary school students as perceived by both the teachers and the students. The p-value of the correlation between the male perception and the female perception was found to be .089. Based on the findings of the study; the researcher recommended that counseling units should be provided in secondary schools to re-direct students' mindset about mathematics; to letting them know the importance and usefulness of mathematics in their everyday activity.*

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## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background to the Study

Mathematics importance to human existence cannot be overemphasized in view of its application to human everyday life activities (Sunday, Akamu & Fajemidagba, 2014). Mathematics is recognized as an essential tool or field of discipline that is widely used for solving day-to-day problems faced by individuals. It is important because the knowledge of it enhances a person's reasoning, problem-solving skills, and of course in general, the ability to think.

The goal of every government at all levels is to provide a better society for its citizens by ensuring its economic growth, development of infrastructure, national security and social justice. Nigeria as an independent developing country, which is tagged as the 'giant of Africa' is bold and present ambitious to be ranked among the top developed economist in the world. Adetunde (2016) noted that mathematics forms the foundation of a solid education and is the corner stone of modern society. He further stressed that the overall national development of any nation and the building of a healthy, happy and prosperous society or nation cannot be successfully achieved without mathematics. As such mathematics has been seen as the core school subject that can help to attain this vision and the key to other science subjects if Nigeria wants to become one of the top economies in the world. This fact implies that the pursuit of mathematics is vital and imperative for any society, community or nation in order to maintain its independence, ensure increased prosperity and keep its place among the civilized nations of the world in this era of technology.

Since mathematics deals with logical reasoning and quantitative calculations (John, 2015), Sadiq (2018) opined that a visible knowledge of mathematics is a

necessity for social and economic transformation of any nation. This is because developed countries have utilized the opportunities offered by the current phenomenal increase in science technology and mathematics especially information and communications technology, applied science whose main engine force is mathematics. Ale and Lawal (2015) stated that the line of demarcation between the developed and the underdeveloped nations is based on their level of mathematical attainment and ingenuity. According to them, mathematics is an undisputed agent of national development and wealth creation. In fact, Ale (2016) noted that no nation can make any meaningful achievement, particularly in economic development without technology, which foundations are science and mathematics. Furthermore, Dambatta (2017) puts it more succinctly when he opined that the knowledge of mathematics allows scientists to communicate ideas using universally accepted technology since it is truly the language of sciences. He noted that the results of mathematical research benefit the economy in the fiber-optic network carrying telephone conversations, computers that carry out various functions, weather forecasting and predictions, the design of fuel efficient automobiles and airplanes, traffic control and medical imaging.

The Federal Government of Nigeria in the National Policy on Education made mathematics compulsory for both primary and secondary school curriculums. It is also needed in every level of education. Mathematics has been a pre-requisite for admission into most of Nigerian universities and higher institutions of learning. The case might seem only applicable to school alone but even after graduation, employers also have a demand for good performance in selection aptitude tests of which such tests have heavy dose of mathematics. As we can see, it's obvious that mathematics is applicable to every human activity, and virtually every profession expresses some degree of numeracy. Mathematics is used in arts, business, commerce, law, medicine, politics,



religion, sociology, war and so on, since man cannot do without the basic ingredients for survival, coupled with the elementary fact that mathematics is the core ingredient of all these, man must as a matter of necessity, learn, understand and apply the language of mathematics to sustain and maintain his existence. From the foregoing, the contributions of mathematics to other subjects and hence to everyday life in national development could be seen.

It is evidently seen that there is poor performance in mathematics among senior secondary school students. The causes of this problem are many and cut across all stakeholders in education. In other words, the causes of poor performance in mathematics among senior secondary school students emanates from the schools, students, teachers as well as the government itself. Many Nigerian students are performing below expectation in their academics. The trend in the academic achievement of secondary school students in Nigeria in the last two decades has become a major source of concern to all stakeholders in the educational sector (Nwadinigu and Azaka-Obieke, 2016). According to Nwadinigu and Azuka-Obieke, 2016, poor academic achievement is an achievement that is adjudged by the examiners as falling below an expected standard. It is when a student performance is below his actual ability. It could be as a result of several factors such as poor teaching, psychological factors, unpreparedness on the part of the students, poor learning environment, location of schools, and the evaluation process and of course the attitude of students towards mathematics which is determined by the level of anxiety a student has toward mathematics.

Mathematics anxieties, according to Blazer (2018), form from a combination of an individual's personality, intellect, and the environment in which they are working. Individuals can produce cognitive anxiety symptoms, such as feelings of low self-

esteem, excess worrying, inability to concentrate, confusion, or the use of negative self-talk. Affective anxiety symptoms may present as nervous sweating on the forehead or in the palms, surging adrenaline, needing to go to the bathroom constantly, experiencing an increase in blood pressure or heart rate, or needing to go to the water fountain because of a dry mouth (Alexander, 2015).

Elekwa (2017) stated that there is a nonchalant attitude exhibited by students towards mathematics, even when they know that it is one of the prerequisite subjects they need to forge ahead in their studies and in life. Such students who have already conditioned their minds that mathematics is a difficult subject are usually not serious in the learning of mathematics and therefore perform poorly in mathematics tests and examinations (Ihendinihu; 2016). As such there is this anxiety that is caused within them whenever mathematics is been mentioned to their hearing.

## **1.2 Statement of the Problem**

It is widely known in Nigeria that larger number of students tends to choose non mathematics related subjects (arts and humanity subjects) while entering senior secondary schools to mathematics related subjects (science subjects). The number of students offering non mathematics related subjects is always higher than the number offering mathematics related subjects in most institutions of learning. Students perceives mathematics as a very difficult subject which is difficult to understand, hence they spent little time, interest and concentration on it. This can be related to mathematics anxiety.

However, the needs of the society today require greater need for mathematics and this explains why a credit in mathematics is one of the qualifications for admission into tertiary institutions of learning. Therefore, it is very dangerous to neglect the adverse effects of anxiety in mathematics. Various attempts have been made by several

researchers to examine the causes of poor academic performance. They discovered causes like intellectual ability, poor study habit, achievement motivation, lack of vocational goals, socio economic status and anxiety; few of them have actually dwelt on anxiety as a major cause of poor academic performance and its reduction among students. However, this study investigates the students' perception on the causes and effects of mathematics anxiety in senior secondary school in Bosso Local Government Area, Minna, Niger State.

### **1.3 Aim and Objectives of the Study**

The aim and objectives of this study are:

- i. To examine the perception of students on the causes of mathematics anxiety among students in Bosso Local Government secondary school.
- ii. To examine the perception of students on the effects of mathematics anxiety on students of secondary school in Bosso Local Government.
- iii. To examine the perception of students based on gender on the causes of mathematics anxiety among students of secondary school in Bosso Local Government.
- iv. To examine the perception of students based on gender on the effects of mathematics anxiety on secondary school students in Bosso Local Government.

### **1.4 Research Questions**

- i. What is the perception of students on the causes of mathematics anxiety in senior secondary schools?
- ii. What is the perception of students on the effects of mathematics anxiety in senior secondary schools?

- iii. What is the perception of male and female students on the causes of mathematics anxiety in senior secondary schools?
- iv. What is the perception of male and female students on the effects of mathematics anxiety in senior secondary schools?

### **1.5 Research Hypothesis**

**H0<sub>1</sub>:** There is no significance difference between the perception of males and female students on the causes of mathematics' anxiety among students of senior secondary schools.

**H0<sub>2</sub>:** There is no significance difference between the perception of males and female students on the effects of mathematics' anxiety among students of senior secondary schools.

### **1.6 Significance of the Study**

The findings of this study will educate the students and teachers of senior secondary schools and the general public on the perception of students and teachers on the causes and effects of mathematics anxiety among students of senior secondary schools.

This research will be a contribution to the body of literature in the area of the effect of personality trait on student's academic performance, thereby constituting the empirical literature for future research in the subject area.

### **1.7 Scope of the Study**

This study was carried out with senior secondary school students of Bosso Local Government in Niger State. The content of the study includes the perception of students on the causes and effects of mathematics anxiety.

## **1.8 Definition of Terms**

The following terms are used throughout this qualitative study concerning perception of students on the causes and effects of mathematics anxiety among students of senior secondary schools:

- i. Anxiety: a feeling of worry, an uneasy or distressing desire for mathematics.
- ii. Causes: The source or reason of mathematics anxiety.
- iii. Mathematics: is the science that deals with the logic of shape, numbers, quantity and arrangement.
- iv. Mathematics Anxiety (math anxiety): A feeling of worry or uneasy or distressing desire for mathematics.
- v. Perception: a belief or opinion.

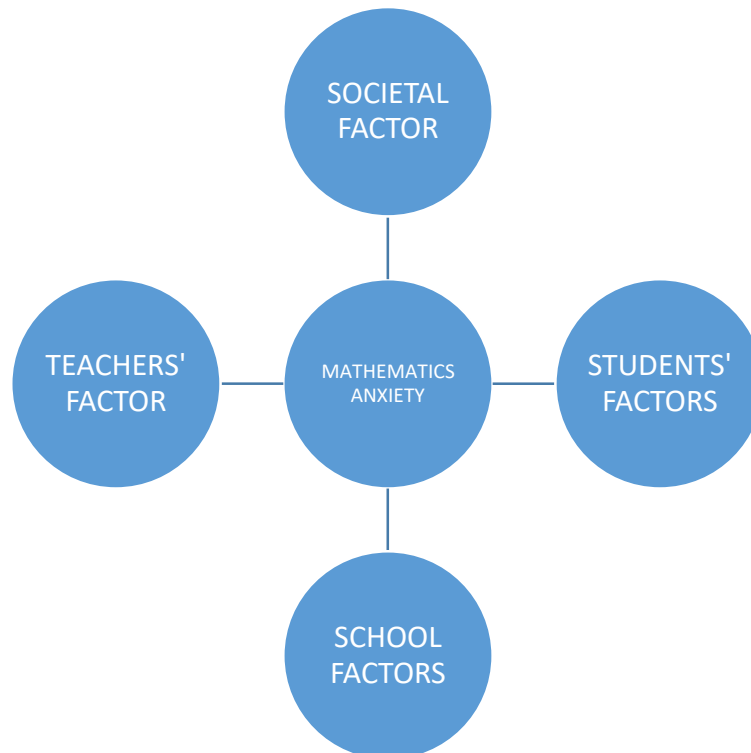
## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Introduction

Among all the subjects taught in secondary school, there is none that seems to create as much anxiety to many students as mathematics (Ormrod2015). As a result of this mathematics anxiety has been an issue of importance to mathematics educators and researchers across the globe. To achieve a successful research, different definitions of mathematics anxiety and the research related to the topic has been explored in this literature review. It also examined past studies related to mathematics anxiety and the perception that students and teachers had on the causes and effects of mathematics anxiety to students especially to students in senior secondary school.

#### 2.2 Conceptual Frame Work



**Figure 2.2: Show the diagrammatic relationship of concepts or components to a central idea**

## A Schematic Diagram Showing the Causative Factors of Mathematical Anxiety among Senior Secondary School Students.

Figure 2.2 show the diagrammatic relationship of concepts or components to a central idea. The paradigm is composed of four circles which are connected to a circle at the center as its body. These circles are the factors that causes Mathematical anxieties experienced by senior secondary school students.

The first circle at the top contains society factors which could be in the form of belief and myth of the society as the cause of mathematics anxiety. The second circle downward refers to school factors which include poor teaching and learning environment. The third circle to the right represents students' factors which can be a negative attitude towards learning mathematics while the last circle refers to teachers' factor which may result from poor teaching method or attitude of teacher to student.

### **2.3 Concept of Mathematics Anxiety**

Some researchers feel that the term 'mathematics anxiety' has become a catch-all for any negative feelings regarding math and, therefore, it has lost some of its usefulness (Taylor & Fraser, 2016). Mathematics anxiety as defined by Blazer (2018) is form from a combination of an individual's personality, intellect, and the environment in which they are working. Individuals can produce cognitive anxiety symptoms, such as feelings of low self-esteem, excess worrying, inability to concentrate, confusion, or the use of negative self-talk. Affective anxiety symptoms may present as nervous sweating on the forehead or in the palms, surging adrenaline, needing to go to the bathroom constantly, experiencing an increase in blood pressure or heart rate, or needing to go to the water fountain because of a dry mouth (Alexander, 2015). Mathematics anxiety was seen by (Sharma and Sansanwal; 2014) as a learned phenomenon on account of which an individual has worry, fear, tension or physiological reactions towards mathematics.

Mathematics anxiety is often pictures as being “bad at mathematics” but it implies more than. It implies that someone would be better at math if he or she weren’t so anxious -- there is evidence that’s true. A growing body of work shows that math anxiety robs people of working memory. It makes keeping several things in mind simultaneously possible. Mathematics anxiety essentially prompts students to do two things at once: solve the mathematics problem and deal with worries about the math (including worries about getting the problem wrong, looking foolish, and what others may think of them). As a result, students have less working memory to devote to the mathematics, and their mathematics performance suffers (Beilock & Willingham, 2015).

Most people with mathematics anxiety have had negative, stressful or excluding mathematics experiences such as embarrassment or humiliation from failure, teachers who are insensitive or may appear uncaring, negative attitudes about mathematics from peers or family, and traditional rote learning rather than understanding the processes. Mathematical situations therefore trigger negative thoughts and memories, a feeling of mathematical helplessness or the ‘fight or flight’ response in the brain. Therefore, mathematics avoidance is common with many students opting out of any subject they think may contain mathematics as soon as possible and this includes statistics courses. However, it is becoming increasingly difficult to avoid statistics in particular with most disciplines expecting students to use or understand quantitative analysis. Mathematics anxiety is an acquired anxiety which can have a big impact on learning but it is treatable. A number of strategies can be used to address mathematics anxiety and enable students to move from a position of mathematical helplessness to mathematically resilient learners. Mathematical resilience is a term used to describe a positive stance towards mathematics where students overcome their barriers to learning, are motivated



to persevere with mathematics and acknowledge that mistakes are part of the learning process (Johnston-Wilder et al, 2014).

#### **2.4 Misconceptions about Mathematics Anxiety**

Misconceptions about mathematics abilities and stereotypes need to be dispelled to students to ensure mathematics anxieties and mathematics avoidance does not creep into a student's life (Blazer, 2018). The first misconception that people have about mathematics is that males are better in mathematicians than the females. When males and females are treated differently with respect to ability and stereotyping, levels of anxiety and achievement are affected.

The second misconception is that individuals that are good in mathematics are born good at it. Parents preserving the notion that mathematical ability is inborn or inherited may also be a contributing factor to mathematics anxiety. When parents feel their child receives bad grades in mathematics because the child simply does not have a mathematics mind and blame a child's poor performance on their inability to do mathematics, this can be detrimental to a child's success in mathematics (Godbey, 2016). Likewise, teachers play an important role in ridding this misconception in the classroom.

The third misconception is that there is only one way to solve a mathematics problem as viewed by Blazer (2018). For instance, when students are told lower years in school that all fractions are written with the biggest number on bottom and then told at their upper year that the biggest number can be on the top, a student's mathematical world may crumble. Having have been told two conflicting rules about fractions, students must now take their current teacher's word on which is the correct procedure.

A teacher showing multiple representations of problems, solutions, and explanations can stop students from believing in only one way to do mathematics (Blazer, 2018).

The fourth misconception is that all mathematicians can solve problems quickly in their heads. Solving all mathematics problems quickly in one's head does not make that individual more intelligent than someone who completes the work on paper. When all these misconceptions are not addressed, students' mathematical anxiety may begin to take a new dimension. A simple idea that a student will never be able to perform better in mathematics because of their gender or parents' attitudes often keeps students from attempting higher levels of mathematics. Consequently, other, more serious symptoms will continue to emerge from students, creating a student who is anxious about mathematics. Teachers must be aware of the many factors leading to the causes of mathematics anxiety to students.

## **2.5 Causes of Mathematics Anxiety**

Mathematics anxiety is a serious and pervasive problem, especially in the community-school setting. Students are prone to experience mathematics anxiety in many forms and degrees, from "freezing up" during a math exam, to attempting to avoid anything that has to do with numbers or calculations. The symptoms of it may be physical or psychological. The physical symptoms may include nausea, shortness-of-breath, sweating, heart palpitations and increased blood pressure. While some of the psychological symptoms may include memory loss, paralysis of thought, loss of self-confidence negative self-talk, math avoidance and isolation (thinking you are the only one who experiences it). These symptoms and other negative math experiences may lead to a vicious cycle in which fear of math interferes with learning math which leads to more negative math experiences (Preis & Biggs, 2016).

It was explained by (Blazer1; 2018) that mathematics anxiety takes place in a complex fashion, resulting from a combination of personal, intellectual, and environmental factors stemming from many years of negative experiences. Personal factors present as low self-esteem, frustration not easily handled, and various levels of shyness, while intellectual factors include a student's lack of ability to understand how to handle mathematics concepts. Environmental factors, according to (Blazer; 2018) stem from various home, classroom, and social situations, such as demanding or undemanding parents, negative school experiences, over emphasis on memorization and repetitive worksheets, poorly trained teachers, poorly written textbooks, peer pressure, and excessive school absences. Each of these factors can cause various levels of anxiety for students.

In the book 'Overcoming Mathematics Anxiety' by (Mitt, 2016) submits a set of environmental factors that many girls are exposed to that may influence their heightened anxiety. (Ashcraft & Humbree in Wei, 2015 p 10) have indicated that "although factors that make learners feel anxious when confronting Mathematics is not yet determined, but learners with higher Mathematics anxiety show a strong tendency to avoid learning Mathematics, they hold negative attitudes towards Mathematics, and have weak self-confidence in doing Mathematics". Furthermore, (Geist; 2017 p.24) says that "in general, there is little empirical research about the causes of Mathematics anxiety" and Newstead (2015) says it is not an easy task to determine the causes of Mathematics anxiety, where and how it begins and grows. Therefore, the primary aim of this research then is to investigate the perception of students and teachers on the causes and effects of Mathematics anxiety among students of senior secondary school.

### **2.5.1. Students Myths and Self-conceptions.**

A group of students were interviewed in a research by Bed Raj, one among the students he interviewed were asked about his perception on mathematics and the student said that mathematics is a subject only for clever ones. It is difficult to learn; only talented students were able to read mathematics. Another student said that, mathematics had several formulas and some of these formulas are always necessary to remember for learning mathematics and difficult to understand by that, he feels that mathematics is a very difficult subject. This also made him to always hesitate joining any mathematics class because of the anxiety he developed toward mathematics. (Interview recorded by Bed Raj Acharya; 23 September, 2014).

Students presumptuously believed that for a person to excel in mathematics, he must have a 'mathematical brain' that is to say that student must naturally be born brilliant but in reality, it's simply an excuse to defend the idea that math is 'difficult' and it create anxiety for them. But learning math is similar to learning in other general subjects as there are multiple factors that affect it such as the mentors, attitude of the student, and the time and practice they dedicate towards the subject.

Mathematics self-concept refers to a person's image with respect to how he or she is perceived and valued in mathematics learning context (Sichizya, 2016). It is a fact that, even though mathematics has great importance and its application is so numerous, it is perceived by most students as difficult, boring, not very practical, and abstract and its learning as requiring a "special ability" that is not always within everyone's reach. As the result of that many students generate negative attitudes towards mathematics in the course of their academic life, and on many occasions become so anxious when faced by any mathematical problem. For most students they don't see the subject math as source of satisfaction, but rather source of frustration, discouragement, and anxiety.

### **2.5.2. Abstract Mathematics Ideas.**

Students perceived that the reason why mathematics subject is difficult to learn is that the concepts in it are abstract and difficult to understand (Allain, 2017). Large parts of mathematics simply would not exist without its algebraic symbols. Indeed, the issue is a deep one, having to do with human cognitive abilities (Devlin, 2018). The recognition of abstract concepts and the development of an appropriate language to represent them are really two sides of the same coin. Sadly, the level of abstraction in mathematics, and the consequent need for notation that can cope with that abstraction, means that many, perhaps most, parts of mathematics will remain forever hidden from the non-mathematician; and even the more accessible parts may be at best dimly perceived, with much of their inner beauty locked away from view. Students were also of the opinion that most of the mathematics taught in schools is not applicable in the real world. Therefore, it is more or less useless with the exception of topics such as business math, and the basic operations.

### **2.5.3. Gender Stereotype**

Research on the relationship between gender and the development of mathematics anxiety is motivated mainly by the finding that females show overall higher levels of mathematics anxiety than males throughout their entire schooling (Devine et al., 2015). Female students are said to have higher mathematics anxiety than their male counterparts (Hadley & Dorward, 2015; Khatoon & Mahmood, 2017; Merritt, 2016 ;), this may be due to social and motivational factors. One of the early mathematics anxiety researchers, Tobias, has been a significant proponent of the view that gender plays a large role in mathematics anxiety. Even though, she later withdrawn from her belief that females are the only ones who must cope with mathematics anxiety in a significant

way, but still recognizes obstacles that women can face. Though, (Hembree's; 2016) does support her findings that girls exhibit more mathematics anxiety than male students. It would appear that most, if not all students are sometimes subject to enough anxiety to alter their performance ability.

By focusing on the gender differences during the college entrance exams, Aftermath and Kim proposed three theories as the reasons why females worry about/during exams more than their male counterparts. First, unlike males, females may believe that poor performance is caused by uncontrollable factors such as low ability. This may result in concerns that low scores indicate that they lack the skills that are essential to succeed and that they have little likelihood to improve these skills.

Secondly, females may be more concerned about not disappointing the significant others in their lives, including parents, teachers, and counselors. Thus, pressure over doing well in exams, and at the same time over pleasing others, may produce high levels of anxiety in these females, which may in turn affect their performance.

Thirdly, females may worry more in a competitive environment since they are socialized to be cooperative as a group. Thus, if females perceive the aim of the college entrance exams as an opportunity to compete for access to high-status colleges and to limited scholarship funds, then, they may be at a disadvantage because of the way they are socialized.

Gender stereotypes have discouraged many students from mathematics. It is mostly believed that men excel more in math compared to women as they are perceived to be 'illogical' which conflicts with math, which happens to be a logical subject. At a young age, girls may not have as much opportunity given to them to investigate the world (mathematically) the same way with boys. This discourages girls enrolling for any

advance math subjects in upper secondary school (Bohrd, Blazek, & Verkhovtseva, 2017; Buckley, 2015).

#### **2.5.4. Environmental Factors (Classroom and Home)**

Classroom environment refers to space or place learners or students and teachers interact with each other and use a valid tools and information resources in pursuit learning (David, 2016). Students' attitudes and perception towards learning mathematics are closely linked with classroom atmosphere. In some other places, learning environments are not promising enough to make the learners get attracted, and therefore they end on hating the subject. In the teaching and learning process, a well-managed and suitable learning environment stimulates students to learning mathematics properly. When teachers addressed the students' need and interest, it motivates them to study well. Child friendly teaching and learning environment has a great role to play in students learning process.

A research was conducted by (Bed Raj Acharya; September, 2014) in an interview with some students, a student said their teacher teaches them mathematics but he was always afraid of the teacher because he (the teacher) threatens them to memorize mathematical formula. So he decided to choose economic subject. While some mathematics teachers are of the opinion that they cannot be able to teach in the classroom with students centered teaching methodologies and technical methods due to large number of students and lack of required material. Another supported view by a head teacher towards teaching learning environment of school they cannot manage trained and professional teachers due to poor economic background of our school. Our School has limited resources and teachers. (Interview recorded by Bed Raj Acharya; September, 2014). By this, students may be weak in mathematics as a result of the

anxiety they develop toward it thereby choosing other subject instead of mathematics to have a better result.

Sloan's (2016) identified one of the antecedents (sources) of mathematics anxiety among students is environmental factors. These environmental factors can include negative school experiences that could lead to negative attitudes towards mathematics, inadequate teaching methods of previous mathematics teachers, negative parental influences, and inadequate mathematics background.

On the other hand, the Western perspective was explained by Buckley (2016) who stated that "negative community beliefs about mathematics are often heavily endorsed in adolescence throughout high school per culture norm". The majority of society share the commonality of math anxiety that it has been socially accepted to be normal. Due to the association of math with the idea of intelligence, the rest of society that don't show high levels of math anxiety are labeled as a 'nerd' due to their enthusiasm and ability to perform better than others. Society can generate and perpetuate ideas about mathematics which can have an effect on a student's attitude towards mathematics. Generally accepted ideas that math is hard and even stereotypes perpetuated in the media can affect how students perceive mathematics to be.

#### **2.5.5. Teachers Attitude toward Mathematics.**

Teachers are also perceived to be one of the causes of math anxiety. Many studies have shown that teachers may produce, increase or reduce mathematics anxiety among students at all levels of schooling especially those in secondary through their attitude and behavior, teaching methods, and formal instruction/instructional strategies. Also, there are indications that some teachers also possess mathematics anxiety (McAnallen, 2017). He carried out a study involving 691 teachers from eight states with diverse geographic locations. It was determined that majority of the participants have only taken



Algebra I as their highest level of mathematical education. Nearly 33% of the total participants reported that they feel anxious towards math and consequently negatively received the idea of pursuing higher levels of mathematical education. Participants who reported to have math anxiety noted that "negative elementary or secondary interactions with teachers about mathematics, poor teaching practices while they were in school, and/or negative experiences taking algebra or geometry in high school," were the primary causes of their anxiety. These shows that students are likely to be influenced by their primary source of information: teachers.

Unpleasant past experiences that generally produce anxiety towards mathematics in students have been found to be largely caused by teachers' behavior (Bekdemir, 2016). According to an interview a student said that, their mathematics teacher discourages them by predicting negative aspects and made us afraid of this mathematics. The teacher also said to them it is very hard to study so, he did not choose to study any mathematics related subject (Interview recorded by Bed Raj Acharya; 17 September, 2014).

#### **2.5.6. Teaching Method**

On the topic of teaching methods, it was examined that being taught in smaller groups and working in pairs seemed to create less anxiety, whereas individual and team competitive math activities made the majority of respondents more anxious (Schenkel, 2016). In some other cases, teacher's assumption of students' knowledge is another drawback (Seka, 2018). That is to say many teachers act as if computational procedures and processes are simple and self-explanatory; and sometimes teachers' pay little attention to students who do not understand a concept, in such situations, a student who is lost (understands little) or is slow in learning is not going to have love for the subject. As a result of this, mastery of the subject may become a problem to the student and therefore ending up having anxiety towards the subject.

Studies do imply that negative attitudes towards math may be passed down from teacher to student (Maloney & Beilock, 2015). Students may develop mathematics anxiety and negative attitudes toward mathematics when they encounter mathematics teachers whose ways of improving student's mathematical prowess and skills involve teaching methods that focus on i) getting the right answers rather than concept development; ii) repetition and speed, or "timed tests," rather than understanding; and iii) persistent emphasis on grades and unreal problem solving activities rather than those relevant to daily life (Geist, 2016). These teachers at times appeared to be harsh, unapproachable, and intimidating.

#### **2.5.7. Previous Knowledge of Students.**

Previous knowledge of students is one aspect that students perceived to be one of the causes of math anxiety. It means the prior knowledge of students on mathematical contents. Students' basic knowledge of mathematics in their junior secondary level is one of the key factors that determined their good performance of it in senior secondary school. Students who lack sufficient previous knowledge on mathematics may not want to learn and could not get success in the subsequent levels. It is responsible for students' failure in mathematics in all secondary school level (Bed Raj Acharya; 2014). He further stressed that; students with insufficient previous mathematical knowledge cannot assimilate new mathematical concept and principle that are related to the previously ones meant to be learned. A mathematics teacher asked some of his students about their previous knowledge to a topic but the entire student kept silent and nobody answered the question. One of the students said that she had a problem with learning mathematics in her lower secondary level. This has actually made her not to like to learn mathematics even when faced with mathematical problem. A senior master said that most of the students that were promoted in the subject of mathematics at lower level without

concept of mathematics, it become difficult for them to perform well in mathematics. Similarly, the mathematics teacher said that in the lower (junior) secondary, mathematics curriculum did not include the sufficient basic concept of mathematics these make the students to feel mathematics to be so new and difficult subject as they go further. (Interview recorded by Bed Raj Acharya; September, 2014)

### **2.5.8 Pear Group**

Students can experience Mathematics anxiety even in an informal setting, that is, outside a Mathematics classroom situation, for instance when solving problems in their everyday lives which involves the manipulation of Mathematical ideas or when discussing issues to do with Mathematics.

Even those that persevere may find that they are isolated from peers who share an interest in mathematics, lacking a person they can learn mathematics fluency with, outside of a possible parent. In fact, Geist (2016) hypothesizes that the increased stimulation from a more mathematically inclined home environment is a primary reason that parent education is so highly correlated with success in mathematics, implying that many children may be left almost entirely without someone to converse with mathematically.

### **2.5.9 Personality Factors.**

At an early age, almost every individual begins to learn how to count. As we mature and enter school, we begin to learn how these numbers can be manipulated to create what is recognized as mathematics.

Research pertaining to skill development and strategies to improve learning and performance, particularly with respect to mathematic skills, has been growing in

response to the 21st century's rapidly evolving technological world. Mathematic skills are essential for increasing individuals' participation in society and their success in everyday life (Maloney, Risko, Ansari, & Fugelsang, 2016). The development of mathematics skills is also critical to ensure continued advancements in science and technology. Despite its significance for individuals and society, some individuals love math while others despise it. In fact, it is common in today's society to encounter individuals who have a fear of mathematics and numbers. These individuals have what is commonly referred to as mathematics anxiety.

Early research focused on the "Trait and State" model of anxiety proposed by Spielberger (2016; as cited in Isiksal, Curran, Koc Gary & Askun, 2018). Following this model, some expressions of anxiety were thought to be associated with individual "traits" (i.e., personality characteristics and/or differences) that increased an individual's vulnerability to anxiety. Alternatively, other expressions of anxiety were thought to be associated with specific "states" or situations where individuals believe they are facing a dangerous situation causing arousal of the autonomic nervous system and a negative emotional reaction (Isiksal et al., 2014).

Personality factors include reluctance to ask questions due to shyness, low self-esteem, lack of confidence, and the influence of previous negative experiences with mathematics or; the innate qualities such as failure to naturally adept at mathematics, which fuels a sense of inadequacy (Adelson, 2016). Since mathematics demands correct answers, it may bring about more anxiety over making mistakes compared to reading and understanding (Menon, 2017). In the case of other students, factors such as the fear of not finishing a timed test, being placed in mathematics courses above level of competence, or feeling not in control of one's life situation, can also contribute to one's math anxiety (Diaz, 2016).

### **2.5.10 Parental Factor**

Parents play a vital role in their children education. The home is the first place of learning to the students before the school. The role of educating students is not only hanged at the neck of teachers, it is also the responsibility of their parents to create awareness, interest and knowledge about handling and guiding their children at home. Parents can also introduce and teach values to their children depending on the level of their education. Uneducated parent do not know important of mathematics knowledge in his life and therefore cannot force the child to learn mathematics (Bed Raj Acharya; 2014).

Parents can serve as the sources or causes of mathematics anxiety to their children since they play a major role in the development of individuals (Gunderson, Ramirez, Levine, & Beilock, 2015) and in providing educational experiences to students (Geist, 2016). Some parents are good at mathematics and set very high expectations for their children in mathematics. They push their children to succeed in the subject by tutoring them and, sometimes, by comparing them with other siblings or peers who excel in mathematics. The negative consequences of parents' high expectations in mathematics are that the child may become anxious about mathematics (Bekdemir, 2016).

Apart from having high expectations for their children in mathematics, some parents stereotype mathematics as a male domain and believe that boys are better in mathematics than girls. This implies that the success of boys in mathematics is due to natural talents while girls' success is a result of hard work (Gunderson et al., 2016). Differing attributions to achievement in mathematics by parents could result in boys frequently getting preferential treatment during mathematics time (Geist, 2016). Furthermore, parents are likely to provide more encouragement and mathematics related

activities for their sons than for their daughters, resulting in deferential treatment of boys and girls. According to Gunderson et al. (2015), differential treatment by parents could be social in nature (e.g., girls are ridiculed when they ask for help) or it could be cognitive in nature (e.g., boys are given more difficult mathematics question to solve, which in turn could result in boys performing at high levels in mathematics).

Furthermore, students from families of low socio-economic background are at a disadvantage in mathematics since they are not typically provided with the extra supports at home or in the community to succeed (Geist, 2016).

### **2.5.11 Socio-economic Status of Parents**

Economics status of parents is also perceived to be one among the causative factors of math anxiety among secondary school students. The early onset of mathematics anxiety amongst secondary school students is most likely caused by social influences and cognitive predispositions. In cognitive predispositions, a student will have negative views towards math in the future as they progress in life if they are lacking in their skills. Cognitively predisposed students are more vulnerable to negative social influence at their tens ages (Maloney & Beilock, 2015).

Economic status of parents determines the education standard of their children. Many literature shows that the economic status of the parents directly affects the Child's learning. Students, whose parents' economic condition is good, mostly have sound education because their parents can manage tutor at home as much as possible which is difficult to find in poor family (Bed Raj Acharya; 2014). To confirm this, he conducted an interview with a group of students on the effect of parents' socio-economic status to their performance. A respondent said that his family economic condition is poor as such he is unable to take extra lessons for mathematics; this made the student to be less interested in mathematics as subject. A mathematics teacher also supported the view

regarding economic condition of the parents as a factor toward students' causes of math anxiety. This teacher said that sometimes he conducts an extra class for weak students but most of the students barely attend due to lack of tuition fee. In the same way a school administrator replied that most of the students in the school were from low economic base and uneducated family background. The children from these families are always busy with household work instead of doing homework after school, so they become weak in mathematics and they are bound to choose other subject because they can't do well in it. On the same matter, a parent said as their economics condition is very low because of traditional agriculture system. Their children are bounded to help them on the farm. This rubbed the children precious and sufficient time to learn mathematics. Also because of their economy they could not be able to manage their children tuition fees for extra class (Interview recorded by Bed Raj Acharya; 27 September, 2014). Social influences might be from peer occurring when other students laugh at them over mathematics discussions.

### **2.5.12 Teachers' Mathematics Content Knowledge**

Lack of adequate knowledge of mathematics in combination with mathematics anxiety; make teachers' abilities to deliver sound mathematics instruction to their students questionable. Other research reported that many teachers at the elementary and high school levels do not necessarily have strong academic backgrounds in mathematics (McAnallen, 2017). Although there are some outstanding mathematics teachers at the secondary school levels, deep understanding of the materials that would help students perform at the highest levels in mathematics is uneven among the teachers (Kajander, Kotsopoulos, Martinovic, & Whiteley, 2016).

According to the Ontario Education Minister, Liz Sandals (as cited by Alphonso & Morrow, 2017), the decrease in students' performance in mathematics could be

associated with elementary teachers' weak academic background in mathematics. In order to resolve this situation, the Minister declared the need to help teachers feel more comfortable with teaching mathematics through professional development. This type of professional development is aimed at "helping teachers become comfortable in teaching the mathematics curriculum by gaining a deep understanding of the concepts they teach" (Hadley & Dorward, 2016, p. 40).

### **2.5.13 Students Nonchalant Attitude towards Mathematics**

Nonchalant attitude that students showed toward mathematics is also a key factor that made students to perform poorly in mathematics, there by having anxiety towards learning mathematics.

Mathematics is a subject that needs constant or regular practice because it has different theory and several formulas that need to be mastered. Generally, mathematics achievements determine students' labor in present situation; students are not laborious in mathematics learning. Therefore, their achievement is less and performance is not as expected therefore anxiety is being created (Bed Raj Acharya; 2014). He further stressed that student's labor is responsible for their performance in mathematics following an interview of some mathematics teachers. Some of the mathematics teachers say that students do not try to learn mathematics and do not want to do extra labor to learning it. They prefer to engage themselves in an unnecessary task even in the class room during learning process.

Mathematics is more complex to understand than any other subject that required more time for drill and practice. But students don't tend to be unserious toward it. In reality students did not give more time to learn mathematics as such when faced with mathematics because of their incompetency of it become anxious towards it.



## **2.6 Theoretical frame work**

### **2.6.1 Cognitive Theory**

Cognitive theory is built around the premise that a person's thoughts control his actions, personality, and to some degree his circumstances. It is an area of psychology that is in sharp contrast with behavioral theory, which states that there is an interrelationship between an individual's behaviors and his physical environment. Some psychologists merge the two theories to form what is called cognitive-behavioral theory. One of the more controversial aspects of cognitive theory is the idea that severe mood disorders can be altered by patterns of thinking.

The main idea behind cognitive theory is that an individual becomes what he thinks. Behaviors are the direct result of internal thoughts, which are able to be controlled. The theory purports that thought processes and patterns can be changed if a person learns how to recognize and correct destructive tendencies. For example, a person's personality and identity can be reshaped through thought manifestation.

In fact, some would go so far as to say that entire life circumstances and outcomes can be directly controlled through the thought process. According to cognitive theory, one way to encourage and unlock new thought patterns is through meditation. Mood disorders, such as depression and anxiety have been shown to be responsive to cognitive forms of therapy. Some experts agree that cognitive therapy is a more effective treatment method than antidepressants alone.

Cognitive theory began to gain a stronghold in the 1980s and 1990s. Many self-help resources are built around the idea of changing a person's life and mood through a change in thought patterns. For example, happiness will continue to elude those who think they are unhappy or who do not see the positive aspects in their situations.

Criticisms of this theory revolve around the idea that the thought process is too complex and abstract to understand completely.

Some might argue that an individual's thought process is not only influenced by his own perceptions, but by the perceptions of others in his environment. Feedback, especially criticism, might stimulate thoughts that are beyond the control of the person who is on the receiving end. While that person can certainly attempt to change those thought patterns and reframe the way the criticism is processed, those negative thought patterns might unintentionally remerge. An additional criticism of cognitive theory is that it is relatively undefined and difficult to apply to the population as a whole.

### **2.6.2 The Growth Zone model**

The Growth Zone model (Johnston-Wilder et al, 2014) is a useful framework for understanding different learning experiences and the feelings associated with each. Everyone encounters some mathematics in daily life which they are comfortable with; for you this might include working out which is the best offer in the supermarket or thinking about which team might win a forth-coming fixture based on past performance; you may be comfortable with understanding percentages and charts used in newspapers. 'Comfort zone' activities are activities where you feel confident about your abilities and do not require help. However, at University, you are likely to need to move beyond this comfort zone into the 'Growth zone' where new learning happens, you may make mistakes and you will need resources and/or help from others. If you are challenged beyond your current level of resilience you may find yourself in the 'Anxiety zone', where a feeling of helplessness and fear take over, your thinking becomes impaired, you feel 'stupid' and effective learning cannot happen. In order to progress with mathematics, you need to move out of that anxiety zone. Ideally you will develop more mathematical resilience and gradually spend more time in your growth zone.

Mathematical resilience is the development of confidence, persistence and perseverance (Williams, 2014) to enable learners to stay in the growth zone as long as possible so that more effective learning can take place

## **2.7 Empirical Studies**

Mathematics anxiety has continued to be an issue of importance to mathematics teachers and educators across the globe. While literature on mathematics anxiety is abundant, previous studies are limited in explaining the predictive effect of factors such as effortful control measures and types of schools.

Lou et al., (2015) conducted a study at a university in west China involving 311 students from a middle (secondary) school. The correlation between mathematics performance and mathematics anxiety was statistically significant negative, and the correlative coefficient was -0.411. The correlative coefficient between the cognitive elements of mathematics anxiety and mathematics performance was -0.339. The results showed the better a student's mathematics performance was, the less mathematics anxiety they experienced. The worse a student's performance was the more mathematics anxiety they exhibited. This confirmed that mathematics anxiety usually happened among low performing students in west China. The participants in this study were only children from middle income families. Although the Lou et al. study contained pertinent and valuable information for the understanding of math anxiety in middle school students, the study did not involve sixth graders and showed ninth graders having the highest level of math anxiety. The research did not cover the factors leading to math anxiety.

Suinn and Edwards (2017) conducted a study of junior high and senior high students, grades 7 to 11, in Arizona and Colorado. The study focused on identifying students experiencing mathematics anxiety. The study sample was compromised of 497

junior high students from Arizona, 1,020 junior high students were from Colorado, and 290 senior high school students were from Colorado. Only 1,780 samples were used because of incomplete data from the different schools. Two instruments were used, the Mathematics Anxiety Rating Scale and a questionnaire. Students indicated the level of anxiety on a 5-point scale from “not at all” to “very much.” The lowest possible score was 98 (low anxiety); a score of 490 indicated a feeling of extreme anxiety. The results from the MARS questionnaire differed. A two-way analysis of variance was computed for the score from each school for the differences in gender. Students with high MARS scores showed lower grade averages in mathematics courses compared to those students with low mathematics anxiety. Boys in the junior high tended to have lower grade averages than the girls. The Colorado junior high schools’ results were also statistically significant for MARS scores ( $F = 40.68, p < .001$ ), but not for gender differences. The study confirmed that high mathematics anxiety, as measured by the MARS, was associated with low mathematics course grades. This study appeared to be a useful diagnostic assessment for identifying students who may need additional help. The only problem with the study was the absence of defining low mathematics course grades. Correlating grades to math anxiety should only be valid if a universal grading scale was used across the different grade levels. At times, grades reflected effort and behavior, not what a student knows or is able to do mathematical.

## **2.8 Summary of Reviewed Literature on this Study.**

As the results of this study the researcher have confirmed, Mathematics anxiety is not caused by single factor but by a combination of several factors. This study therefore concludes that the causes of Mathematics anxiety among senior secondary school students originate from Classroom activities initiated by teachers such as short time spans to complete assignments, high volumes of assigned work, individual competitive

Mathematics tasks, independent Mathematics tasks, being given written work every day and teachers who assign Mathematics homework as punishment for misbehaving, emphasize on drill and practice, focus on speed in getting answers with no room for justification and teachers who follow examples from the textbook. Students and society's myths about Mathematics difficulties and some adjectives (boring, hard) used by the society to describe Mathematics. Personal factors which include lack of confidence, inadequate preparation, lack of persistence, impractical applications of Mathematics and having to work certain topics like logarithms vectors, equations, transformations and circle geometry.

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter will be discussed under the following headings; research design, population of the study, sample and sampling technique, instrument of data collection (validation and reliability) method of data collection, method of data analysis and the summary of the chapter.

#### **3.2 Research Design**

The researcher adopted a survey research design because the research involves data collection about an individual perception on the causes and effects of mathematics.

#### **3.3 Population of the Study**

The population of the study in the senior secondary school students in Bosso LGA. There are twenty(20) senior secondary schools in Bosso LGA with a total population of fifteen thousand, six hundred and thirty-four (15,634) out of which eight thousand and ninety-six (8096) are males and seven thousand, five hundred and thirty-eight (7538) are female For the table of population go to the appendix.

#### **3.4 Sample and Sampling Technique:**

A questionnaire was administered to a sample of three hundred and seventy-five (375) randomly selected students from SS1, SS2 and SS3. The sample is considered to be appropriate in (Krejcie & Morgan, 2015) table for sample size. Four (4) schools were selected from the entire population and Table 3.4 shows the distribution of the sample across the four sampled schools.

The sample size is made of four schools namely; Bosso Secondary School Minna, Maryam Babangida Girls Science College, Model Science College Tudun Fulani Minna

and Abudllahi Dada Secondary School Maikunkele which are represented with School A, School B, School C and School D respectively.

**Table 3.4 sample size table**

<b>GROUP</b>	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
School A	54	45	99
School B	53	40	93
School C	47	40	87
School D	50	46	96
<b>TOTAL</b>			<b>375</b>

*Source: Niger State Ministry of Education Minna (2021)*

### **3.5 Instrument of Data Collection**

The instrument used for this investigation was the Likert scale questionnaire which is an interval scale-ranging from strongly agree to strongly disagree. The instrument was designed by the researcher and was approved by the supervisor. It is a questionnaire for students of the selected schools and it is subdivided into two (2) sections as follows; Section A: Bio-data of students, Section B: Causes of mathematics anxiety. The questionnaire is made of twenty items. The following acronyms were used: Strongly Agree (SA) =1, Agree (A) = 2, Undecided (U) = 3, Disagree (D) = 4 and Strongly Disagree (SD) = 5. A cut up mean of 3.50 level of significance was accepted for research questions.

#### **3.5.1 Validity of Instrument**

The instrument was validated by the supervisor and some other two lecturers from Science Education Department of the Federal University of Technology Minna, Niger State.

### **3.5.2 Reliability of Instrument**

The researcher used survey research method and the reliability of the instrument (questionnaire) used in gathering the data for this research work has a Cronbach's alpha coefficient of 0.80

### **3.6 Method of Data Collection**

An introductory letter seeking for permission to carry out the research work was taken to each sampled school by the researcher and the permission to carry out the research was granted. The questionnaire was administered to the students. The questionnaires were collected after the questions had been answered.

### **3.7 Method of Data Analysis**

The comparative analysis was achieved by means of utilizing Chi-square test. While, the research questions were answered by descriptive statistics: Mean and Standard deviation, where the mean of 0.05 level of significant is set. Any mean less than 0.05 will be rejected while mean greater than or equal to 0.05 will be accepted.



## CHAPTER FOUR

### 4.0 Analysis, Results and Discussions

#### 4.1 Introduction

The purpose of this research is to find the perception of students on the causes of mathematics anxiety in senior secondary school. This chapter includes the result of the procedures used to answer the two research questions and test the one hypothesis. The result includes statistical significance when appropriate and whether the null hypothesis was to be accepted or rejected. The data generated were collected and tabulated. The research questions were answered using mean and standard deviation while the hypothesis was tested using Chi-square test tool tested at 0.05 levels of significances all using the IBM SPSS statistics package version 22.0. In answering the research questions, any item with response mean within 3.50 and above was accepted while any below 3.50 was rejected. The data is analyzed as follows.

#### 4.2 Bio-Data of Students

##### 4.2.1 Gender of Students

**Table 4.2.1 Gender Distribution Table**

<b>Gender</b>	<b>frequency</b>	<b>percentage</b>	<b>Cumulative</b>
		<b>%</b>	
Male	139	37%	37
Female	236	63%	100
Total	375	100%	

Table 4.2.1 shows the gender distribution of the students respondents. From the table we can see that male has the frequency of one hundred and thirty nine (139) respondents which represent 37% of the population, while the female had the frequency of two hundred and thirty six (236) which is equivalent to 63% of the total population.

#### 4.2.2 Class of the Students

**Table 4.2.2 class distribution table**

<b>Class</b>	<b>frequency</b>	<b>percentage</b>	<b>Cumulative</b>
		<b>%</b>	
SS1	70	19%	19
SS2	201	53%	72
SS3	104	28%	100
Total	375	100%	

\*source: Research Field Work (2021)

Table 4.2.2 shows the class distribution of the respondent. SS1 students has the frequency of 70 respondent which is same as 19% of the whole respondent, SS2 happens to be with the total population of 201 as frequency with percentage of 53% and SS3 students has the frequency of 104 with a percentage of 28% of the respondents.

### 4.3 Research Questions

#### 4.3.1 Research Question One

What is the perception of students on the causes of mathematics anxiety in senior secondary school?

##### 4.3.1.1 Societal Factor

##### 4.3.1.1 Distribution Table of Societal Factors causing Mathematics Anxiety

<b>S/N</b>	<b>Causes of anxiety</b>	<b>Mean</b>	<b>SD</b>	<b>Remark</b>
1	Societal believe that mathematics is a difficult subject also contribute to the causes of mathematics anxiety among students.	3.97	3.15	Accepted
2	The requirement of mathematics in all levels of education causes mathematics anxiety among students.	3.96	3.14	Accepted
3	Mathematics is a subject for the brilliant this thought causes mathematics anxiety among students.	4.20	3.32	Accepted

4	Perceived limited career choices available in mathematics in the society causes mathematics anxiety among students	4.39	3.25	Accepted
5	The society believes that mathematics is abstract and doesn't really have a direct or obvious application this causes anxiety to students.	4.65	3.32	Accepted
<b>Grand Mean=4.23</b>				

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\*source: Research Field Work (2021)

Table 4.3.1.1 shows that items 1-5 were all accepted as societal causes of mathematics anxiety among students because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 4.23 is higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students.

#### 4.3.2 School Factors

**Table 4.3.1.2 Distribution Table of School Factors Causing Mathematics Anxiety among students**

S/N	Causes of anxiety	Mean	SD	Remark
6	Non conducive learning environment causes mathematics anxiety among students.	4.00	3.23	Accepted
7	Absence of mathematics laboratories in school causes mathematics anxiety among students.	3.96	3.18	Accepted
8	Lack of reading materials in mathematics causes mathematics anxiety among students.	4.04	3.28	Accepted
9	Overcrowded class causes mathematics anxiety among students.	3.94	3.23	Accepted
10	Time allocated to mathematics in a day causes mathematics anxiety.	3.86	3.09	Accepted
<b>Grand mean=3.96</b>				

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\*source: Research Field Work (2021)

Table 4.3.1.2 shows that items 6-10 were all accepted as school factors that causes of mathematics anxiety among students because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 3.96 is higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students.

#### 4.3.1.3 Teachers' Factors

**Table 4.3.1.3 Distribution Table of Teachers' Factors Causing Mathematics Anxiety**

S/N	Causes of Anxiety	Mean	SD	Remark
11	Teachers' inability to break down concept into simple and understandable units results to mathematics anxiety among students.	3.82	3.09	Accepted
12	Poor teacher-student relationships cause mathematics anxiety among students.	3.86	3.01	Accepted
13	Harshness or strictness of a teacher to students causes mathematics anxiety among students.	3.87	3.06	Accepted
14	Nonuse of instructional materials while teaching causes math anxiety among students.	3.93	3.09	Accepted
15	Teachers' confidence in solving mathematical problems causes mathematics anxiety among students.	4.10	3.30	Accepted
<b>Grand Means=3.92</b>				

\*source: Research Field Work (2021)

Table 4.3.1.3 shows that items 11-15 were all accepted as teachers' factors that causes of mathematics anxiety among students because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 3.92 is higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students.

#### 4.3.1.4 Students' Factors

**Table 4.3.1.4 Distribution Table of Students' Factors causing mathematics Anxiety**

S/N	Causes of anxiety	Mean	SD	Remark
16	Students' negative attitude towards mathematics leads to mathematics anxiety among students.	3.81	3.09	Accepted
17	Parent high demand on mathematics performance causes mathematics anxiety among students.	4.03	3.15	Accepted
18	Students' poor mathematics background causes mathematics anxiety among students.	3.81	3.11	Accepted
19	Students career choice lead to mathematics anxiety among students.	4.39	3.38	Accepted
20	Students' inability to solve mathematical problems results to mathematics anxiety among students.	3.95	3.19	Accepted
<b>Grand mean=4.0</b>				

\*source: Research Field Work (2021)

Table 4.3.1.4 shows that items 16-20 were all accepted as students' factors that causes mathematics anxiety among students because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 4.0 is higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students.

#### 4.3.2 Research Question Two

What is the perception of male and female students on the causes of mathematics anxiety in senior secondary school?

### 4.3.2.1 Societal Factors

#### 4.3.2.1 Distribution Table of Societal Factors causing Mathematics Anxiety

S/N	Causes of anxiety	Gender	Mean	SD	Remark
1	Societal believe that mathematics is a difficult subject also contribute to the causes of mathematics anxiety among students.	Male	3.14	4.07	Accepted
		Female	4.36	3.83	Accepted
2	The requirement of mathematics in all levels of education causes mathematics anxiety among students.	Male	3.89	3.14	Accepted
		Female	3.99	3.15	Accepted
3	Mathematics is a subject for the brilliant this thought causes mathematics anxiety among students.	Male	4.01	3.22	Accepted
		Female	4.30	3.39	Accepted
4	Perceived limited career choices available in mathematics in the society causes mathematics anxiety among students	Male	4.33	3.34	Accepted
		Female	4.41	3.21	Accepted
5	The society believes that mathematics is abstract and doesn't really have a direct or obvious application this causes anxiety to students.	Male	4.47	3.37	Accepted
		Female	4.73	3.29	Accepted
		<b>Grand Mean (males)=3.97</b>			
		<b>Grand Mean (females)=4.36</b>			

\*source: Research Field Work (2021)

Table 4.3.2.1 shows that items 1-5 were all accepted as societal causes of mathematics anxiety among students as perceived by both male and female because they had responses mean greater than the instrument scale mean of 3.50. Also the grand mean of 3.97 by male and grand mean of 4.36 by female are higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students by both genders.

#### 4.3.2.2 School Factors

**Table 4.3.2.2 Distribution Table of School Factors Causing Mathematics Anxiety among students**

S/N	Causes of Anxiety	Gender	Mean	SD	Remark
6	Non conducive learning environment causes mathematics anxiety among students.	Male	4.06	3.27	Accepted
		Female	3.98	3.21	Accepted
7	Absence of mathematics laboratories in school causes mathematics anxiety among students.	Male	3.87	3.27	Accepted
		Female	4.01	3.13	Accepted
8	Lack of reading materials in mathematics causes mathematics anxiety among students.	Male	4.25	3.52	Accepted
		Female	3.94	3.14	Accepted
9	Overcrowded class causes mathematics anxiety among students.	Male	4.12	3.34	Accepted
		Female	3.85	3.15	Accepted
10	Time allocated to mathematics in a day causes mathematics anxiety.	Male	3.92	3.15	Accepted
		Female	3.83	3.06	Accepted
			<b>Grand mean (males)=4.04</b>		
			<b>Grand Mean (females)=3.92</b>		

\*source: Research Field Work (2021)

Table 4.3.2.2 shows that items 6-11 were all accepted as school factors that causes mathematics anxiety among students as perceived by both male and female because they had responses mean greater than the instrument scale mean of 3.50. Also the grand mean of 4.04 by male and the grand mean of 3.92 by female are higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students by both genders.

### 4.3.2.3 Teachers' Factors

**Table 4.3.2.3 Distribution Table of Teachers' Factors Causing Mathematics Anxiety**

S/N	Causes of Anxiety	Gender	Mean	SD	Remark
11	Teachers' inability to break down concept into simple and understandable units results to mathematics anxiety among students.	Male	3.96	4.23	Accepted
		Female	3.75	3.01	Accepted
12	Poor teacher-student relationships cause mathematics anxiety among students.	Male	3.91	3.09	Accepted
		Female	3.84	2.97	Accepted
13	Harshness or strictness of a teacher to students causes mathematics anxiety among students.	Male	4.10	3.19	Accepted
		Female	3.75	2.98	Accepted
14	Nonuse of instructional materials while teaching causes math anxiety among students.	Male	3.81	3.09	Accepted
		Female	3.99	3.08	Accepted
15	Teachers' confidence in solving mathematical problems causes mathematics anxiety among students.	Male	3.88	3.26	Accepted
		Female	4.21	3.31	Accepted
<b>Grand Mean (males)=3.93</b>					
<b>Grand mean (females)=3.91</b>					

\*source: Research Field Work (2021)

Table 4.3.2.3 shows that items 11-15 were all accepted as teachers factors that causes mathematics anxiety among students as perceived by both male and female because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 3.93 by male and the grand mean of 3.91 by female are higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students.



#### 4.3.2.4 Students' Factors

**Table 4.3.2.4 Distribution Table of Students' Factors Causing Mathematics Anxiety**

S/N	Causes of anxiety	Gender	Mean	SD	Remark
16	Students' negative attitude towards mathematics leads to mathematics anxiety among students.	Male	3.84	3.15	Accepted
		Female	3.80	3.06	Accepted
17	Parent high demand on mathematics performance causes mathematics anxiety among students.	Male	4.04	3.21	Accepted
		Female	4.03	3.12	Accepted
18	Students' poor mathematics background causes mathematics anxiety among students.	Male	3.75	3.12	Accepted
		Female	3.85	3.10	Accepted
19	Students career choice lead to mathematics anxiety among students.	Male	4.06	3.31	Accepted
		Female	4.55	3.39	Accepted
20	Students' inability to solve mathematical problems results to mathematics anxiety among students.	Male	3.86	3.10	Accepted
		Female	3.99	3.23	Accepted
<p><b>Grand mean (males)= 3.91</b>  <b>Grand mean (females)=4.04</b></p>					

\*source: Research Field Work (2021)

Table 4.3.2.4 shows that items 16-20 were all accepted as societal causes of mathematics anxiety among students as perceived by both male and female because they had response mean greater than the instrument scale mean of 3.50. Also the grand mean of 3.91 by male and the grand mean of 4.04 by female are higher than the scale mean which implies high perception of those items as causes of mathematics anxiety among students

## 4.4 Test of Hypothesis

### 4.4.1 Hypothesis One:

There is no significant difference between male and female perceptions on the causes of mathematics anxiety in senior secondary school.

**Table 4.4.1 Chi-square Tests for H0<sub>1</sub>**

	Value	df	p-value
Pearson Chi-square	8.065**	4	0.089*
Likelihood Ratio	8.517	4	0.074
Liner-by-Linear Association	3.547	1	0.065
N of valid cases	375		

\*Not significant  $p > .05$

From table 4.4.1 we can see that the p-value is 0.089 which is greater than the 0.05 level of significance. Based on the result, the null hypothesis is accepted. This implies that, there is no significant difference between male and female perception on the causes of mathematics anxiety among secondary school students.

## 4.5 Discussion of Result

From the results and the analysis, it can be deduced that students both male and female have similar perception on the causes of mathematics anxiety among senior secondary school students because all the items that were measured ranging from the societal, school, teacher' and students factors were all accepted as the causes of mathematics anxiety. That is to say society, school, teachers and even the students themselves causes anxiety for themselves.

## CHAPTER FIVE

### 5.0 Summary, Conclusion and Recommendation

#### 5.1 Summary

The overall essence of this study was to determine the perception of students on the causes of mathematics anxiety in senior secondary school.

Results from the findings have shown that the students both male and female have positive perception of the factors that causes mathematics anxiety among secondary school students. These factors that cause mathematics anxiety were categorized into four factors that included societal factors, school factors, teachers' factors and the students' factors.

The society play a role in causing mathematics anxiety to students in the sense that they believed that mathematics is a difficult subject, the high requirement of mathematics in all level of education and they believes that mathematics is for the brilliant students. They also believed that there is no much career opportunity available for anyone that studies mathematics and most of all, they believed that mathematics is abstract as such it create mathematics anxiety to students.

The school contribute to the causing of mathematics anxiety among students in that there is no conducive learning environment, absence of mathematics laboratories that students can go in to see real aspect of the mathematics, there are inadequate reading materials for these students to consult on their own, some classes are overcrowded and the time usually allocated to mathematics lesson in a day causes anxiety to the students.

Teachers also cause mathematics anxiety to students due to inability to breakdown concept into simple and understandable units, poor teacher-students relationships, some teachers are harsh and/or strict to their students, nonuse of instructional materials while teaching and the level of teachers' confidence to solve mathematical problems all causes mathematics anxiety to the students.

The students on their own were not left out as one of the causative factor that causes mathematics anxiety for them. The finding found out that students have negative attitude toward mathematics, their parents' high demand on their mathematics performance, students' poor mathematics background, career choices of students and the students' inability to solve mathematical problems causes mathematics anxiety among them.

## **5.2 Conclusion**

The result of the study revealed factors that contribute to the causes to mathematics anxiety among secondary school students as the society, the school, the teachers and the students as perceived by the students.

## **5.3 Recommendations**

Based on the results of this study, the following recommendations were made;

1. The society should be re-orientated on the importance of mathematics and the role it plays to the national development of any nation.
2. Schools' management and stake holders should provide a conducive and a good learning environment in schools where students can learn with ease.
3. Laboratories and adequate reading materials should be provided in each school so as students can learn mathematics through practical and for further consultations.
4. Mathematics teachers should be re-trained periodically in order to have ideas of innovative approaches of teaching mathematics to avoid causing anxiety among students.
5. Mathematics teachers should be re-trained on the development and use of instructional or technological aids so as to fit in with the world of technology around.
6. Mathematics practical should be included in mathematics curriculum so as to reduce its abstractness to students.
7. A good teacher-students relationship should be encouraged in schools so as the students can be able to tell the teachers what their problem is.
8. Counseling units should be provided in secondary schools to re-direct students' mindset about mathematics to letting them know the importance and usefulness of mathematics in their every day to day activity.
9. Students should be orientated on the career choices available in mathematics so as students can have confidence of learning it.
10. Teachers should de-emphasize the process of correct or wrong answer and encourage their students to justify their answers even on incorrect responses.
11. Teachers should give students less challenging work to boost their confidence in their Mathematics ability.

12. Teachers should exhibit enthusiasm about the subject in order to win the hearts of the learners.
13. Teachers should practice meta-teaching, that is, teachers should always reflect on their practice especially their method of instruction.
14. Teachers should give students ample time to reflect on their answers.
15. Teachers and parents should battle to de-myth the myths held by the society about Mathematics difficulties.
16. Teachers should always employ appropriate teaching strategies for their lessons.
17. Teachers should always select appropriate instructional aids by using students learning styles; these will enhance love, understanding, success and acceptance from the students.
18. Parents should adopt a good support system for their children and not to just send their children for extra lesson without consultation.
19. Parents and teachers should avoid expressing negative attitude about Mathematics.
20. Parents should provide their children with support and encouragement and carefully monitor their children's progress in their academic.

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## Appendix A

### Causes of Mathematics Anxiety Questionnaire

Dear respondent,

Questionnaire on the perception of students on the causes of mathematics anxiety among in senior secondary school

**Instruction:** Kindly complete this questionnaire with utmost sincerity. Your responses are confidential and will only be used for the purpose of this research. Write or tick (√) where appropriate in both sections.

SD – Strongly Disagree, D – Disagree, U –Undecided, A – Agree and SA – Strongly Agree.

#### Section A. Students' Bio-data

1) Gender

Male ( )      Female ( )

2) Class

SS1 ( )      SS2 ( )      SS3 ( )

#### Section B. Causes of Mathematics Anxiety

S/ N	Societal factors	SA	A	U	D	SD
1	Societal believe that mathematics is a difficult subject also contribute to the causes of mathematics anxiety among students.					
2	The requirement of mathematics in all levels of education causes mathematics anxiety among students.					
3	Mathematics is a subject for the brilliant this thought causes mathematics anxiety among students.					
4	Perceived limited career choices available in mathematics in the society causes mathematics anxiety among students					
5	The society believes that mathematics is abstract and doesn't really have a direct or obvious application this causes anxiety to students.					
	<b>School factors</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
6	Non conducive learning environment causes mathematics anxiety among students.					
7	Absence of mathematics laboratories in school causes mathematics anxiety among students.					
8	Lack of reading materials in mathematics causes mathematics anxiety among students.					
9	Overcrowded class causes mathematics anxiety among students.					



10	Time allocated to mathematics in a day causes mathematics anxiety.					
	<b>Teachers' factors</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
11	Teachers' inability to break down concept into simple and understandable units results to mathematics anxiety among students.					
12	Poor teacher-student relationships cause mathematics anxiety among students.					
13	Harshness or strictness of a teacher to students causes mathematics anxiety among students.					
14	Nonuse of instructional materials while teaching causes math anxiety among students.					
15	Teachers' confidence in solving mathematical problems causes mathematics anxiety among students.					
	<b>Students' factors</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
16	Students' negative attitude towards mathematics leads to mathematics anxiety among students.					
17	Parent high demand on mathematics performance causes mathematics anxiety among students.					
18	Students' poor mathematics background causes mathematics anxiety among students.					
19	Students career choice lead to mathematics anxiety among students.					
20	Students' inability to solve mathematical problems results to mathematics anxiety among students.					

## Appendix B

### Population table

S/ N	NAME OF SCHOOL	SS1			SS2			SS3		
		M	F	To.	M	F	To.	M	F	To.
1	Abudllahi Dada Secondary School Maikunkele.	65	57	122	60	61	121	42	51	93
2	Bosso Secondary School Minna	207	255	462	237	208	445	91	57	148
3	Day Secondary School Gbada Gidan Mangoro	134	97	231	109	87	196	97	60	157
4	Day Secondary School Chanchaga 'B'	129	104	233	131	136	267	97	80	177
5	Day Secondary School Garatu	79	58	137	81	31	112	53	45	98
6	Day Secondary School Maikunkele 'A'	73	48	121	68	50	118	60	30	90
7	Day Secondary School Maitumbi Minna	164	200	364	184	200	384	120	90	210
8	Day Secondary School Pyata Bosso	39	48	87	95	82	177	103	90	193
9	Day Secondary School Shata Bosso	32	36	68	59	37	96	62	35	97

10	Federal Government College Minna	168	140	308	171	170	341	151	117	268
11	Government Army Day Secondary School	399	381	780	358	353	711	309	251	560
12	Government Day Secondary School Beji	95	76	171	66	56	122	70	58	128
13	Government Science College Chanchaga	129	197	326	215	260	475	161	185	346
14	Government Senior Secondary School Kampala	58	80	138	58	40	98	72	50	122
15	Government Technical College Minna	466	60	526	450	63	513	279	58	337
16	Maryam Babangida Girls Science College	0	251	251	0	576	576	0	421	421
17	Model Girls Science College Tudun Fulani	83	99	182	80	92	172	62	54	116
18	Niger State School For Special Education Minna	25	12	37	27	10	37	20	11	31
19	Sheikh Muhammad Sambo College of Arts and Islamic Studies Tudun Fulani	333	132	465	316	56	372	211	35	246
20	Sir. Ahmadu Bello Model Secondary School	296	352	648	206	342	548	91	167	258
	<b>TOTAL</b>	<b>2974</b>	<b>2683</b>	<b>5657</b>	<b>2971</b>	<b>2910</b>	<b>5881</b>	<b>2151</b>	<b>1945</b>	<b>4096</b>