Contributions of Time Spend on Doing Homework and Mathematics Anxiety to Mathematics Achievement of Secondary Schools Students

Jimma University

College of Education and Behavioral Science

Department of Psychology

MA Thesis for Graduate Studies

By

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The Contribution of Time Spend on Doing Homework and Mathematics Anxiety to Mathematics Achievement of Secondary Schools Students.

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DECLARATION

I, the under signed, declare that this thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

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This is to certify that the thesis prepared by Shiferaw Moru entitled: The Contribution of Time Spend on Doing Homework and Mathematics Anxiety to Mathematics Achievement of Secondary Schools Students and submitted in partial fulfillment of the requirement for the degree of Masters of Arts complies with the regulation of the University and meets the accepted standards with originality and quality.

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Table of contents

List of Tables

Abbreviation

NEAEA: National Educational Assessment and Examinations Agency

STEM: Science, Technology, Engineering and Mathematics

MOE: Ministry of Education

E.C: Ethiopian Calendar

Abstract

The main purpose of this study was to figure out the influence of time spend on doing homework and mathematics anxiety on mathematics achievement of students. A correlation research design with the involvement of 317 students from 3060 of grade 9 and 10 of Garba Guracha administrative town's secondary schools. Stratified followed by simple random sampling techniques were employed to select the subjects of the study. Questionnaires and mathematics achievement were used as tools for collection of data. Data were analyzed using descriptive statistics such as percentage, mean and standard deviations and inferential statistics like Pearson correlation, multiple regression, independent sample t-test and One-way ANOVA methods. The results indicate that without controlling for other factors, students who spent more than 5hours per week on doing mathematics homework scored higher in their achievement than those spent their time; none hour, 2 hours, 3 hours, 4 hours and 5 hours. The level of students' mathematics anxiety is at moderate which accounts mean of 26.47. Time spend on doing homework has week positive correlation with mathematics achievement (r = 0.093). Mathematics anxiety has modest negative correlation with mathematics achievement (r = -0.298). The result showed that mathematics anxiety has significant impact on students' mathematics achievement. But even if it has some contribution on mathematics achievement, time spend on doing homework has not significant impact. On mathematics achievement and time spend on doing homework Alamayo Atomsa secondary school students were significantly scored better than Garba Guracha secondary school students but significantly scored less on mathematics anxiety. On achievement of mathematics males were significantly perform better than female but experienced less mathematics anxiety than female. Likewise, grade 10 students significantly scored higher on mathematics achievement than grade 9 students. But there is no significant mean difference on time spend on doing homework and mathematics anxiety between grade 9 and 10 students. There is no significance difference on study variables as a result of parent's educational status. It is recommended that students should be make practice on mathematics homework and other activities and have self confidence to ensure that their mathematics anxiety not last to influence their achievement.

Chapter One

Introduction

1.1. Background

Currently, the Ethiopian educational system has paid due attention to school subjects with special emphasis on Science, Technology, Engineering, and Mathematics (STEM) education. Related to these expansion efforts, Ministry of Education in Ethiopia has published professional mix guidelines based on a 70:30 annual intake ratio favoring the placement of students in the field of science and technology (MoE, 2008; as cited in Yilfashewa, 2018). This indicates the extent that the country has paid attention to science and technology, and how much consideration the government has given for the advancement of science, technology, and mathematics education. This idea is emphasized by Benbow and Arjmand, (1990) that the development of science shows a tendency to become more mathematical methods and mathematical styles are penetrating everywhere.

Homework has always been one of the most prominent features and an integral part of instruction in most educational systems. The traditional definition of homework is that it is any task or assignment that an instructor requires the student to complete during nonschool hours (Cooper, Robinson, &Patall, 2006). A more appropriate way to define homework is that it encompasses all activities that a teacher requires his/her students to conduct during non-instructional time (Harris Cooper, as cited in Bembenutty, 2011).

Although a wealth of literature in the field of education exists on the link between time spent on homework and academic achievement, many of the prior studies based their findings on samples that do not readily generalize to national populations. Even in nationally representative studies, results are not always in agreement across subpopulations. For instance, Mau and Lynn

(2000) showed the existence of significant positive correlations between time spent on homework and achievement scores in mathematics, reading, and science. These correlations ranged between .17 and .36. Furthermore, they showed that such correlations differed significantly between males and females with the correlations for females exceeding those for males. These differences suggest that homework may play a more important role in the achievement scores of females than those of males. On the other hand, in a recent study, Kitsantas et al. (2011) showed that more time spent on mathematics homework does not necessarily translate into higher test scores in mathematics. Using a sample of 5,200 fifteen year old high school US students from a national survey, they showed that a negative and weak but significant association exists between proportion of time spent on mathematics homework and mathematics achievement. Unlike Mau and Lynn (2000), Kitsantas et al. did not find any significant difference between males and females in terms of the effect of time spent on homework on academic achievement.

Another factor which might hinder students in learning mathematics is due to their anxiety on the subject. Mathematics anxiety should be regarded from a larger perspective. It is a complex construct consisting of “affective, behavioral and cognitive responses to a perceived threat to self-esteem which occurs as a response to situations involving mathematics” (Atkinson, 1988). Cemen (1987) defined it as a “state of discomfort created when students are required to perform mathematical tasks”, whereas Richardson et al. (1972) described it as "feelings of tension and apprehension that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary and academic situations". In fact, mathematics anxiety is more than a dislike toward mathematics.

Many people experience a genuine fear of mathematics and become nervous when engaging in mathematical tasks (Maloney et al., 2012; Vinson, 2001), avoid mathematics and mathematics-related professions, severely limiting their future career and earning opportunities (Hembree, 1990; Chipman et al., 1992). The resulting shortage of skilled science, technology, engineering and mathematics (STEM) workers has negative consequences at the national level (Chipman et al., 1992). This is particularly true as our society becomes increasingly dependent upon technology.

In mathematics education, plenty of researchers endorse innovative ways of teaching, linking concept and real- life applications and motivating the students to have interest in mathematics (Hemmings et al, 2011: as cited in Gilbert & Denis, 2018). Therefore, in order to meet students' needs and thirst for mathematics, effective teaching pedagogy must be applied in the classroom. However, in the study of Dagaylo-an & Tancinco (2016) concluded that the teaching approach used by the teachers in Mathematics has nothing to do with the Math anxiety of the students. Furthermore, they concluded that there is no significant relationship between the level of mathematics anxiety and the mathematics performance of the students.

Though there is an agreement that mathematics is a fundamental subject for the development of any country in general and development of individual's minds in particular, many students experience an anxiety or dislike of mathematics during the school years (Attard, 2013; as cited in Aweke, 2018). Because of this, achievement of students in mathematics is low (National Educational Assessment and Examinations Agency, NEAEA, 2014), students' interest to study the field as well as their foundation skills in mathematics is at a predicament state.

1.2. Statement of the Problem

In the process of reaching a medium income country, science, mathematics and technology have become an emphasis in the education system of Ethiopia. The researchers have observed various studies done throughout secondary schools students on the issue the relationship between time spent on doing homework and mathematics anxiety with mathematics achievement. In this connection review of local studies conducted in Ethiopia concerning the relationship between mathematics anxiety and students' mathematics achievement indicated different results. For instance, according to Aweke, (2018) there was a significant negative relationship between mathematics anxiety and mathematics achievement. The mathematics anxiety level was found at the average level which indicates the existence of constrain in Ethiopian schools.

Getachew, (2015) indicated mathematics achievement was highly correlated with students' attitude towards mathematics and mathematics anxiety. But contrary to this, Belete, (2014) indicated that there is positive relationship between student's achievement in mathematics and student's affective factors (perceived usefulness, self-concept, motivation, anxiety and confidence). This implies that there is no significance relationship between each affective factor (perceived usefulness, self-concept, motivation, anxiety and confidence) and their mathematics achievement.

Lower result in mathematics may be partly explained by students' mathematics anxiety. Failing to devote their time in doing homework, teachers teaching skill, family educational background and materials may also factors which influence students' mathematics achievement. It is possible to see both Garba Guracha and Alemayo Atomsa secondary schools' 2011E.C 2nd semester grade 9&10 students' mathematics achievement scores from 100%. As indicated in the

table -1 below in each school as well as in each grade in average almost about 50% of the students did not get passing mark.

Table-1: 2011 E.C second semester Students' Mathematics Achievement data

School Name	Grade	No. of students		No. of students got passing mark (>= 50 % from 100%) on achievement score			
		Male	Female	Male	%	Female	%
Garba	9	694	723	361	52	354	49
Guracha	10	458	419	257	56	214	51
Alemayo	9	230	180	127	55	72	40
Atomsa	10	155	125	95	61	48	38

Even though there were many studies conducted on time spent on doing homework and mathematics anxiety, the effect size and direction of the relationship with students' mathematics achievement was inconsistent. Additionally, when we see the local studies there was no much investigation on the association between time spend on doing homework and students' mathematics achievement. Therefore, this study is designed to test the inconsistency of results and to fill the local study gap. This study is interested to assess how much students devote their time to do homework to score good mathematics achievement, students' mathematics anxiety level and to what extent do time spend on doing homework and mathematics anxiety influences mathematics achievement of grade 9&10 students.

Thus, the study sought to answer the following Research Questions.

1. How often do students work their mathematics homework?
2. What is the level of students' mathematics anxiety?
3. What is the extent of relationship between time spend on doing homework, mathematics anxiety and mathematics achievement of students?

4. Which independent variable (time spend on doing homework or mathematics anxiety) predict students' mathematics achievement scores (dependent variable)?
5. Is there a significant difference on time spent on doing home work, mathematics anxiety, and students' mathematics achievement among study participants as a result of school type, gender, grade level, and parent's educational status?

1.3. The Objective of the Study

1.3.1. General Objective

The general objective of this study is to figure out the influence of time spent on doing home work and mathematics anxiety on mathematics achievement.

1.3.2. The Specific Objective of the Study

1. To assess how much do students devote their time in doing mathematics homework.
2. To assess the level of students' mathematics anxiety.
3. To assess the relationship between time spend on doing homework, mathematics anxiety and students' mathematics achievement.
4. To assess the extent to which time spent on doing mathematics homework and mathematics anxiety level of students predict students' mathematics achievement.
5. To explore the differences of time spend on doing homework, mathematics anxiety level and mathematics achievement among study participants as a result of school type, gender, grade level, and parent's education?

1.4. Significance of the Study

The finding of this study is expected to have particular utility in the effective teaching and learning processes in the subject mathematics. Primarily, it helps the student in advancing

the direction of relationship between time spend on doing homework, mathematics anxiety and their mathematics achievement and the ways in which they can be familiar to mathematics. Secondly, it has various advantages for teachers; to come up with innovative way of teaching, to address students' fear of mathematics and facilitating the ways in which his/her students deal with mathematics homework. Thirdly, it helps the school administrative in being aware of mathematics anxiety level of students and the importance of spending time on doing home work of students to take action for improvement. Fourthly, it helps school counselors to teach/counsel students to overcome their mathematics anxiety. Lastly, but not least educational experts, policy makers and concerned stakeholders may use the result of this study in implementing educational policies, strategies and programs.

1.5. Delimitation of the Study

The scope of this study was delimited in the Garba Guracha and Alemayo Atomsa secondary schools which are found in Garba Guracha administrative Town, Kuyu Woreda, North Shoa Zone, Oromia regional state, Ethiopia. The participants of the study were both ninth and tenth grade students in both schools. This study was focused on time spent on doing homework and mathematics anxiety of the students on the study area to know how they influence the students' mathematics achievement.

1.6. Limitation of the Study

Since any research activities require the accessibility of relevant and adequate related materials to conduct the study, the researcher faced a problem of getting necessary literature on students' time spent on doing mathematics homework in Ethiopian context.

An incomplete response given by some respondents on questionnaires was another limitation of this study.

1.7. Operational Definition

Mathematics Achievement Scores: refers to Garba Guracha and Alemayo Atomsa secondary schools grade 9 and 10 students' mathematics score of year 2012 E.C first semester.

Mathematics anxiety: refers to a state of acting nervously at a time dealing with any activity relating to mathematics.

Homework: refers to all mathematics activities that a teacher requires his/her students to do during non instructional time.

Time Spend on Doing Homework: refers to the time that students devoting on doing mathematics homework given by their teacher to enhance their achievement.

Secondary School Students: refers in this study to grade 9 and 10 students of Garba Guracha and Alemayo Atomsa secondary schools found in Garba Guracha Administrative town.

Chapter Two

Literature Review

The influence of avoiding spending time on mathematics home work and mathematics anxiety on mathematics achievement among high school students is an issue of great concern for different researchers. This part of the study, thus, reviews the contentions of various studies in the area. To this effect, the following themes will deal with goals of home work, impact of home work definition of mathematics anxiety, and area of mathematics anxiety and its impact.

2.1. Homework

2.1. 1. Definition of Homework

Homework is defined as any type of academic work assigned by a teacher to be completed at home. The assignments may be completed during a study hall period, or other class time (Cooper, 2001).

2.1.2. Goals of Homework

Whether or not students are overburdened, homework remains a task all students must complete at some point in their education. Therefore, in order to evaluate its impact, it is important to consider the underlying goals of homework. What is it teachers seek to achieve by assigning work for students to complete outside of class time? Two purposes commonly discussed in the research literature are the practice of concepts already discussed and preparation for upcoming material (Epstein & Van Voorhis, 2001). In those schools participating in the recently popular movement of "flipping" the classroom (Sparks, 2011), students are tasked with reviewing online videos of their teacher (i.e., lecture) and other materials presenting content and are responsible for learning the basic content on their own before engaging in activities and

practice during subsequent in-school class periods. Others claim that homework develops study skills, student responsibility, communication skills and other factors that are more difficult to measure (Cooper, Robinson, & Patall, 2006). These objectives are not necessarily exclusive to one another. In other words, a teacher may assign homework that bridges the gap between previously covered material and concepts yet to be taught, and completion of the work also helps the student develop study skills.

Regardless of the directed purpose, both teachers and students assume that completion of homework will deepen conceptual understanding and lead to greater student achievement (Epstein & Van Voorhis, 2001; Xu, 2005). Whatever the intended goal of the homework tasks, what these assignments do is extend the school day beyond regular class instruction. In many ways, homework provided the original mechanism to increase learning time. Recently, the approach to increase learning time involves schools and districts around the country extending the length of the school day (e.g., Chicago Public Schools, Oklahoma City Public Schools) or the school year (e.g., Massachusetts, North Carolina, Washington) in efforts to try to improve student achievement. While these moves are generally supported by research indicating a positive association between extended learning time and student achievement, the research base is not extensive nor particularly strong (Patall, Cooper & Allen, 2010). Not surprisingly, the conclusions of many researchers is that it is not simply an increase in instructional time, but the way that time is used that is most important.

2.1.3. Impact of Homework

Secondary school teachers were more likely to use homework to prepare students for work yet to come and to enrich classroom activities (Muhlenbruck, et al, 2000). Teachers also most frequently cite homework as a method of communication with parents (Carvalho, 2001),

Lehr & Osborn (2002) as cited by Getnet, (2009) list many reasons for homework assignments. These reasons include communication, practice, re-teaching, and preparation. It helps parents know what their child's strengths and weaknesses are academically (Epstein & Voorhis, 2001). Teachers can and should use parent involvement practices to create more understanding of the school environment.

A research by Cooper (1994) showed that homework can have both positive and negative effects. Cooper reported the positive effects of homework included "improved attitude toward school; better study habits and skills; [and] learning [was] encouraged during leisure time; greater self-discipline; better time organization; [and] more independent problem solving" . Cooper also reported significant negative effects of homework as "loss of interest in academic material; copying [homework] from other students; and [getting] help beyond tutoring". Research by Brahier (2000) has shown that the positive effects of homework generally outweigh the negative effects. Brahier suggested that teachers follow assessment principles in assigning and evaluating home work effectiveness. The homework assignment should be consistent to the overall teaching strategy and assessment for the course. Cooper et al. (2006) conducted a meta-analysis of the results from the studies and concluded that the amount of homework completed by students has a significant and positive relationship with student achievement and noted that this relationship is greatest for secondary students.

2.2. Anxiety of Mathematics

2.2.1. Definition of Mathematics Anxiety

Mathematics anxiety can be defined as the general lack of comfort that someone might experience, along with the feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of life and academic

situations (Richardson &Suinn, 1972). On the other hand, mathematics anxiety defined as tense or worrisome feelings that significantly hinder mathematical performance in academic and ordinary life situations (Ashcraft, 2002; Richardson & Suinn, 1972).

Likewise, mathematics anxiety is a phenomenon in which students suffer from an irrational fear of mathematics that affects their ability to learn, comprehend, practice, and perform mathematical problems and procedures. (Miller & Mitchell, 1994). This anxiety can cause an inability to think and/or process new information. Students are not born with math anxieties; they are victims to the system.

2.2.2. Area of Mathematics Anxiety and its Impact

According to Hadfield and McNeil (1994) the causes of mathematics anxiety can be divided into three areas: environmental, intellectual and personality factors. Environmental factors include negative experiences in the classroom, parental pressure, insensitive teachers, mathematics taught as a rigid set of rules and non-participatory classrooms. (Dossel, 1993) intellectual factors include being taught with mismatched learning styles, student attitude and lack of persistence, self-doubt, lack of confidence in mathematical ability and lack of perceived usefulness of mathematics. (Cemen, 1987) Personality factors include reluctance to ask questions due to shyness, low self-esteem, and viewing mathematics as a male domain.

Research on the relationship between student anxiety about mathematics and student ways of knowing is limited, and is needed (Muis, 2004). Researchers believe that mathematics anxiety is rooted in student experiences with formal mathematics instruction from kindergarten through high school (Hauge, 1991; Jackson &Leffingwell, 1999). Anxiety about mathematics which arises during primary and secondary education accompanies matriculating students to the college mathematics classroom (Betz, 1978; Zakaria & Nordin, 2008). Anxiety about

mathematics is so pronounced in some students that they avoid mathematics at all costs, some going as far as lowering achievement goals or quitting school altogether (Tobias, 1991).

2.2.3. Mathematics Anxiety and Mathematics Achievement

The first mathematics anxiety measurement scale was developed by Richardson and Suinn in 1972. Since this development, several researchers have examined mathematics anxiety in empirical studies. Hembree (1990) conducted a thorough meta-analysis of 151 studies concerning mathematics anxiety. It determined that math anxiety is related to poor mathematics performance on mathematics achievement tests and that mathematics anxiety is related to negative attitudes concerning mathematics. Hembree also suggests that mathematics anxiety is directly connected with mathematics avoidance.

Mathematics anxiety is an especially promising mediator of the relationship between parental involvement and children's mathematics achievement specifically because of the link between parenting practices and children's anxiety-related behaviors more generally (e.g., McLeod, Wood, & Weisz, 2007; Wood, McLeod, Sigman, Hwang, & Chu, 2003) as cited Vukovic, Roberts, and Green Wright (2013) and because of the well-documented relationship between mathematics anxiety and mathematics achievement (Hembree, 1990). Indeed, highly mathematically anxious students enjoy mathematics less, are less confident in their mathematical. Abilities, and, as early as middle school, steer away from mathematics courses (Ashcraft, 2002; Hembree, 1990). Ashcraft also suggests that highly anxious mathematics students will avoid situations in which they have to perform mathematical calculations. Unfortunately, mathematics avoidance results in less competency, exposure and mathematics practice, leaving students more anxious and mathematically unprepared to achieve. In college and university, anxious mathematics students take fewer mathematics courses and tend to feel

negative towards math. In fact, Ashcraft found that the correlation between mathematics anxiety and variables such as confidence and motivation are strongly negative.

2.2.4. The Effect of Gender and Family Background on Mathematics Anxiety

The relationship between gender and mathematics anxiety has also been studied extensively; but findings have not been consistent. There are many studies that have found significantly greater levels of mathematics anxiety in females than males (Wigfield A, Meece, 1988). However, there are also many Studies that show no gender differences in mathematics anxiety (Chiu L, Henry LL, 1990,). There are indeed a few studies that have found higher Mathematics anxiety levels in males than in females. Indeed, many different mathematics anxiety measures have been used in past studies. Hembree's meta analysis revealed that females' higher mathematics anxiety did not result in poorer mathematics performance and that mathematics anxiety was more predictive of mathematics performance in males (Hembree R, 1990).

Ma and Xu (1999) also found gender differences in the relationship between mathematics anxiety and achievement. Specifically, they found that boys' prior low mathematics achievement predicted later high mathematics anxiety at all grade levels, however girls' prior low mathematics achievement only predicted later high mathematics anxiety at critical transition points during schooling (for example, transferring from middle school to secondary school).

A possible explanation for the findings of a greater relationship between mathematics anxiety and achievement in males is that girls tend to experience mathematics anxiety whether or not they have any intrinsic difficulties in mathematics, whereas Mathematics Anxiety in boys is more likely to reflect initial problems in the subject. Alternatively, boys' performance may be more negatively affected by anxiety, perhaps because it is less socially acceptable for them to

communicate their anxieties, and thus they may be less likely to develop or be shown effective strategies of dealing with anxiety. On the other hand, other studies have failed to find gender differences in the relationship between mathematics anxiety and performance/achievement.

Many studies indicate small differences in the level of mathematics anxiety experienced by females as compared to males. Hembree (1990) states that females are show a higher degree of mathematics anxiety in particularly at the post -high school level. Research conducted by Lupkowski and Schumacker as cited by Hembree (1990), involving mathematics anxiety among talented students, showed that female students who do experience low levels of mathematics anxiety might even perform better in mathematical situations.

Accordingly, Drew (1992) states in Hall (1999) that women who have high abilities in mathematics are more likely than men with high abilities to understate their mathematics abilities. In contrast, both males and females may experience the same trouble doing mathematics. However, males will not be as likely to be affected by the mathematics anxiety they experience (Tobias, 1980).

Hall (1999) suggested that parents form impressions of their child's interest and abilities in general on the basis of their own beliefs. Parents communicate their beliefs and attitudes about mathematics and its utility through their individual practices. The outcome of these communicated attitudes is one in which students take on their parents' mathematics anxiety (Bush, 1991). Parental influence is therefore significant in the instilling of mathematics anxiety

2.2.5. Causes of Mathematics Anxiety

The most frequently cited cause is the teacher, identified by Foong (1987) as the main source of students' tension. Highly-tensed students dread presenting solutions in front of their classmates, viewing such situations as threatening (Ashcraft, 2002). Teachers who complained of

insufficient instructional time might resort to preparing their students for assessment rather than for understanding. This creates more tension when students encounter unconventional problems or when the mathematics becomes more advanced. Researchers also claimed that anxious teachers spend lesser time teaching mathematics and are more likely to pass their phobia to their students (Hembree, 1990; Ma, 1999). Like teachers, parents could also pass their dread of mathematics to their children (Hembree, 1990). Parents who are overly-concerned about results end up pressurizing their children, more so in Asian countries. Then there exists this myth that mathematical ability is inborn or hereditary (Godbey, 1997). Others believed that females are weaker in mathematics even though researchers (Hembree, 1990) have found that though females tend to be more anxious, they are not necessarily weaker in mathematics.

Studies on the impact of teaching methods have been inconclusive. Norwood (1994) as cited in Preston (2008) argued that traditional methods intensified students' anxieties though he found that college students who were weak in mathematics were more at ease with lecture-based teaching. Newstead (1998) claimed that students were more nervous working in groups and Preston added that as most teachers were recipients of direct instruction, they might not enjoy teaching in the constructivist way. Next, mathematics has being viewed as an inherently difficult subject. Many students are unable to see its practicality and teachers seldom attempt to make the connections. Foong (1987) explained that due to its cumulative and sequential nature, when students missed out something along the way, it is likely that they may never fully comprehend it.

Furthermore, some students have repeatedly performed poorly, leading to loss of self confidence and increased tension. There are others who believe that mathematics is a measure of their intelligence (Puteh, 2002) and are embarrassed by their inadequate performance. Lastly,

student cohesiveness within a class has been found to have a significant positive correlation with mathematics anxiety level (Taylor & Fraser, 2003). The literature review has underlined the multi-faceted and varied nature of the origins of mathematics anxiety, thus supporting the research aim to assess our students' anxieties.

2.2.6. Conceptual Framework

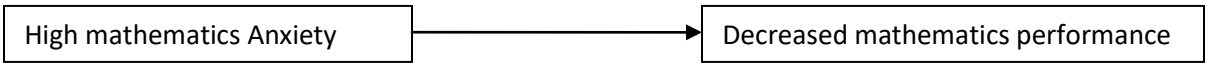

Fig1 Image showing a causal relationship from high mathematics anxiety to decrease mathematics performance adopted from (Carey et al., 2015)

People with maths anxiety are less likely to enroll in maths classes (Hembree, 1990), and that those with maths anxiety do especially poorly in questions which require a high level of working memory to solve (Ashcraft & Kirk, 2001). This suggests a tendency towards maths avoidance in those with maths anxiety, which has a negative impact on both learning opportunities and recall in tests (Carey et al., 2015).

Chapter Three

Methods

3.1. Research Design

In order to address the research questions and objectives of this study, correlation research design was used. Creswell (2012) indicated that in correlation research design, investigators use the correlation statistical test to describe and measure the degree of association (or relationship) between two or more variables or sets of scores. Here mathematics anxiety and time spent on doing homework were independent variables whereas mathematics achievement was the dependent variable. It was suggested that correlation research design helps to study the relationships between study variables (time spend on doing homework, mathematics anxiety and mathematics achievement of students).

3.2. Target Population

Garba Guracha administrative town has two secondary school namely Garba Guracha secondary school and Alemayo Atomsa secondary school. The current study was conducted in both Garba Guracha and Alemayo Atomsa Secondary schools. These schools were selected purposefully because the researcher made document analysis on the 2011 E.C students' second semester roster of the two secondary schools to evaluate the students' prior mathematics achievement and made observation on the reaction of the students on doing homework. Therefore, the students' roster showed that, only 50.25% of students scored passing mark in both schools. Concerning homework most of the time in both schools students fired out during mathematics class because of not doing homework and ordered to call their parents. These were the reasons behind that forced the researcher to select these schools for study. The target population consists of 2564 students from grade 9 and 516 from grade 10 in sum 3060 students

who are learning in both secondary schools in the academic year 2012 E.C. in Garba Guracha administrative town.

3.3. Participants and Sampling

There were 3060 grade 9 and 10 students in Garba Guracha and Alamayo Atomsa secondary school. So as to get better representation of students' population, a stratified random sampling based on students' school, grade and section followed by simple random sampling technique was used. The sample population sizes of students from each school and grade for the study were separately determined based on the formula of sample size determination suggested by Krejice& Morgan, (1970). The level of significance was taken as 95%, (Z=1.96), margin of error 5% (e=0.05). The sample size was calculated using the following standardized

Formula: $\boldsymbol{n = \frac{z^2}{4e^2 + \frac{z^2}{N}}}$

Where: n= required sample size, N= population size, Z- critical value at 95 % confidence level assumption (1.96), and e- margin of error between the sample and population or the precision (0.05). Thus the sample size was calculated as $n=1.96^2/ (4*0.05^2) + 1.96^2/3060 = 341$

Therefore the method of sample selection that suggested by Krejice and Morgan was applied to draw the sample of this study. From the total of 2564 grade 9 a sample of 284 and from the total of 516 grade 10 students a sample of 57 were taken. In sum, 341 students were taken as a sample of this study.

The number of sampled survey student in each class was allocated proportionally by using the relation: $\boldsymbol{ni = \frac{n}{N} Ni}$ where $\boldsymbol{Ni}$ is the number of students in each class; and $\boldsymbol{ni}$ is the required sample size in each class of the students. The sample distribution of the students was shown in the following table-2 below.

Table-2 Sample Distribution of the students

Ser. no.	School Name	Grade	Total number of population			Number of sample		
			Male	Female	Total	Male	Female	Total
1	Garba Guracha secondary school	9	991	875	1866	110	98	208
		10	288	99	387	32	11	43
		Total	1279	974	2253	142	109	251
2	Alamayo Atomsa secondary school	9	341	337	678	39	37	76
		10	96	33	129	10	4	14
		Total	437	370	807	49	41	90
Total		9	1332	1212	2564	149	135	284
		10	384	132	516	42	15	57
		9&10	1716	1344	3060	191	150	341

3.4. Source of Data

To gather relevant information upon the relationship of time spent on doing homework, mathematics anxiety and mathematics achievement, primary and secondary data source were used. Primary data was obtained through questionnaire and secondary data was obtained from students' mathematics achievement score.

3.5. Instruments of Data Collection

In order to collect reliable and sufficient information from different sources in the study area, two data collection tools were employed. Questionnaires were used to collect data from primary source and for secondary data source students' mathematics achievement score was used.

3.5.1. Questionnaire

The questionnaire part constitutes three parts. Part one included demographic part such as school name, gender, age, grade and section. Part two included items related to students themselves about how much time they spend on doing mathematics homework per week and their parent's educational status. Part three dealt with mathematics anxiety measuring scales which help to obtain data of respondents' feeling. The scale was adopted from Mahmood and Khatoon (2011).

This anxiety scale included fourteen items. The odd numbered items were worded positively and the even numbered items were worded negatively. The numbers of odd and even items were equal. Both negative and positive number items were measured on Likert type scales where the value ranges 1= strong disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree. The mathematics anxiety score was calculated by adding the individual scores of all the items together, where possible standard deviation and mean were calculated, the higher the mean score the more anxiety of the students towards mathematics. 5-point Likert type scale assesses positive and negative dimensions of mathematics anxiety. This scale produced two factors, the first representing positive/ doing well in mathematics and second representing negative/not doing well in mathematics. Before, this bi-dimensionality mathematics anxiety scale had Cronbach alpha of .87 using 250 secondary school students. 14 items were administered to the pilot sample students and internal consistency of reliability of the mathematics anxiety scale was checked by Cronbach Alpha formula. Initially, the reliability coefficient of the instrument was found to be r = 0.764. But for the main study, only 9 items which has greater than 0.3 corrected item total correlation were selected. The main study reliability for mathematics anxiety scale was r=0.854. Moreover, to minimize obtaining wrong data due to language confusion, the English version of

the Mathematics anxiety measuring scale was changed to Afan Oromo version. The language translation was made by my staff partner who has rich experience in the area and also checked by three English teachers for consistency with Afan Oromo Version.

3.5.2. Mathematics Achievement Scores

This was the second basic instrument, which shown students achievement. The student' first semester of 2012 E.C mathematics score out of 100 % was considered.

3.6. Pilot Test

To determine Mathematics anxiety measuring scale's validity and reliability, pilot testing was conducted on 30 grade 11students in Alamayo Atomsa secondary school. Important direction was given for students to give response to the questionnaires. The number of male and female participants was sampled proportionally. Finally, the responses of the respondents were entered in to SPSS version 20 to compute item inter correlation and Cronbach-Alpha in order to evaluate the scales and their reliability. As a result, the internal consistency reliability of the scale was found to be r = 0.764. But for the main study, only 9 items which have greater than 0.3 corrected item total correlation were selected. The main study reliability for mathematics anxiety scale was r = 0.854.

3.7. Procedures of Data Collection

Primarily, the total number of grade 9 and 10 students was collected from both secondary schools. Secondly, depending on the known target population, using the formula Krejice& Morgan, (1970), the sample size for each school, grade and section were drown proportionally. Then discussion was held with each school administrators on the way the questionnaires could be distributed to the students and how the students' first semester mathematics achievement

obtained. As a result, the schools' administrators facilitated things and permitted the researcher to collect the needed data.

The collection process was started by coding and distributing questionnaire to sample students. The data was collected with the assistant of secondary school teachers, administrators in the selected schools and with the supervision of the researcher. The purpose of the study, a necessary explanation about the instruction of the tools and the confidentiality of the information was provided to the respondents. The questionnaire was administered in their respective schools during regular class periods. The questionnaires were administered to 341 students; the analysis was made using 317 students whereas 24 questionnaires were discarded because of incomplete information of the respondents. Finally, 2012 E.C first semester students' mathematics achievement scores were collected from their roster.

3.8. Methods of Data Analysis

Both descriptive and inferential statistical methods were used to analyze the data. Responses obtained from the questionnaire on independent variables (time spent on doing home work and mathematics anxiety) and dependent variable (mathematics achievement scores) were entered and analyzed using SPSS version 20. Mean, Standard deviation, Correlation, multiple regression, independent sample t- test, and one-way ANOVA analyses were done. Statistical methods like mean and standard deviation were used to describe how often the students do their mathematics homework and the level of students' mathematics anxiety.

To see if there were significant relationships among study variables (between time spend on doing homework and mathematics achievement as well as between mathematics anxiety and mathematics achievement) the researcher was used Pearson product moment correlations. A multiple regression analysis for two ordered sets of predictors was conducted to predict the

mathematics achievement from time spend on doing homework and mathematics anxiety of students.

Independent samples t-tests to search for significant differences among students' time spend on doing homework, mathematics anxiety and mathematics achievement between the two gender groups, grade level and between the two schools were used.

To examine the significant differences on time spent on doing homework, mathematics anxiety and mathematics achievement among study participants as a result of parent's educational level a One-Way ANOVA was used. Finally, all differences were tested for statistical significant at the 0.05 level.

3.9. Ethical Considerations

Before starting to conduct the study, from the selected study area administrator permission was assured with the help of letter of entry which was prepared by Jimma University, College of Education and Behavioral science, Department of Psychology. Ethical consideration was seriously taken into account that questionnaires were given for students and achievement scores were collected from students' roster in secret. Without the permission of individual no one could interfered the response of other so that the concern, integrity, consents and other human elements of the participants, were well protected. Students were asked to participate in the research voluntarily without physical or psychological coercion. Respondents were enlightened (well informed) to know the purpose of the study prior and responding to the question. Respondents were assured that any information concerning them has never been passed to other unauthorized person or institutes without their consent. The selected study participants were requested kindly whether they agree to participate in the study or not. Moreover, confidentiality of the information was assured and privacy was maintained.

Chapter Four

Results

At the beginning of this chapter, the demographic Characteristics of the respondents: school name, grade level, gender, Age, Time spend on Doing Homework per week (in hours), Father's Educational Status and Mother's Educational status were analyzed in terms of frequencies and percentage. Secondly, students' time spend on doing mathematics homework and level of mathematics anxiety were considered based on descriptive statistics like mean and standard deviation. Thirdly, the relationship between variables and the Contributions of independent Variables on Students' Mathematics Achievement were considered. Finally, the differences of time spend on homework, mathematics anxiety level and mathematics achievement among study participants as a result of school type, gender, grade level and parent's educational status were treated.

4.1. Demographic Characteristics of the Respondents.

School name, grade level, gender, Age, Time spend on Doing Homework per week (in hours), Father's Educational Status and Mother's Educational status are shown in the table-3 below.

Table-3: Demographic Characteristics of the students

Variables	Categories	Frequency	Percent
School Name	Garba Guracha	230	72.6%
	Alamayo Atomsa	87	27.4%
	Total	317	100%
Grade	Nine	263	83%
	Ten	54	17%
	Total	317	100%

Gender	Male	175	55.2%
	Female	142	44.8%
	Total	317	100%
Age	13	1	.3%
	14	10	3.2%
	15	32	10.1%
	16	114	36%
	17	92	29%
	18	51	16.1%
	19	11	3.5%
	20	5	1.6%
	21	1	.3%
	Total	317	100%
Time spend on Doing Homework per week (in hours)	I have not time for doing mathematics homework	7	2.2%
	I spend 2 hours	57	18%
	I spend 3 hours	47	14.8%
	I spend 4 hours	56	17.7%
	I spend 5 hours	54	17%
	I spend more than 5 hours	96	30.3%
	Total	317	100%
Father's Educational Status	Has never been to school	105	33.1%
	Between grade 1 and 12	160	50.5%
	Has certificate	20	6.3%
	Has diploma	13	4.1%
	Has degree or above	19	6%
	Total	317	100%
Mother's Educational status	Has never been to school	172	54.3%
	Between grade 1 and 12	107	33.8%
	Has certificate	19	6%
	Has diploma	6	1.9%
	Has degree or above	13	4.1%
	Total	317	100%

When we see the demographic characteristics of the respondents as shown on the table-3 above, 317 students were participated in the study whereas 24 students were not included in the study as a result of their an incomplete information on the questionnaires. From the total 230(72.6%) were from Garba Guracha secondary school and 87(27.4%) were from Alamayo Atomsa secondary school. As indicated in the table 263(83%) were grade 9 and 54(17%) were grade 10 students. When we see the respondents gender, 175(55.2%) were male and 142(44.8%) were female students.

4.2: Students' Time Spend on Doing Homework

Table-4 below shows the average mathematics achievement score for a cross-tabulation of student-reported time spend on doing homework.

Table-4: Mathematics achievement score at differing levels of students self report "Time spend on doing homework"

	Mathematics Achievement score		
time spend on doing mathematics homework per week(in hour)	Mean	N	Std. Deviation
I haven't time for doing maths homework	50.4286	7	8.03860
I spend 2 hours on doing homework	50.5965	57	10.82797
I spend 3 hours on doing maths homework	50.4894	47	12.63513
I spend 4 hours on doing maths homework	48.9643	56	10.49323
I spend 5 hours on doing maths homework	49.2593	54	11.63305
I spend more than 5 hours for doing maths homework	53.9271	96	12.03088
Total	51.0694	317	11.59939

As indicated in the table-4 above without controlling for other factors, students spent more than five hours per week scored better mathematics achievement (M = 53.9271, SD = 12.03088).

4.3. Students' Level of Mathematics Anxiety

Minimum, maximum, mean, standard deviation and skewness of the variables are shown in the table-4 below.

Table-5: Descriptive Statistics of mathematics anxiety and mathematics achievement

Variables	N	Min	Max	M	Std. Dev.	Skewness	
						Statistics	Std. Error
Mathematics Anxiety	317	9	45	26.47	7.917	0.065	0.137
Mathematics Achievement	317	30	99	51.06	11.599	1.43	

As shown in the table-5 above, the mean score of students' mathematics anxiety was found to be 26.47 with standard deviation of 7.917. This indicates that students' mathematics anxiety is at a moderate level.

4.4. The Relationship between Times Spent on doing Homework, Mathematics Anxiety and Mathematics Achievement

Pearson Product Moment correlations among study variables are shown in the table-6 below.

Table-6: Pearson Correlation Coefficient of the Variables treated in the study

Variables	**1**	**2**	**3**
Time spend on doing homework (1)	-	-.112*	-
Mathematics Anxiety(2)	-	-	-.298*
Mathematics Achievement (3)	.093*	-	-

*correlation is significant at the .05 level (2-tailed)

As revealed on table-6 it indicates the inter-correlation between the variables treated under the study. As shown there were inter-correlation between the dependent and independent variables. Mathematics achievement has showed modest statistically significant negative correlation with mathematics anxiety (r= -.298). It implies that as the mathematics anxiety increases, the student's mathematics achievement score decrease and vise verse. On the other hand, mathematics achievement has weak positive correlation with time spend on doing homework (r= .093) while, mathematics anxiety has the modest negative correlation with time spend on doing homework (r= -.112).

4.5. Contribution of Independent Variables on Students' Mathematics Achievement

The contributions of time spend on doing homework and mathematics anxiety in the prediction of student's mathematics achievement is shown in the table-7 below.

Table-7: The Result of the Multiple Regression Analysis on Mathematics Achievement

Sources of variations	Sum of Squares	Df	Mean Square	F	R^2	Adj R^2
Regression	6416.131	7	916.590	7.846	.151	.132
Residual	36100.342	309	116.830			
Total	42516.473	316				

a. Dependent Variable: Mathematics Achievement score P<.05

b. Predictors: (Constant), Mathematics Anxiety score, Father's educational status, time spend on doing mathematics homework per week (in hour), Grade, gender, school name, mother's educational status.

The contribution of the independent variables to the prediction of Mathematics achievement score can be shown in table-7 above. As indicated in table-9 the predictor variables gender, time spend on doing homework, mathematics anxiety, grade, school name, father's educational status, and mother's educational status all together contributed for the variation of students mathematics achievement by 15.1%. It implies that 15.1% proportion of mathematics achievement variance accounted for by the independent variables. The remaining proportion couldn't be known in this study. The adjusted R-Squared was 0.132. It indicated that there were the modest relationships between the predictors and the outcome variable. This proportion of variance was statistically significant ($F(7,309) = 7.846$, $P<.05$).

Table-8: Results of Regression Analysis on Mathematics Achievement in General

Variables	Correlation Coefficient (r)	Unstandardized Coefficients		Standardized Coefficients	T	P
		B	Std. Error	Beta		
(Constant)		24.882	15.981		1.557	.120
Gender (X_1)	-.228	-4.020	1.252	-.173	-3.210	.001*
School Name (X_2)	.135	2.356	1.411	.091	1.669	.096
Grade (X_3)	.179	4.049	1.652	.131	2.451	.015*
Time spend on doing Mathematics homework per week(in hour) (X_4)	.093	.377	.387	.052	.974	.331
Mathematics Anxiety score (X_5)	-.298	-.351	.080	-.240	-4.388	.000*
Father's educational status (X_6)	.005	.228	.675	.021	.338	.736
Mother's educational status (X_7)	.015	-.513	.732	-.043	-.701	.484

Dependent Variable: Mathematics Achievement score *P<0.05

Constant = 24.882, sig > .05, R = .388, R^2 = .151

As indicated in table-8 above in the summery multiple regression analysis there exist statistically significant relation between some predictors and the outcome variable. For instance, t-test revealed in the multiple regression analysis as there were statistically significant relation between gender and mathematics achievement scores (t (317) = -3.210, P<.05), between grade and mathematics achievement score (t (317) = 2.451, P<.05) and between mathematics anxiety

and mathematics achievement score (t (317) = -4.388, P<.05). Contrary to this, there was no statistically significant relation between schools and mathematics achievement score, time spend on doing homework and mathematics achievement score, father's educational status and mathematics achievement score and mother's educational status and mathematics achievement score. Totally, for the variation of students' mathematics achievement among other variables, mathematics anxiety had highly dominant and very much influential.

The percentage effect or the contribution of each component gender (X_1), school name(X_2), grade (X_3), time spend on doing home work (X_4), mathematics anxiety (X_5), father's educational status (X_6), and mother's educational status (X_7) on mathematics achievement can be found by $R^2\times100\% \approx(\beta_1r_1+ \beta_2r_2+ \beta_3r_3+ \beta_4r_4+ \beta_5r_5+ \beta6r6+ \beta_7r_7) \times100\%$ whereas β is the standardized coefficient and r is the correlation coefficient of the respective affective variables. Therefore,basedontheformula$(\beta_1r_1+\beta_2r_2+\ldots+\beta_7r_7)\times100\%\approx.039444\times100+.012285\times100+.023449\times100+.004836\times100+.07152\times100+.000105\times100+.000645\times100\approx3.9444+1.2285+2.3449+0.4836+7.152+0.0105-0.0645 \approx 15.0994\%$. Therefore, the contribution of gender enhanced mathematics achievement by 3.9444%, the contribution of school name enhanced mathematics achievement by 1.2285%, the contribution of grade enhanced mathematics achievement by 2.3449%, the contribution of time spend on doing homework enhanced mathematics achievement by 0.4836% while the contribution of mathematics anxiety lessen mathematics achievement by 7.152 %, the contribution of father's educational status enhanced mathematics achievement by 0.0105% and the contribution of mother's educational status enhanced mathematics achievement by -0.0645%. Thus, the variables other than those studied in this study accounted for 84.9006% of the variability in students' mathematics achievement.

Table-9: Result of Regression analysis on Mathematics achievement gender, school name, grade, father's educational status, mother's educational status as the first set of predictors

Source of Variations	Sum of Squares	Df	Mean Square	F	R^2
Regression	3962.815	5	792.563	6.393	.093
Residual	38553.659	311	123.967		
Total	42516.473	316			

a. Dependent Variable: Mathematics Achievement score P<.05

b. Predictors: (Constant), Mother's educational status, Sex, school name, Grade, Father's educational status

As indicated in table-9 above gender, grade, school name, father's educational status and mother's educational status as the first set of predictors, accounted for a significant amount of mathematics achievement variability, R^2 =.093, F(5,311)=6.393, P=.000<.05).

Table-10: Result of Regression on Mathematics Achievement time spend on doing homework and mathematics anxiety as the second set of predictors.

Sources of Variations	Sum of Squares	Df	Mean Square	F	R^2
Regression	3937.690	2	1968.845	16.025	.093
Residual	38578.783	314	122.862		
Total	42516.473	316			

a. Dependent Variable: Mathematics Achievement score P<.05

b. Predictors: (Constant), Mathematics Anxiety score, time spend on doing mathematics homework per week(in hour)

Table-10 above indicated the results of the regression analysis, time spend on doing homework and mathematics anxiety as the second set of predictors accounted for a significant proportion of mathematics achievement variance after controlling for gender, school name,

grade, father's educational status and mother's educational status. The multiple correlation indicates that the two variables had the moderate relationship with mathematics achievement score, R = .304. About 9.3% of the variance in mathematics achievement can be explained by the linear combination of time spend on doing homework and mathematics anxiety. The model explains one of the independent variables predicted significantly mathematics achievement, F (2,314) = 16.025, P =.000. The result showed that time spend on doing homework did not predict mathematics achievement significantly, b = .438, t = 1.122, P = .263. Whereas, mathematics anxiety did predict mathematics achievement significantly, b = -.427, t = -5.388, P = .000.

Therefore, $Y' = 60.539 + .438X_1 - .427X_2$ is the equation of the regression line. Where, Y' represents mathematics achievement, X_1 represents time spend on doing homework and X_2 represents mathematics anxiety.

4.6. Schools Differences among Variables

Mean, standard deviation and t-value for schools on time spend on doing homework, mathematics anxiety and mathematics achievement are shown in table-11 below.

Table-11: Mean Difference on Students' Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement among Schools.

Variables	Group of the respondents	N	M	SD	T	P
Time Spend on Doing Homework	Garba Guracha School	230	4.0130	1.62803	-3.195	.002*
	Alamayo Atomsa School	87	4.6207	1.46463		
Mathematics Anxiety	Garba Guracha School	230	27.2609	7.93487	2.938	.004*
	Alamayo Atomsa School	87	24.3678	7.51760		
Mathematics Achievement	Garba Guracha School	230	50.1087	10.85117	-2.220	.028*
	Alamayo Atomsa School	87	53.6092	13.10899		

*P<.05 (2-tailed)

As shown in the table-11 above the t-test was used to see whether there was a statistically significant difference between school groups. Results showed that on the variable time spend on doing homework, Alamayo Atomsa secondary school students scored higher(M=4.6207, SD=1.46463) than Garba Guracha secondary school (M=4.0130, SD=1.62803). On the other hand, Alamayo Atomsa secondary school scored lower mathematics anxiety (M=24.3678, SD=7.51760) than Garba Guracha secondary school (M=27.2609, SD=7.93487). Whereas in the variable mathematics achievement, Alamayo Atomsa secondary school scored higher (M=53.6092, SD=13.10899) than Garba Guracha secondary school (M=50.1087, SD=10.85117). This implies that Alamayo Atomsa secondary school students devoted more of their time on doing mathematics homework by minimizing mathematics anxiety than Garba Guracha secondary school students which enabled them to score more in mathematics achievement. This indicates that there was a statistically significant mean difference between school groups; (t

(315) = -3.046, p<.05), (t(315)=2.938, p<.05) and (t(315)=-2.416, p<.05) in the variables time spend on doing homework, mathematics anxiety and mathematics achievement respectively.

4.7. Gender Differences among Variables

Mean, standard deviation and t-value for gender on time spend on doing homework; mathematics anxiety and mathematics achievement are shown in table-12 below.

Table-12: Mean Difference on Students' Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement based on gender

Variables	Group of respondents	N	M	SD	T	P
Time Spend on Doing Homework	Male	175	4.1886	1.66571	.108	.914
	Female	142	4.1690	1.53434		
Mathematics Anxiety	Male	175	25.3314	8.41754	-2.921	.004*
	Female	142	27.8662	7.03308		
Mathematics Achievement	Male	175	53.4457	12.35100	4.248	.000*
	Female	142	48.1408	9.88128		

*P<.05 (2-tailed)

As indicated in the table-12 above the independent t-test was used to identify whether there was a statistically significant mean difference between gender groups. The results shown that male students scored lower mathematics anxiety (M=25.3314, SD=8.41754) than female students (M=27.8662, SD=7.03308). Contrary to this, male students scored higher mathematics achievement (M=53.4457, SD=12.35100) than female students (M=48.1408, SD=9.88128). This implies that female students were more anxious about mathematics than male students which hinder them from achieving better in mathematics achievement. But there was no mean difference in time spend on doing homework between male and female students (M=4.1886, SD=1.66571) and (M=4.1690, SD=1.53434) respectively. This indicates that there was a

statistically significant mean difference between gender groups in the variable mathematics anxiety (t (314.720) = -2.921, p=.004) and in their mathematics achievement (t (314.944)=4.248, P=.00). Whereas there was not a statistically significant mean difference between gender in the variable time spend on doing homework (t (315) =.108, p=.914)

4.8. Grade Differences among Variables

Mean, standard deviation and t-value for grade level on time spend on doing homework, mathematics anxiety and mathematics achievement are shown in table-13 below

Table-13: Mean Difference on Students' Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement based on Grade.

Variables	Group of respondents	N	M	SD	T	P
Time Spend on Doing Homework	Grade 9	263	4.1787	1.59029	-.026	.979
	Grade 10	54	4.1852	1.69432		
Mathematics Anxiety	Grade 9	263	26.8593	7.79797	1.956	.051
	Grade 10	54	24.5556	8.28426		
Mathematics Achievement	Grade 9	263	50.1293	9.60073	-2.200	.032*
	Grade 10	54	55.6481	17.91085		

*P<.05 (2-tailed)

As shown in the table-13 the independent sample t-test was used to see whether there was a statistically significant mean difference between grade 9 and grade10 students. The result revealed that there was not mean difference in variable time spend on doing homework between grade 9 and grade 10 students (M= 4.1787, SD=1.59029) and (M=4.1852, SD=1.69432) respectively as well as on mathematics anxiety (M=26.8593, SD = 7.79797) and (M = 24.5556, SD = 8.28426) respectively. Contrary to this grade 10 students scored higher mathematics achievement (M=55.6481, SD=17.91085) than grade 9 students (M=50.1293, SD=9.60073). This

implies that there was a statistically significant mean difference between grade 9 and 10 students on their mathematics achievement (t (317) = -2.200, P<.05). Whereas there was not a statistically significant mean difference between grade level in the variable time spend on doing homework (t (317) = -.026, P>.05) and mathematics anxiety (t (315) = 1.956, P>.05).

Additionally, to see whether there was significance mean difference on student's time spend on doing homework, mathematics anxiety and mathematics achievement with respect to family educational status or not , a one-way ANOVA analysis was used as follow.

4.9. Significant Differences among variables as a result of Students' Fathers Educational Status

The mean of students' time spend on doing homework, mathematics anxiety and mathematics achievement as a result of their father's educational status which categorized in 5 levels (never been to school, between grade 1 and grade 12, has a certificate, has a diploma and has a degree or above) is shown in the table-14 below in order to observe the significance difference of students on these variables.

Table-14: Descriptive statistics on Student's Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement with Respect to Father's Educational Status

Variables	Categories	N	Mean
Time spend on doing mathematics homework per week(in hour)	never been to school	105	3.9810
	between grade 1 and grade 12	160	4.2875
	has a certificate	20	4.6000
	has a diploma	13	3.6923
	has a degree or above	19	4.2632
	Total	317	4.1798
Mathematics Anxiety score	never been to school	105	26.8381
	between grade 1 and grade 12	160	26.5188
	has a certificate	20	24.8500
	has a diploma	13	26.7692
	has a degree or above	19	25.4737
	Total	317	26.4669
Mathematics Achievement score	never been to school	105	26.8381
	between grade 1 and grade 12	160	50.1750
	has a certificate	20	46.7500
	has a diploma	13	55.0769
	has a degree or above	19	53.4211
	Total	317	51.0694

As shown on table-14 above the mean scores of student's time spend on doing homework were 3.9810, 4.2875, 4.600, 3.6923, 4.2632, the mean scores of mathematics anxiety level were 26.8381, 26.5188, 24.8500, 26.7692, 25.4737 and the mean scores of mathematics achievement were 52.3333, 50.1750, 46.7500, 55.0769 and 53.4211 to the corresponding father's educational status never been to school, between grade 1 and 12, has certificate, has diploma and has degree or above respectively.

To observe the significance difference of time spend on doing homework, mathematics anxiety and mathematics achievement with respect to father's educational status we can consider the following table which is linked to the above descriptive values.

Table - 15: One-way ANOVA on Students' time spend on doing homework, mathematics anxiety and mathematics achievement with respect to Father's Educational Status

Variables		Sum of Squares	Df	Mean Square	F	P
time spend on doing mathematics homework per week(in hour)	Between Groups	12.760	4	3.190	1.241	.293
	Within Groups	801.990	312	2.570		
	Total	814.751	316			
Mathematics Anxiety score	Between Groups	87.116	4	21.779	.345	.848
	Within Groups	19719.786	312	63.204		
	Total	19806.902	316			
Mathematics achievement score	Between Groups	982.735	4	245.684	1.846	.120
	Within Groups	41533.738	312	133.121		
	Total	42516.473	316			

From the above table-15 we observed that the F-statistics of time spend on doing homework, mathematics anxiety and mathematics achievement were 1.241, .345 and 1.846 respectively. Likewise, we observed that the significance value of time spend on doing homework, mathematics anxiety and mathematics achievement were .293, .848 and .120 respectively. From the revealed results we can conclude that in testing whether there was statistically significant mean difference as a result of students' father's educational status on the five categories; in the variables time spend on doing homework, mathematics anxiety and

mathematics achievement, it was found that there was no statistically significant mean difference on variables in each categories since P>.05.

In the same way, for both school students the descriptive statistics and one-way ANOVA on time spend on doing homework, mathematics anxiety and mathematics achievement with respect to their Mother's educational status were as follow.

4.10. Significant Differences among variables as a result of Students' Mother's Educational Status

The mean of students' time spend on doing homework, mathematics anxiety and mathematics achievement as a result of their mother's educational status which categorized in 5 levels (never been to school, between grade 1 and grade 12, has a certificate, has a diploma and has a degree or above) is shown in the table-16 below in order to observe the significance difference of students on these variables

Table-16: Descriptive statistics on Student's Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement with Respect to Mother's Educational Status

Variables	Categories	N	Mean
time spend on doing mathematics homework per week(in hour)	never been to school	172	4.1163
	between grade 1 and grade 12	107	4.1776
	has a certificate	19	4.4737
	has a diploma	6	3.8333
	has a degree or above	13	4.7692
	Total	317	4.1798
Mathematics Anxiety score	never been to school	172	27.2384
	between grade 1 and grade 12	107	25.7196
	has a certificate	19	26.8947
	has a diploma	6	21.0000
	has a degree or above	13	24.3077
	Total	317	26.4669
Mathematics Achievement score	never been to school	172	51.3953
	between grade 1 and grade 12	107	49.8879
	has a certificate	19	52.8421
	has a diploma	6	56.8333
	has a degree or above	13	51.2308
	Total	317	51.0694

As indicated in the table 16 above that mean scores of student's time spend on doing homework were 4.1163, 4.1776, 4.4737, 3.8333, 4.7692, the mean scores of mathematics anxiety were 27.2384, 25.7196, 26.8947, 21.0000, 24.3077 and the mean scores of mathematics achievement were 51.3953, 49.8879, 52.8421, 56.8333 and 51.2308 to the corresponding mother's educational status never been to school, between grade1 and 12, has certificate, has diploma and has degree or above respectively.

To observe the significance difference of time spend on doing homework, mathematics anxiety and mathematics achievement with respect to mother's educational status we can consider the following table-17 which is linked to the descriptive values above.

Table-17: One-way ANOVA on Students' time spend on doing homework, mathematics anxiety and mathematics achievement with respect to Mother's Educational Status

Variables		Sum of Squares	Df	Mean Square	F	Sig.
time spend on doing mathematics homework per week(in hour)	Between Groups	7.572	4	1.893	.732	.571
	Within Groups	807.178	312	2.587		
	Total	814.751	316			
Mathematics Anxiety score	Between Groups	405.528	4	101.382	1.630	.166
	Within Groups	19401.374	312	62.184		
	Total	19806.902	316			
Mathematics Achievement score	Between Groups	427.035	4	106.759	.791	.531
	Within Groups	42089.438	312	134.902		
	Total	42516.473	316			

From the above one-way ANOVA table-17 we observed that the F-statistics of time spend on doing homework, mathematics anxiety and mathematics achievement were .732, 1.630 and .791 respectively. Likewise, we can observed that the significance value of time spend on doing homework, mathematics anxiety and mathematics achievement were .571, .166 and .531 respectively. Therefore, from the above data in tasting whether there was any significant mean difference on mother's educational status on the five categories; students in Garba Guracha and Alamayo Atomsa secondary schools on time spend on doing homework, mathematics anxiety

and mathematics achievement, it was found that there was no significant mean difference in each categories since P>.05.

Chapter Five

Discussion

The present study attempted to examine how often students work their mathematics homework, to examine the level of students' mathematics anxiety based on the mean scores of mathematics anxiety, to determine the relationships between dependent variable (mathematics achievement) and independent variables (gender, school name, grade, time spend on doing homework, mathematics anxiety, father's educational status and mother's educational status), to look for the predictability of the independent variables to the dependent one and it also sought to identify whether there was a significant mean difference between participants as a result of the schools, gender, grade level and parent's educational level on the variables time spend on doing homework, mathematics anxiety and mathematics achievement.

5.1: Students' Time Spend on Doing Homework

Under this section the analysis was made to examine how often students work their mathematics homework. To this end descriptive analysis was made. Thus the result revealed that without controlling for other factors, students spent more than five hours per week scored better mathematics achievement (M = 53.9271, SD = 12.03088). The possible reason behind this might be as the students go through and make practice frequently on the given task it empowers them more and help those students to achieve better achievement. In line with this finding, Dettmers et al. (2009) suggested that spending a long time on homework may show a student worked conscientiously. In contrast, low achieving students may report spending a lot of time on their homework because they struggle to complete it (Epstein and Van Voorhis, 2001).

5.2. Students' Level of Mathematics Anxiety

In this section the analysis was made to examine the level of students' mathematics anxiety based on the mean scores of mathematics anxiety. To this end, the result revealed that students mean score on mathematics anxiety was found to be 26.47 with standard deviation of 7.917. This indicates that students' mathematics anxiety was at a moderate level. This shows the existence of mathematics anxiety to students. Zakaria and Nordin (2008) found that pre-tertiary students with high mathematics anxiety scored significantly lower in achievement than less anxious students.

5.3. The Relationship between Times Spent on doing Homework, Mathematics Anxiety and Mathematics Achievement

Under this section attempt was made to deal with the research question whether there was a relationship between time spent on homework, mathematics, anxiety and mathematics achievement. The result was analyzed by Pearson product moment. Pearson product moment showed that gender was modest positively and significantly correlated with mathematics anxiety (r=.159) which indicates female students scored higher in mathematics anxiety than male students, revealing that female students were more anxious about mathematics subject than male students. In line with this result (Tobias, 1980) suggested that males will not be as likely to be affected by the mathematics anxiety they experience. Gender was negatively and significantly correlated with mathematics achievement (r = -.228) which shows that male students scored larger values in mathematics achievement than female. There was a statistically significant weak negative correlation between gender and time spent on doing home work (r= -.006) which indicates male students and female students almost scored similar values in time spend on doing homework. Mathematics achievement had statistically significant modest negative correlation

with mathematics anxiety (r = -.298). It implies that as the mathematics anxiety increases, the student's mathematics achievement score decrease and vise verse.

In line with this, Hembree (1990) conducted a thorough meta-analysis of 151 studies concerning mathematics anxiety. It determined that math anxiety is related to poor mathematics performance on mathematics achievement tests and that mathematics anxiety is related to negative attitudes concerning mathematics. (Ashcraft, 2002) also suggested that highly anxious mathematics students will avoid situations in which they have to perform mathematical calculations. Whereas time spend on doing homework had weak positive correlation with mathematics achievement (r = .093). And there are some other studies that support this result for instance, Mau and Lynn (2000) showed the existence of significant positive correlations between time spent on homework and achievement scores in mathematics, reading, and science. Kalenkoski and Pabilonia (2017) found that homework time has positive effects on academic achievement for boys in high school. Department of Education research results indicated that working on homework two-three hours per day could increase student achievement greatly in English, math, and science (Vasagar, 2012). However, Kitsantas et al. (2011) showed that more time spent on mathematics homework does not necessarily translate into higher test scores in mathematics. Using a sample of 5,200 fifteen year old high school US students from a national survey, they showed that a negative and weak but significant association exists between proportion of time spent on mathematics homework and mathematics achievement. Also another study conducted at Stanford University found that too much homework may cause more stress, physical health problems, imbalance and isolation from society (Boddison, 2015).

On the other hand, mathematics anxiety had modest negative relationship with time spend on doing homework (r = -.112). It indicates that as the time spend on doing homework increased, the student's mathematics anxiety level decreased and vise verse.

5.4 Contributions of Independent Variables on Mathematics Achievement

Under this section, the multiple regression analysis method was used to answer the research question which independent variable more predicts students' mathematics achievement. To this end, the multiple regression analysis result in the study showed that the proportion of mathematics achievement accounted for by the independent variables varies from variable to variable. Results for the first set of predictors suggest that all the controlled variables; school name, gender, grade, father's educational status and mother's educational status had a significant effect on mathematics achievement which accounted for 9.3% of variance (F (5, 311) = 6.393, P = .000). In the same way, result of the second set of predictors time spend on doing homework and mathematics anxiety had also a significant effect on mathematics achievement which accounted for 9.3% of variance (F (2, 314) = 16.025. P = .000). However, time spend on doing homework did not predict mathematics achievement significantly, b = .438, t = 1.122, P = .263. Whereas, mathematics anxiety did predict mathematics achievement significantly, b = -.427, t = -5.388, P = .000. Sheffield et al. (2006) did a study and based on it and on other studies of other researchers, they concluded that it is clear that math anxiety has a direct effect on performance of math tasks. These effects are greatest when a secondary task is being completed; this might be akin to a distraction within lectures or testing situations or completing a more complex calculation that involves retaining part of the calculation in memory.

Ashcraft and Kirk (2001) studied the relationships among memory, math anxiety, and performance. They found that those individuals who have high math anxiety demonstrate smaller

working memory spans, which mean when they are assigned a computation task their reduced working memory capacity will increase their errors. They suggested more empirical attention to be given to math anxiety.

Amanda Andrews and Jennifer Brown (2015) studied the effects of math anxiety on 80 freshmen students at a university in the southeastern United States. They conducted an observational study using pre-existing data from www.ccsenet.org/ies International Education Studies Vol. 8, No. 11; 2015 241 the Freshman Orientation Survey, which contained the 9-item Abbreviated Math Anxiety Scale, and institutional research data. The results suggest that standardized test scores and math anxiety had a moderate, negative relationship.

The predictor variables of gender, school name, grade, time spend on doing homework, mathematics anxiety, father's educational status and mother's educational status all together explained for by the variation of students' mathematics achievement scores by 15.1%. It indicates that 15.1% proportion of mathematics achievement was explained for by the independent variables. Whereas, the remained proportion 84.9% of the variability in mathematics achievement was explained for by other independent variables which needs further studies.

5.5. School Differences on Time spend on doing Homework, Mathematics Anxiety and Mathematics Achievement

Under this the focus was made to answer the research question whether there is a statistically significant mean difference between Garba Guracha secondary school and Alamayo Atomsa secondary school students on time spend on doing homework, mathematics anxiety and mathematics achievement. The independent sample t-test results revealed that there was a statistically significant mean difference between Garba Guracha and Alamayo secondary school in time spend on doing homework, mathematics anxiety and mathematics achievement (t (315) =

-3.046, p=.003), (t(315)=2.938, p=.004) and (t(315)=-2.416, p=.016) respectively. Alamayo Atomsa secondary school students spent more their time on doing mathematics homework and achieved better mathematics achievement than Garba Guracha secondary school students. The possible reasons for these significant differences might be student's commitment to spend their time functionally on the given task, commitment of teachers in giving and attending homework to their students, affirmative action given for students, conduciveness of school, and agreement of teachers with their students and among themselves. From real observation of the researcher Alemayo Atomsa secondary school is constructed in modernized way with full facility by one goodwill person recently near the town. This attractive school can form contented place for students to study, do their homework at any time out of their regular class and to make practice with their classmate. On the other hand, when we compare the agreement of the staff members between the two schools, Alamayo Atomsa secondary school staff members do everything with agreement more.

In line with this finding, (Cooper, Robinson, & Patall, 2006) argued that homework develops study skills, students responsibility, communication skills and other factors that are more difficult to measure. Additionally, they stated that a teacher may assign homework that bridges the gap between previously covered materials and concepts yet to be taught, and completion of the work also helps the students develop study skills. This idea also supported by, (Epstein & van voorhis, 2001; Xu. 2005) found that regardless of the direct purpose, both teachers and students assume that completion of homework will deepen conceptual understanding and lead to greater student achievement. Ronning (2010) considered longer time spent on doing homework can be an expression of high motivation rather than problems of understanding.

On the other hand, students in Garba Guracha secondary school have high mathematics anxiety (M=27.2609, SD=7.93487) than Alamayo Atomsa secondary school students (M=24.3678, SD=7.51760). Various reasons for these significant differences might be like mathematics anxious teacher, parent's dread of mathematics and traditional methods of teaching. Similarly, study finding of (Foong, 1987) argued that teacher as the main source of student's tension. This idea corresponds with those of (Hembree, 1990; Ma, 1999). They stated that anxious teachers spend lesser time teaching mathematics and are more likely to pass their phobia to their students. Likewise, (Hembree, 1990) stated that like teachers, parents could also pass their dread of mathematics to their children. In addition to this (Ashcraft, 2002) stated that highly tensed students dread presenting solutions in front of their mates, viewing such situations as threatening. In line with the present findings (Norwood, 1994; as cited in Preston, 2008) argued that traditional methods intensified students' anxieties though he found that college students who were weak in mathematics were more at ease with lecture-based teaching.

5.6. Gender Differences on Time Spend on Doing Homework, Mathematics Anxiety and Mathematics Achievement

In this section an attempt was made to answer the research question of whether there is a statistically significant mean difference between male and female students among variables; time spend on doing mathematics, mathematics anxiety and mathematics achievement. The result was analyzed by using the independent sample t-test. Even if the mean score of time spend on doing homework for male was higher than female students, the result of the independent sample t-test shown that there was no statistically significant mean difference between male and female students (t (315) =.108, P=.914). Similarly, the study by (Ngaruiya, Boniface Njoroge, 2018) reported that the time spent by boys and girls in homework was no significantly different.

The mean mathematics anxiety score for female students was higher than the mean mathematics anxiety score of male students in the sample. The independent sample t-test results revealed that there was a statistically significant mean difference on mathematics anxiety between male and female students, (t (314.720) =-2.921, P=.004). This indicates that female students were more anxious about mathematics subject than male students. The possible reason might be social factors toward female students, vulnerability to marriage and sexual violence, negative attitude toward female students and domestic work. For instance, in Garba Guracha administrative town some female students are attending their high school education by doing domestic work in others home which hinder their education. On the other hand, as a traditional believe students' parent in this town assumed as male can do mathematics and science subjects better than female students in favoring male students which contributed to female mathematics anxiety. There are many studies that support this finding, for instance, (Wigfield A, Meece, 1988) has found significantly greater levels of mathematics anxiety in females than males. (Hembree, 1990) states that females have shown a higher degree of mathematics anxiety in particularly at the post -high school level. However, (Chiu L, Henry LL, 1990) argued that no gender differences in mathematics anxiety.

Similarly, the t-test of the students showed that there was a statistically significant difference on mathematics achievement between gender groups (t (314.944) = 4.248, P=.000). This confirms that male students achieved higher mathematics achievement than female students. The possible reasons for this gender gap could be gender stereotypes in parent's evaluation of children ability, parental expectations, girls' self-efficacy, self-concept, anxiety in doing mathematics related activities, none cognitive abilities including motivation and self-esteem.

Gender-stereotypes in parent's evaluation of children abilities have been found to affect achievements and children's self-perception (amongst others: Jacobs 1991; Jacobs and Bleeker 2004; Jacobs and Eccles 1992; Bhanot and Jovanovic 2009). Fryer and Levitt (2010) showed that parental expectations regarding performance in math are lower for girls than for boys even after accounting for test scores. The students were observed to have adopted the societal stereotype that boys perform better in Math than girls. This is evident when tasks are given to the students, yet most girls would be hesitant to participate; they prefer that boys perform the tasks given to them. Other than that, if group activities are given, girls usually refuse to accept the responsibility of doing the activities assigned to them. Boys are usually delegated to do the tasks for the group. In this connection, boys are observed to be more confident in sharing their ideas and solutions to the class whenever they are asked to discuss their answers in front. If left unattended, this scenario will promote the perceptions that girls are inferior to boys when it comes to mathematics skills.

Although the causal direction is difficult to assess, girls display less math self-efficacy (self confidence in solving math related problems) and math self-concept (beliefs in their own abilities), and more anxiety and stress in doing math related activities (Heckman and Kautz 2012, 2014; Lubienski et al 2013). As demonstrated by the recent work by Heckman and colleagues (e.g. Heckman and Kautz 2012, 2014), non-cognitive abilities including motivation and self-esteem are important predictors of success in life and in the labour market. In this perspective, the females' lower self-esteem in math could be responsible of their relatively poorer performance in STEM subjects and future educational choices and occupational outcomes. However, finding from longitudinal study about gender differences in mathematics show

that there is no difference among boys and girls in mathematics achievement. (Ding, Song and Richardson; 2007).

5.7. Differences among Variables as a Result of Grade Level

Under this section an attempt was made to answer the research question of whether there is a statistically significant mean difference between grade levels among variables; time spend on doing mathematics, mathematics anxiety and mathematics achievement. The result was analyzed by using the independent sample t-test. Although the mean score of time spend on doing homework for grade 10 students exceeds grade 9 students mean score, the result of the independent sample t-test revealed that there was no statistically significant mean difference between grade 9 and 10 students (t (315) = -.027, P = .979). Similarly, although the score of mathematics anxiety for sample grade 9 students was higher than grade 10 students, the result of the independent sample t-test shown that there was a statistically insignificant mean difference between grade 9 and 10 students (t (315) = 1.956, P = .051).

On the other hand, the mean score mathematics achievement for grade 10 students was higher than grade 9 students. The result of the independent sample t-test shown that there was a statistically significant mean difference between grade 9 and 10 students (t (59.396) = -2.200, P=.032). This confirms that grade 10 students achieved higher mathematics achievement than grade 9 students. The possible reasons for this difference may be grade 10 students are more customized to school cultures than grade 9 students and for grade 9 students, language problem in understanding mathematics concepts is a matter since they have learnt mathematics by their mother tongue in the lower grades.

5.8. Differences among Variables as a Result of Students' Mother's and Father's Educational Status

Under this section a one-way ANOVA test analysis was used to answer the research question whether there is significant mean difference on variables among participants as a result of parental educational status. The result of a one-way ANOVA showed that on father's and mother's educational status on five categories ; students in Garba Guracha and Alamayo Atomsa secondary school students' time spend on doing homework, mathematics anxiety and mathematics achievement, it was found that there was no significant difference in all variables of each categories since P>.05. The result of the present study agreed with the previous study, like Hawkes (1995) which noted that student performance do not necessarily depend on parent's professional competency or educational attainments. On the other hand, Karshen (2003) says that students whose parents are well educated get higher positions than those whose parents are not educated. Educated parents help their children in school work activities.

Chapter Six

Summary, conclusion and Recommendation

6.1. Summary

The main objective of the present study was to figure out the contribution of time spend on doing homework and mathematics anxiety to students' mathematics achievement of grade 9 and 10 students in Garba Guracha administrative town. To achieve this objective the study was designed to answer the following basic questions.

1. How often do students work their mathematics homework?
2. What is the level of students' mathematics anxiety?
3. What is the extent of relationship between time spend on doing homework, mathematics anxiety and mathematics achievement of students?
4. Which independent variable (time spend on homework doing or mathematics anxiety) predict students' mathematics achievement scores (dependent variable)?
5. Is there a significant difference on time spent on doing home work, mathematics anxiety, and students' mathematics achievement among study participants as a result of school type, gender, grade level, and parent's educational status?

This study was conducted in Garba Guracha and Alemayo Atomsa secondary schools. These schools were purposefully selected after critical observation has been done by the researcher on the schools felt difficulties. Due to the difference in school, grade, number of students and gender, proportional stratified sampling followed by simple random sampling technique was applied to select students as a sample of study from each school and grade. The participants of this study were grade 9 and 10 students of the sample schools. The target population consists of 1827 students from grade 9 and 1157 students from grade 10. The

researcher selected 191 male and 150 female in sum 341 students in line with Krejice and Morgan, (1970) formula to determine the sample size of participants from the target population. The questionnaires were administered to 341 students; the analysis was made using 317 students whereas 24 questionnaires were discarded because of incomplete information of the respondents. The instruments used in this study were mathematics anxiety scale developed by (Mahmood and Khatoon, 2011) to measure student's mathematics anxiety level and 2012 E.C first semester mathematics achievement scores collected from sampled school record office. Additionally, questionnaires concerning student's time spend on doing homework and students' parent's educational status were used. Primarily, mathematics anxiety scale was administered on a pilot sample grade 11 students n=30.Then, the instrument was identified the reliability.

The data was analyzed by using descriptive and inferential statistics like independent sample t-test, Pearson correlation coefficient, multiple regressions and Analysis of Variance (one-way ANOVA). As a result, the analysis yields the following findings.

Without controlling for other factors, students who spent more than 5 hours per week on doing mathematics homework scored better in their achievement which accounts mean of 53.9271 with standard deviation 12.03088 than students those spent their time from "I haven't time for doing mathematics homework to I spent 5 hours on doing mathematics homework" per week. The level of students' mathematics anxiety was moderate which accounts mean of 26.47 with standard deviation of 7.917.

The Pearson Product Moment correlation was used to explore inter-correlations between gender, school name, grade level, time spend on doing homework, mathematics anxiety, mathematics achievement, father's educational status and mother's educational students. The result showed that there was significant relationship with in independent variables as well as

between independent and dependent variables. Thus mathematics anxiety has showed modest statistically significant negative correlation with mathematics achievement (r = -.298). Whereas time spend on doing homework has showed the existence of weak positive correlation with mathematics achievement (r = .093).

To explore the contributions of independent variables in predicting the student's mathematics achievement (dependent variable) multiple regression was used. The result showed that there were relationships between independent variables (gender, school name, grade level, time spend on doing homework, mathematics anxiety, father's educational status and mother's educational students) and dependent variable (mathematics achievement) ($R_{x\,y\,1,2,3,4,5,6,7}$ =.388). It was also observed from the coefficient of multiple determination that (R^2 =.151), 15.1% of the variation in students' mathematics achievement was explained for by the variance in the independent variables. The controlled variables; school name, gender, grade, father's educational status and mother's educational status were taken as the first set of predictors and had a significant effect on mathematics achievement which accounted for 9.3% of variance. In the same way, result of the second set of predictor; time spend on doing homework and mathematics anxiety had also a significant effect on mathematics achievement which accounted for 9.3% of variance. However, time spend on doing homework did not predict mathematics achievement significantly. Whereas, mathematics anxiety was predict mathematics achievement significantly.
The independent sample t-test employed to show significant mean difference between schools, gender and grade level on student's time spend on doing homework, mathematics anxiety and mathematics achievement.

The t-test showed that there was significant difference between the two schools on the variables time spend on doing homework, mathematics anxiety and mathematics achievement.

Therefore the mean score of student's time spend on doing homework and mathematics achievement of Alamayo Atomsa secondary school was statistically significantly higher for Garba Guracha secondary school by 0.6077 and 3.5005 respectively and the mean score of student's mathematics anxiety of Alamayo Atomsa secondary school was statistically significantly lower for Garba Guracha secondary school by 2.893.

Similarly, the t-test showed that there was significant difference between gender groups on variables mathematics anxiety and mathematics achievement, but there was no significant mean difference between male and female students on the variable time spend on doing homework. So that the mean score of mathematics anxiety of male students was statistically significantly lower for female students by 2.5348. Contrary to this, the mean score of mathematics achievement of male students was statistically significantly higher for female students by 5.3049. But there was no mean differences on students' time spend on doing homework between gender groups.

Likewise, the t-test showed that there was significant difference between grade 9 and 10 students with the variable mathematics achievement, but there was no significant difference between the two grade level on the students' time spend on doing homework and mathematics anxiety. Therefore there was no mean difference in variable time spend on doing homework and mathematics anxiety between grade 9 and grade 10 students. Contrary to this, the mean score of mathematics achievement of grade 10 students was statistically significantly higher for grade 9 students by 5.5188.

On the other side, there was no statistically significant difference between each variables (students' time spend on doing homework, mathematics anxiety and mathematics achievement) as a result of their father's and mother's educational status since $P > 0.05$ in each categories.

6.2. Conclusion

This research was aimed to explore the contribution of time spend on doing homework and mathematics anxiety to mathematics achievement of grade 9 and 10 students in Garba Guracha and Alemayo Atomsa secondary schools. Correlation research design was employed. The questionnaire and document analysis were used as a tools to obtain reliable and essential data from students of the selected schools and respective grades. Descriptive, Pearson correlation, multiple regressions, independent sample t-test and a one-way ANOVA method were used for data analysis. On this basis, the analysis leads to the following conclusions:

Without controlling for other factors, students who spent more than 5 hours per week on doing mathematics homework scored better in their achievement. From this, it can be concluded that as the students devote more time on doing mathematics homework they can get a better achievement on the subject. The result of descriptive analysis of students' mathematics anxiety level revealed 26.47 mean value which indicates the students' mathematics anxiety level is at a moderate level. Based on this result, it is possible to conclude that there is the existence of mathematics anxiety to these secondary schools' students.

As the result of Pearson Product Moment correlation *r* revealed that, time spent on doing homework and mathematics achievement has weak positive correlation and mathematics achievement is moderately negatively correlated with mathematics anxiety. From this result it is possible to conclude that when the students spend more time on doing mathematics homework they can score better achievement and at the time they fail to spend more time on homework, they achieved less mathematics achievement. On the other hand it can be concluded that as the students experience mathematics anxiety, they scored low mathematics achievement and the reverse is also true.

As the multiple regression result revealed that, students' time spend on doing homework was failed to predict mathematics achievement. From this it is possible to conclude that although the contribution of students' time spend on doing homework to mathematics achievement is not significant, it has a positive effect on students' mathematics achievement. Whereas mathematics anxiety is significantly predict mathematics achievement. From this we can conclude that students' anxiety of mathematics hinders them from achieving good result on the subject.

There is statistically significant mean difference between Garba Guracha and Alamayo Atomsa secondary school students on the variables time spend on doing homework, mathematics anxiety and mathematics achievement. Similarly, there is statistically significant mean difference between gender groups on the variables mathematics anxiety and mathematics achievement and there is statistically no significant mean difference between male and female students on the variable time spend on doing homework. And also there is statistically significant mean difference between grade 9 and grade 10 students on the variables mathematics achievement. Whereas, there is no statistically significant mean difference between the two grades on the variables time spend on doing homework and mathematics anxiety. Based on these result, it is possible to conclude that Alamayo Atomsa Secondary school students spend more time on doing the given homework and experienced less mathematics anxiety than Garba Guracha secondary school students. As a result they achieved better mathematics achievement. Similarly, male students experienced less mathematics anxiety and scored better mathematics achievement than female students. Also it is possible to conclude that grade ten students achieved better mathematics achievement than grade nine students.

On the other hand, there is no significant mean difference on students' time spend on doing homework, mathematics anxiety and mathematics achievement as a result of their father's

and mother's educational status. From this result, it is possible to conclude that students' parent's educational status haven't significant contribution to their children's homework, to reduce vulnerability to mathematics anxiety and in achieving good mathematics achievement.

6.3. Recommendation

Based on the findings of this study and conclusions, the following recommendations are forwarded for concerned bodies:

1. The finding of the research showed that students those spent more than 5 hours per week on doing mathematics homework scored better achievement. Therefore, teachers should assigning homework for his/her students, guiding how students deal with their homework, time management in doing mathematics homework and give awareness on the advantages of spending more time on doing homework.
2. The finding of the research revealed that there is a moderate students' mathematics anxiety level. As a result the students failed to achieve better mathematics achievement. Therefore, schools administrators and teachers should be aware of their students' mathematics anxiety level and take administrative and instructional measures to facilitate student's learning. Students should be make practice on mathematics homework and other activities and have self confidence to ensure that their mathematics anxiety not last to influence their achievement.
3. The finding of the research showed that time spent on doing homework and mathematics achievement has weak positive correlation and mathematics achievement is moderately negatively correlated with mathematics anxiety. This indicates that time spent on doing homework and mathematics anxiety has adverse relationship with mathematics achievement. Therefore, Students should spend their time on doing homework to enhance mathematics

achievement. Teachers and parents should advise and encourage students to spent sufficient time on doing homework and minimize mathematics anxiety to enhance their achievement.

4. The finding of the research indicated that there is a statistically significant mean difference between schools, gender groups and grade level among variables. Therefore, school administrators, should handle this gap on time spend on doing homework, mathematics anxiety and mathematics achievement. School principals and teachers should be aware of students' individual differences and adopt appropriate strategies especially for addressing female students' mathematics anxiety. Teachers have to give affirmative action like tutorial class, assignments and worksheets of mathematics for female students to reduce gender gap in achievement and to reduce mathematics anxiety. Mathematics teachers need to make discussion with each other and with students on filling gender gap on mathematics anxiety and mathematics achievement in both schools. Parents should not pass their dread about mathematics to children, instead of that they should support children by giving more time to do their homework and practice with their friends.
5. I imagine that students can develop their knowledge, study habit and enhance their mathematics achievement through spending their time on doing the given homework. Hence, studies in the future have to focus on the association of the amount of time students spend on doing homework per mathematics class as well as the feedback given to student's homework with student's achievement. On the other hand, the future studies also have to focus on the mechanisms of minimizing student's mathematics anxiety level to maximizing their achievement.

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Appendix-A: Questionnaires

Jimma University

College of Education and Behavioral Science

Department of Psychology

This questionnaire is to be completed by students' of secondary schools in Garba Guracha Administrative Town.

To the Respondents:-

This questionnaire is prepared for the purpose of conducting a study on The Relationship of time spend on Homework Doing, Mathematics Anxiety and Mathematics Achievement of Grade 9 and 10 Students in Garba Guracha Secondary Schools. To achieve the purpose, your cooperation in completing this questionnaire is highly appreciated. The success of this study by and large depends on your honest and sincere responses to the question items. The data you provide will be kept confidential and will not be disclosed to any third party. You are, therefore, kindly requested to provide the required information.

Thank You in Advance For your cooperation!

I. Background Information

Instruction:- Some characteristics of students are given below. Please respond either by filling in the blank space or by circling the letter of the appropriate

Grade &section……. Sex: a) Male b) Female

Age…… Name of the School……

II. Items related to yourself and your parents

1. How many hours do you spend in doing mathematics homework per week?

   a) more than 5 hours per week
   b) 5 hours
   c) 4 hours
   d) 3 hours
   e) 2 hours
   f) I do not have time to do homework

2. The educational status of my parents

   2.1. My father's educational status is :-

a) Never been to school
b) Between grade 1 and grade 12
c) Has a certificate
d) Has a diploma
e) Has a degree or above

   2.2.My mother's educational status is:-

a) Never been to school
b) Between grade 1 and grade 12
c) Has a certificate
d) Has a diploma
e) Has a degree or above

III. Scale Used to Measure Mathematics Anxiety

Anxiety scale to be rated by students

The purpose of this scale is to examine mathematics anxiety of grade 9 and 10 students. The success of the study highly depends on your honesty in rating the scale. Hence, you are kindly requested to rate the scale carefully and honestly.

Directions:

Each of the statements in this scale expresses mathematics anxiety. You are to indicate, on a five point scale, the extent of agreement between the attitudes expressed in each statement is: Strongly Disagree (SD), Disagree (D) ,Undecided (U), Agree (A),and Strongly Agree (SA). Mark (X) the point which best indicates how closely you agree or disagree with the attitude expressed in each statement as it concerns you.

Table-18:

No.	Mathematics Anxiety Item	SD	D	UD	A	SA
1.	Math makes me feel comfortable and easy.					
2.	Math is most dreaded subject for me.					
3.	I find math interesting.					
4.	I feel worried before entering the math class					
5.	Math is one of my favorite subjects.					
6.	I am always afraid of math exams.					
7.	Solving math problems is always pleasant for me.					
8.	I feel nervous when I am about to do math homework					
9.	I feel happy and excited in a math class as compared to any other class.					
10.	Math is a headache for me					
11.	I would prefer math as one of my subjects in higher studies.					
12.	I am afraid to ask questions in math class.					
13.	Math doesn't scare me at all					
14.	My mined goes when teacher asks math questions					

Apendix-B: Translation of Questionnaires to Students' Mother tongue (Afan Oromo)

Yuuniversiitii Jimmaa

Koollejjii Barnootaa Fi Saayinsii Amalaa

Dippaartimantii Xiin-sammuu

Gaafannoon kun barattoota manneen barnootaa sadarkaa 2^{ffaa} magaalaa Garba Gurraachaa keessatti argamaniin kan guutamuudha.

Gaafannoo kana nama Guutuuf:

Gaafannoon kun kan qophaa'eef kaayyoo qo'annoo mata duree "*Walitti dhufeenya yeroo barattootni hojii manaa hojjechuu irratti dabarsanii, sodaa Herregaa fi qabxii Herregaa Barattoota Kutaa 9^{ffaa} fi 10^{ffaa} manneen barnootaa Garba Gurraachaa sadarkaa 2ffaa*" jedhu irratti adeemsisuufidha. Kaayyoo kana galmaan gahuuf gaafannoo kana guutuu fi gargaarsa isin gootaniif duursinee sin galateeffanna. Fiixa bahiinsi qo'annoo kanaa haqummaa fi dhugummaan akaakuu gaafannoowwan isiniif dhiyaatan guutuu keessan irratti hundaa'a. Odeeffannoon isin kennitan icciitummaan isaa kan eegamee fi nama sadaffaatti dabarfamee kan hin kennamneedha. Kanaafuu, odeeffannoo barbaadame akka nuuf gumaachitan kabajaan sin gaafanna.

Caalmatti Hirmaannaa Keessaniif Guddaa Galatoomaa!

Qoraticha.

I. Odeeffannoo Dhuunfaa

Qajeelfama: Waa'een barattootaa kanaa gaditti caqasameera. Mee maaloo odeeffannoo gaafatamtan kana fuuldura isaatti filannoo siniif kennametti maraa ykn iddoo duuwwaa irratti guutaa.

Kutaa fi Daree_____

Saala a) dhiira b)dubara Umrii_____ Maqaa ManaBarumsaa_____

II. Gaafannoo waa'ee keetii fi maatii keetiin wal qabatan:

1) Torbeetti yeroo hammamii hojii manaa Herreegaa hojjechuu irratti dabarsita?

a) torbeetti sa'aa 5 oli d) sa'aa 3

b) sa'aa 5 e) sa'aa 2

c) sa'aa 4 f) hojii manaa hojjechuuf yeroo hin qabu

2) Haala barumsaa maatii kootii

2.1. sadarkaa barumsa abbaa kootii

a) Gonkumaa hin baranne d) Dippilooma Qaba

b) Kutaa 1-12 gidduudha e) Digirii duraa ykn isaa olii kan qabuudha

c) waraqaa ragaa qaba

2.2. Sadarkaa barumsaa Haadha kootii

a) Gonkumaa hin baranne d) Dippilooma Qabdi

b) Kutaa 1-12 gidduudha e) Digirii duraa ykn isaa olii kan qabduudha

c) waraqaa ragaa qabdi

III. Iskeelii sodaa Herregaa Safaruuf Gargaaru

Iskeelii sodaa barattootaan sadarkeeffamu:

Kaayyoon iskeelii kanaa sodaa barattootni kutaa 9^{ffaa} fi 10^{ffaa} gosa barnootaa Herregaa irratti qabanii madaaluuf. Kaayyoon qo'annichaa olaantummaan kan galma gahuu danda'u haqummaa fi of eeggannoon iskeelicha sadarkeessuun guutuu keessaniini.

Qajeelfama: Tokkoon tokkoon himaa iskeelii kanaa sodaa Herregaa ibsa. Kan sirraa eegamu sadarkaalee shanan keessaa kan filattu mallattoo √ gochuun ta'ee, ilaalchonni himicha keessatti

caqasaman haalli itti sadarkeessuuf itti walii galame SWH-Sirriitti Walii Hin galu, WH- Walii Hin galu, MH- Murteessuu Hin danda'u, WN- Walii Nan gala, SWN-Sirriitti Walii Nan gala.

Table-19:

Lakk.	Hima sodaa Herreegaa	Sirriitti walii hin galu (SWH)	Walii hin galu (WH)	Murteessuu hin danda'u (MH)	Walii nan gala (WN)	Sirriitti walii nan gala (SWN)
1.	Herreegni salphaa fi kan natti toluudha.					
2.	Herreegni gosa barumsa kaanirra na yaaddessa					
3	Herreegni kan na gammachiisu ta'een argadhe.					
4.	Daree Herreegaa seenuun duratti miira cinqiitu natti dhagahama.					
5.	Herreegni gosa barnootaa ani jaaladhu keessaa isa tokkoodha.					
6.	Yeroo hunda qormaata Herreegaa nan sodaadha.					
7.	Pirobleemota Herreegaa furuun yeroo hunda na gammachiisa					
8.	Yemmuun hojii manaa Herreegaa hojjechuuf jedhu dhiphina sammuutu natti dhagahama.					
9.	Gosa barnootaa biroo waliin wal bira qabee yeroon ilaalu, yeroo daree Herreegaa kaan irra gammachuu fi si'aayinatu natti dhagahama.					

10.	Herreegni anaaf mataa dhukkubbiidha.					
11.	Fuula duraatti barnoota koo sadarkaa olaanaa keessatti gosa barnoota Herreegaa filannoo koo isa tokko taasisuun fedha.					
12.	Yeroo daree Herreegaa gaaffii gaafachuu nan sodaadha.					
13.	Herreegni gonkumaa ana hin sodaachisu					
14.	Yeroo barsiisaan gaaffii Herreegaa gaafatu sammuun koo na deema/nan dhiphadha.					

Appendix-C: Mathematics Anxiety sub-scale reliability analysis scale Item Total Statistics

Table-20 Item-Total Statistics

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Math makes me feel comfortable and easy.	21.6333	62.447	.519	.526	.845
I find math interesting.	21.5000	58.397	.646	.523	.832
I feel worried before entering the math class	21.9667	65.206	.407	.383	.855
Math is one of my favorite subjects.	21.5333	55.982	.760	.756	.819
I am always afraid of math exams.	21.7000	62.838	.519	.398	.844
Solving math problems is always pleasant for me.	21.4667	58.740	.689	.694	.827
I feel nervous when I am about to do math homework	22.1333	63.637	.470	.523	.849
Math is a headache for me	22.0333	63.482	.495	.427	.847
Math doesn't scare me at all	21.2333	59.357	.669	.695	.830

Reliability coefficients

Number of cases = 30, Number of Items = 9, Cronbach's Alpha = 0.854

Appendix-D: Distribution of Mathematics Anxiety Scores and Mathematics Achievement Scores

Table-21

Id. No.	Mathematics Anxiety Scores	Mathematics Achievement Scores
1.00	37.00	41.00
2.00	33.00	44.00
3.00	31.00	40.00
4.00	21.00	35.00
5.00	35.00	42.00
6.00	23.00	39.00
7.00	32.00	37.00
8.00	16.00	61.00
9.00	32.00	55.00
10.00	14.00	62.00
11.00	11.00	86.00
12.00	25.00	49.00
13.00	26.00	39.00
14.00	24.00	41.00
15.00	36.00	56.00
16.00	21.00	38.00
17.00	27.00	44.00
18.00	33.00	51.00
19.00	29.00	38.00
20.00	16.00	48.00
21.00	30.00	47.00
22.00	28.00	40.00
23.00	18.00	46.00
24.00	24.00	44.00
25.00	36.00	39.00
26.00	33.00	52.00

27.00	23.00	56.00
28.00	22.00	42.00
29.00	24.00	47.00
30.00	18.00	39.00
31.00	37.00	49.00
32.00	31.00	50.00
33.00	28.00	47.00
34.00	35.00	37.00
35.00	11.00	55.00
36.00	10.00	66.00
37.00	29.00	36.00
38.00	13.00	52.00
39.00	20.00	66.00
40.00	31.00	58.00
41.00	17.00	47.00
42.00	20.00	51.00
43.00	16.00	70.00
44.00	28.00	53.00
45.00	12.00	66.00
46.00	28.00	69.00
47.00	30.00	49.00
48.00	24.00	49.00
49.00	23.00	48.00
50.00	27.00	53.00
51.00	33.00	43.00
52.00	35.00	50.00
53.00	29.00	45.00
54.00	22.00	47.00
55.00	33.00	45.00
56.00	26.00	45.00
57.00	30.00	48.00

58.00	31.00	61.00
59.00	26.00	35.00
60.00	28.00	49.00
61.00	17.00	49.00
62.00	16.00	47.00
63.00	40.00	42.00
64.00	16.00	48.00
65.00	29.00	36.00
66.00	42.00	49.00
67.00	37.00	46.00
68.00	28.00	52.00
69.00	32.00	41.00
70.00	22.00	43.00
71.00	25.00	46.00
72.00	18.00	62.00
73.00	29.00	61.00
74.00	28.00	52.00
75.00	30.00	52.00
76.00	45.00	47.00
77.00	27.00	36.00
78.00	26.00	36.00
79.00	26.00	52.00
80.00	30.00	53.00
81.00	45.00	59.00
82.00	34.00	53.00
83.00	22.00	60.00
84.00	31.00	49.00
85.00	13.00	61.00
86.00	21.00	58.00
87.00	24.00	62.00
88.00	31.00	47.00

89.00	25.00	65.00
90.00	24.00	50.00
91.00	30.00	59.00
92.00	27.00	56.00
93.00	27.00	54.00
94.00	25.00	41.00
95.00	9.00	63.00
96.00	41.00	44.00
97.00	20.00	63.00
98.00	15.00	80.00
99.00	28.00	55.00
100.00	33.00	49.00
101.00	29.00	48.00
102.00	35.00	49.00
103.00	42.00	51.00
104.00	19.00	44.00
105.00	25.00	43.00
106.00	29.00	51.00
107.00	27.00	47.00
108.00	26.00	68.00
109.00	30.00	59.00
110.00	34.00	41.00
111.00	28.00	46.00
112.00	19.00	45.00
113.00	30.00	45.00
114.00	30.00	49.00
115.00	27.00	38.00
116.00	42.00	57.00
117.00	21.00	40.00
118.00	29.00	49.00
119.00	29.00	49.00

120.00	45.00	49.00
121.00	37.00	49.00
122.00	29.00	61.00
123.00	29.00	44.00
124.00	33.00	34.00
125.00	32.00	52.00
126.00	31.00	48.00
127.00	41.00	54.00
128.00	29.00	37.00
129.00	29.00	48.00
130.00	45.00	49.00
131.00	35.00	52.00
132.00	33.00	54.00
133.00	37.00	52.00
134.00	29.00	49.00
135.00	42.00	55.00
136.00	28.00	45.00
137.00	31.00	54.00
138.00	23.00	61.00
139.00	37.00	55.00
140.00	25.00	52.00
141.00	28.00	57.00
142.00	29.00	52.00
143.00	28.00	38.00
144.00	28.00	47.00
145.00	40.00	44.00
146.00	25.00	49.00
147.00	25.00	45.00
148.00	31.00	58.00
149.00	32.00	49.00
150.00	45.00	37.00

151.00	45.00	39.00
152.00	45.00	49.00
153.00	25.00	51.00
154.00	16.00	51.00
155.00	29.00	37.00
156.00	25.00	44.00
157.00	31.00	59.00
158.00	29.00	62.00
159.00	27.00	51.00
160.00	27.00	51.00
161.00	9.00	54.00
162.00	42.00	53.00
163.00	32.00	60.00
164.00	20.00	51.00
165.00	26.00	48.00
166.00	26.00	48.00
167.00	24.00	44.00
168.00	29.00	43.00
169.00	41.00	55.00
170.00	18.00	41.00
171.00	41.00	79.00
172.00	21.00	60.00
173.00	12.00	32.00
174.00	28.00	58.00
175.00	33.00	43.00
176.00	33.00	48.00
177.00	28.00	41.00
178.00	33.00	37.00
179.00	26.00	41.00
180.00	27.00	50.00
181.00	13.00	90.00

182.00	29.00	49.00
183.00	25.00	50.00
184.00	28.00	33.00
185.00	27.00	71.00
186.00	33.00	34.00
187.00	33.00	44.00
188.00	29.00	38.00
189.00	28.00	51.00
190.00	25.00	43.00
191.00	38.00	59.00
192.00	18.00	56.00
193.00	13.00	94.00
194.00	27.00	51.00
195.00	20.00	57.00
196.00	19.00	78.00
197.00	23.00	40.00
198.00	15.00	62.00
199.00	16.00	84.00
200.00	27.00	48.00
201.00	24.00	47.00
202.00	25.00	52.00
203.00	23.00	45.00
204.00	14.00	56.00
205.00	38.00	44.00
206.00	35.00	47.00
207.00	24.00	30.00
208.00	30.00	46.00
209.00	31.00	32.00
210.00	11.00	42.00
211.00	30.00	55.00
212.00	26.00	46.00

213.00	18.00	42.00
214.00	19.00	45.00
215.00	29.00	34.00
216.00	14.00	38.00
217.00	31.00	30.00
218.00	19.00	55.00
219.00	19.00	42.00
220.00	23.00	38.00
221.00	42.00	44.00
222.00	25.00	50.00
223.00	39.00	52.00
224.00	33.00	45.00
225.00	28.00	45.00
226.00	25.00	67.00
227.00	9.00	98.00
228.00	29.00	43.00
229.00	14.00	71.00
230.00	18.00	68.00
231.00	29.00	42.00
232.00	26.00	56.00
233.00	18.00	40.00
234.00	30.00	39.00
235.00	14.00	62.00
236.00	15.00	61.00
237.00	17.00	63.00
238.00	26.00	47.00
239.00	9.00	52.00
240.00	45.00	56.00
241.00	24.00	73.00
242.00	15.00	87.00
243.00	37.00	60.00

244.00	19.00	69.00
245.00	13.00	65.00
246.00	28.00	57.00
247.00	14.00	52.00
248.00	19.00	66.00
249.00	18.00	40.00
250.00	31.00	36.00
251.00	25.00	49.00
252.00	30.00	64.00
253.00	25.00	34.00
254.00	22.00	58.00
255.00	21.00	61.00
256.00	34.00	52.00
257.00	25.00	50.00
258.00	27.00	47.00
259.00	17.00	46.00
260.00	11.00	40.00
261.00	20.00	51.00
262.00	37.00	51.00
263.00	31.00	39.00
264.00	17.00	50.00
265.00	21.00	47.00
266.00	20.00	52.00
267.00	24.00	64.00
268.00	41.00	41.00
269.00	34.00	56.00
270.00	19.00	53.00
271.00	18.00	44.00
272.00	28.00	52.00
273.00	33.00	38.00
274.00	22.00	59.00

275.00	11.00	54.00
276.00	17.00	55.00
277.00	30.00	54.00
278.00	21.00	41.00
279.00	11.00	72.00
280.00	26.00	46.00
281.00	30.00	44.00
282.00	21.00	53.00
283.00	20.00	56.00
284.00	24.00	57.00
285.00	18.00	42.00
286.00	24.00	49.00
287.00	28.00	56.00
288.00	26.00	51.00
289.00	33.00	44.00
290.00	33.00	44.00
291.00	29.00	47.00
292.00	27.00	47.00
293.00	28.00	49.00
294.00	20.00	49.00
295.00	24.00	42.00
296.00	23.00	52.00
297.00	22.00	58.00
298.00	24.00	37.00
299.00	23.00	51.00
300.00	25.00	45.00
301.00	28.00	41.00
302.00	36.00	42.00
303.00	24.00	38.00
304.00	34.00	43.00
305.00	13.00	80.00

306.00	33.00	56.00
307.00	13.00	63.00
308.00	30.00	44.00
309.00	25.00	60.00
310.00	20.00	80.00
311.00	33.00	59.00
312.00	24.00	99.00
313.00	28.00	40.00
314.00	43.00	55.00
315.00	26.00	59.00
316.00	14.00	92.00
317.00	29.00	97.00

Table-22

Independent Samples Test (School Name)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
time spend on doing mathematics homework per week(in hour)	Equal variances assumed	3.465	.064	-3.046	315	.003	-.60765	.19951	-1.00018	-.21511
	Equal variances not assumed			-3.195	171.134	.002	-.60765	.19021	-.98311	-.23218
Mathematics Anxiety score	Equal variances assumed	.038	.846	2.938	315	.004	2.89305	.98466	.95570	4.83040
	Equal variances not assumed			3.011	162.893	.003	2.89305	.96091	.99562	4.79049
Mathematics Achievement score	Equal variances assumed	3.056	.081	-2.416	315	.016	-3.50050	1.44891	-6.35127	-.64973
	Equal variances not assumed			-2.220	133.001	.028	-3.50050	1.57708	-6.61990	-.38110

Table-23

Independent Samples Test (Sex)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
time spend on doing mathematics homework per week(in hour)	Equal variances assumed	2.136	.145	.108	315	.914	.01956	.18164	-.33783	.37694
	Equal variances not assumed			.109	309.938	.914	.01956	.18009	-.33480	.37392
Mathematics Anxiety score	Equal variances assumed	7.532	.006	-2.867	315	.004	-2.53477	.88415	-4.27436	-.79518
	Equal variances not assumed			-2.921	314.720	.004	-2.53477	.86789	-4.24236	-.82718
Mathematics Achievement score	Equal variances assumed	8.090	.005	4.152	315	.000	5.30487	1.27767	2.79102	7.81872
	Equal variances not assumed			4.248	314.944	.000	5.30487	1.24872	2.84798	7.76176

Table-24

Independent Samples Test (Grade)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
time spend on doing mathematics homework per week(in hour)	Equal variances assumed	.473	.492	-.027	315	.979	-.00648	.24028	-.47923	.46627
	Equal variances not assumed			-.026	73.422	.979	-.00648	.25055	-.50578	.49283
Mathematics Anxiety score	Equal variances assumed	.951	.330	1.956	315	.051	2.30376	1.17757	-.01313	4.62065
	Equal variances not assumed			1.880	73.546	.064	2.30376	1.22561	-.13857	4.74609
Mathematics Achievement score	Equal variances assumed	34.669	.000	-3.232	315	.001	-5.51887	1.70763	-8.87868	-2.15906
	Equal variances not assumed			-2.200	59.396	.032	-5.51887	2.50822	-10.53711	-.50063

Appendix-E: Father's Educational Status

Table-25 Descriptive

Variables	Educational Status	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
time spend on doing mathematics homework per week(in hour)	Has never been to school	105	3.9810	1.81861	.17748	3.6290	4.3329	.00	6.00
	Between grade 1 and grade 12	160	4.2875	1.41149	.11159	4.0671	4.5079	.00	6.00
	Has a certificate	20	4.6000	1.42902	.31954	3.9312	5.2688	2.00	6.00
	Has a diploma	13	3.6923	1.93152	.53571	2.5251	4.8595	2.00	6.00
	Has first degree or above	19	4.2632	1.79016	.41069	3.4003	5.1260	2.00	6.00
	Total	317	4.1798	1.60572	.09019	4.0024	4.3573	.00	6.00
Mathematics Anxiety score	Has never been to school	105	26.8381	8.18080	.79836	25.2549	28.4213	9.00	45.00
	Between grade 1 and grade 12	160	26.5188	8.00862	.63314	25.2683	27.7692	9.00	45.00
	Has a certificate	20	24.8500	5.99364	1.34022	22.0449	27.6551	11.00	36.00
	Has a diploma	13	26.7692	6.27367	1.74000	22.9781	30.5604	16.00	36.00
	Has first degree or above	19	25.4737	8.84036	2.02812	21.2128	29.7346	11.00	45.00
	Total	317	26.4669	7.91707	.44467	25.5920	27.3418	9.00	45.00
Mathematics Achievement score	Has never been to school	105	52.3333	12.19289	1.18990	49.9737	54.6930	30.00	99.00
	Between grade 1 and grade 12	160	50.1750	11.14374	.88099	48.4350	51.9150	32.00	98.00
	Has a certificate	20	46.7500	9.55249	2.13600	42.2793	51.2207	35.00	66.00
	Has a diploma	13	55.0769	11.91261	3.30396	47.8782	62.2756	32.00	84.00
	Has first degree or above	19	53.4211	12.67244	2.90726	47.3131	59.5290	30.00	86.00
	Total	317	51.0694	11.59939	.65149	49.7876	52.3512	30.00	99.00

Appendix-F: Mother's Educational Status

Table-26 Descriptive

Variables	Educational Status	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
time spend on doing mathematics homework per week(in hour)	Has never been to school	172	4.1163	1.63241	.12447	3.8706	4.3620	.00	6.00
	Between grade 1 and grade 12	107	4.1776	1.57104	.15188	3.8765	4.4787	.00	6.00
	Has a certificate	19	4.4737	1.64548	.37750	3.6806	5.2668	2.00	6.00
	Has a diploma	6	3.8333	2.04124	.83333	1.6912	5.9755	2.00	6.00
	Has first degree or above	13	4.7692	1.30089	.36080	3.9831	5.5553	2.00	6.00
	Total	317	4.1798	1.60572	.09019	4.0024	4.3573	.00	6.00
Mathematics Anxiety score	Has never been to school	172	27.2384	8.00995	.61075	26.0328	28.4440	9.00	45.00
	Between grade 1 and grade 12	107	25.7196	7.63037	.73766	24.2572	27.1821	9.00	45.00
	Has a certificate	19	26.8947	5.65582	1.29753	24.1687	29.6208	13.00	35.00
	Has a diploma	6	21.0000	9.01110	3.67877	11.5434	30.4566	11.00	34.00
	Has first degree or above	13	24.3077	10.31491	2.86084	18.0745	30.5409	12.00	45.00
	Total	317	26.4669	7.91707	.44467	25.5920	27.3418	9.00	45.00
Mathematics Achievement score	Has never been to school	172	51.3953	12.21281	.93122	49.5572	53.2335	30.00	99.00
	Between grade 1 and grade 12	107	49.8879	10.16962	.98313	47.9387	51.8370	32.00	94.00
	Has a certificate	19	52.8421	10.52649	2.41494	47.7685	57.9157	34.00	73.00
	Has a diploma	6	56.8333	16.24089	6.63032	39.7896	73.8771	41.00	86.00
	Has first degree or above	13	51.2308	13.86935	3.84667	42.8496	59.6119	30.00	84.00
	Total	317	51.0694	11.59939	.65149	49.7876	52.3512	30.00	99.00