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# Mathematics anxiety, attitude and performance among secondary school students in Kenya

**Casty Mukami Mutegi*, Ciriaka Muriithi Gitonga and Peter Rugano**

Department of Education, Faculty of Education and Social Sciences, University of Embu, P. O. Box 6-60100. Embu, Kenya.

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**Mathematics anxiety and attitude have a great influence on mathematics performance. This article presents an analysis of the relationship between Mathematics anxiety, attitude and performance. The study adopted a correlational research design. The analysis is based on the responses of 367 students who were randomly selected from 55 secondary schools. An adapted Mathematics Anxiety Scale (MAS) and Attitude towards Mathematics Inventory (ATMI) were used. The performance grades for the students were also gathered from the teachers whereby the list that contained the students' marks also contained the admission numbers of the students for easier linkage with the individual student questionnaire. The data were analyzed using the scatter plot diagram to give the outline of the relationship and Spearman's correlation coefficient to find out whether there is a significant relationship between Mathematics anxiety, Mathematics attitude and performance. There was a positive significant linear relationship between Mathematics anxiety and Mathematics attitude (r= 0.538, p< 0.05). There was a negative significant linear relationship between Mathematics performance and Mathematics anxiety (r= -0.723, p< 0.05). This shows that Mathematics attitude correlates with Mathematics anxiety which later correlates with Mathematics performance of the students, hence the two variables should be given appropriate attention to produce better and positive results in terms of performance.**

**Key words:** Mathematics anxiety, Mathematics attitude, Mathematics performance.

## INTRODUCTION

Mathematics is a fundamental part of school curriculum as a subject and acts as a tool for the development of other sciences. Mathematics is essential in every facet of life as numeracy skills become a requirement to function effectively in daily life (Gafoor and Kurukkan, 2015). Mathematics stimulates involvement and success in many careers especially those in the fields of Science, Technology, Engineering, and Mathematics (STEM) (Ferguson et al., 2015). Following research findings that mathematics as a subject is poorly performed the following factors are attributed to the same; inadequacy of resources and teaching personnel, anxiety and fear of Mathematics, poor teaching methods, overcrowded classrooms and mathematics attitude of students (Sa'ad et al., 2014).

Scarpello (2007) reports that seventy-five percent of

*Corresponding author. E-mail: 1203@student.embuni.ac.ke. Tel: 0706853509.

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Americans stop the study of Mathematics and avoid many careers that related to mathematics. Mathematics anxiety is one of the main reasons for these avoidance behaviours (Gafoor and Kurukkan, 2015). Ashcraft (2002) reported that students show a severe negative emotional response in situations that involve numerical and mathematical activities, a situation referred to as Math anxiety (Ruff and Boes, 2014). Mathematics anxiety is a feeling of fear and tension towards mathematics which can result to an individual's inability to do mathematics. It is therefore vital to detect math anxiety in children to prevent them from developing an avoidance of mathematics which might bring about lasting effects (Aarnos and Perkkilä, 2012). The levels of anxiety can either be of high, moderate or low. Low/moderate levels result in students focusing on mathematics computations and problem solving, while high levels result in much tension which prevents the students from participating in the mathematical task ahead.

Haladyna et al. (1983) termed mathematics attitude as either a positive or negative feeling or expression towards mathematics. Zan and Martino (2009) identify three dimensions within attitude towards mathematics: emotional disposition, vision of mathematics, and perceived competence. This implies that Mathematics attitude is a feeling of like or dislike for mathematics (Zan and Martino, 2009; Haladyna et al., 1983). Mathematics attitude can either be positive or negative. Positive mathematics attitude enables the students to be focused on mathematics computations and problem solving; negative attitude diverts the students' mind from concentrating on mathematics computation and solving problems. They look at mathematics as challenging. Studies show a relationship between mathematics anxiety and attitude and the two variables influence mathematics performances.

Students' performance in mathematics is influenced by Mathematics anxiety, Mathematics attitude, inadequate learning and teaching resources, strategies and the teaching and learning environments (Oyugi, 2018; Ndinda, 2016; Githaiga, 2019). Mathematics anxiety and Mathematics attitude are caused by environmental factors (Shaikh, 2013). Environmental factors are associated with the surrounding where students learn mathematics. Environment can influence students' attitude towards mathematics or cause anxiety. Students need conducive environment to learn mathematics.

Instructional methodologies that are used for teaching embrace a key role in children's ambitions to pursuing future career choices related to mathematics. The old teaching practices such as expectations on correct answers, fear of making errors, and rote calculations and memorizations are said to be the contributing factors to students' anxiety and attitude towards mathematics in basic classrooms (Haciömeroğlu, 2017). According to Yeo et al. (2015), teachers can influence Mathematics attitude and anxieties in students when they embarrass them in front of others, assign many complex assignments and when they delay in helping students solve problem after consultation. The teacher's mode of introducing a concept to students plays a great role in a students' performance. If a teacher uses difficult terms to teach the students, this may disengage the students causing Mathematics anxiety. Teachers should avoid increasing the anxiety levels of Mathematics in students.

The students' attitude towards mathematics and anxiety can be promoted by their own family background factors in connection to Mathematics. A study carried out in India by Soni and Kumari (2017) asserts that parental Mathematics anxiety and attitude may lead to mathematics anxiety and influence students' attitude towards mathematics. When parents' anxiety is high that of their children increases especially if they help them to do their homework. This is because parents express to their own children their own dislike and frustration with Mathematics. According to Maloney et al. (2015), attitude can be transmitted socially to students during early learning.

**Relationship between mathematics anxiety and mathematics attitude**

Mathematics anxiety may influence mathematics attitude towards mathematics problems directly or indirectly (Kargar et al., 2010), where students develop avoidance behaviors towards mathematics. First, mathematics anxious students may avoid mathematics courses or subjects dealing with mathematical tasks and this may mean that these students do not gain competence or mastery of mathematics operations. Second, mathematics anxiety may influence mathematics attitude. Math's anxious students may attempt to evade particular classes and their anxiety may directly affect their ability to successfully complete math's problems (Plaisance, 2009).

Students who achieve a positive mathematics attitude can solve all mathematics problems provided that they have low level of mathematics anxiety. Akin and Kurbanoglu (2011) postulated that there is a negative link between math anxiety and positive attitudes. Math anxiety is related to insights of one's own mathematical abilities in relation to skills in other subject areas and with negative math attitudes. Simply, negative attitudes have negative results in mathematics thus generating math anxiety (Vinson, 2001). Also, when one takes math anxiety as a state of uneasiness which occurs in response to situations involving mathematical tasks which can often create a negative attitude toward the subject (Zettle and Raines, 2002), the relationships between math anxiety and math attitudes are easily understandable. That means that negative math attitudes promoted mathematics anxiety to be high while positive attitude decreased mathematics anxiety (Akin and

Kurbanoglu, 2011). Chaman and Callingham (2013) posited that there is a relationship between mathematics anxiety and mathematics attitude.

Research in Kenya has shown that students had negative attitude towards mathematics (Githaiga, 2019). This is further supported by Ndinda (2016) who posited that poor attitudes towards mathematics lead to poor performance (Oyugi, 2018). Further, consistent failure in Mathematics is attributed to students' attitudes towards Mathematics as a subject (Manoah et al., 2011; Nui and Wahome, 2006). There existed a correlation between anxiety levels and academic achievement; high anxiety resulted in poor academic results while moderate levels of anxiety resulted in high academic results recorded in Mathematics by the students (Syokwaa et al., 2014). This shows that both Mathematics anxiety and attitude affect the performances in Mathematics, though attitude is directly proportional to achievement while anxiety is indirectly proportional (Mweni, 2015).

## Relationship between mathematics anxiety and performance

Mathematics anxiety has been found to make students avoid Mathematics lessons resulting in poor performance in mathematics (Buckley et al., 2016). Individual and environment factors contribute to Mathematics anxiety leading to poor performance (Chang and Beilock, 2016). Individual factors may be the memory coordination while solving mathematical problems and again how one is motivated to undertake the problem at hand. Environmental factors that stimulate Mathematics anxiety include students' perception about the classroom environment, parental support and also teachers' classroom activities. The reasons for avoidance are often associated with fears and worries about their abilities to pass Mathematics (Maloney and Beilock, 2015). These fears result in difficulties in basic numerical processing and low performance in courses related to numerical reasoning (Núñez-Peña et al., 2013; Maloney et al., 2011). These difficulties brought by avoidance of Mathematics therefore may result in Mathematics anxiety together with poor performance in Mathematics.

Radišić et al. (2015) provide an evidence that students displaying high Mathematics anxiety symptoms score low marks; the lower level of Mathematics anxiety has been associated with the achievement and interest in Mathematics, and high Mathematics self-concept. This is because high anxiety results in less achievement in the performance of mathematical related problems (Ifamuyima and Rosanwo, 2016). They further argue that when the students have moderate anxiety they settle down and face the task at hand; and this results in better outcome in mathematics content and performance.

Moderate level of Mathematics anxiety is linked to achievement and interest in Mathematics, high Mathematics self-concept, and conducive school and classroom atmosphere. Again the atmosphere in which the learning takes place is essential for students' Mathematics anxiety determination. Similarly, a study carried out in the Netherlands by Macher et al. (2012) postulates that Mathematics anxiety holds a crucial role in Mathematics performance. When students become anxious Mathematics performances becomes low compared to students with moderate levels of anxiety. Mathematics anxious students feel stressed and worried about carrying out simple mathematics tasks and they usually perform poorly in Mathematics (Bekdemir, 2010).

The relationship between mathematics anxiety and performance can be linked to arousal performance theory by Yerkes and Dodson (1908). In their theory, they posits that; 'if arousal increases, performance will also increase but if arousal becomes too great and continuous then performance would deteriorate'. The theory has two assumptions namely; increase in arousal results in decrease in performance and moderate arousal results in optimal performance. During the onset of arousal, a student is confident to have the ability to control the arousal pressure and this may increase his performance. Once the arousal becomes so great the student would start to become less confident on the ability to control the pressure and the performance would drop. For good performance, there is a need for little arousal. The arousal can be linked to a task that can influence anxiety levels. If there is no arousal then there is no anxiety which allows respondents to be relaxed and not engage in any Mathematics task resulting to poor performance. When the anxiety is mild or moderate the respondents enjoy the ability to control it and work towards the Mathematics task. This results in high performance; when the anxiety is very high then the respondents' performance is threatened since they cannot deal with the high anxiety together with the task.

There is a relationship between mathematic anxiety and mathematical performance (Syokwaa et al., 2014). Further, there exists a correlation between anxiety levels and academic achievement; high anxiety leads to poor academic results while moderate levels of anxiety lead to high academic results. High anxiety affects students' ability to perform effectively in Mathematics.

## METHODOLOGY

### Research design

The study adopted a correlational research design. The design allows one to know if there exists any relationship between the study's two variables. The design used the survey method of data collection which provided the respondents' tools to gauge their opinions they had experienced on variables (Mathematics anxiety and mathematics attitude) after which the relationships were established.

### Participants

A total of 367 students from 55 public secondary schools were

**Table 1.** KCSE grading system.

| Score range (Mathematics) | Points | Grade |
|---|---|---|
| 70-100 | 12 | A |
| 65-69 | 11 | A- |
| 60-64 | 10 | B+ |
| 55-59 | 9 | B |
| 49-54 | 8 | B- |
| 43-48 | 7 | C+ |
| 37-42 | 6 | C |
| 31-36 | 5 | C- |
| 25-30 | 4 | D+ |
| 19-24 | 3 | D |
| 12-18 | 2 | D- |
| 0-11 | 1 | E |

selected to take part in the study. The sample consisted of 170 (46.3%) male and 197 (53.7%) female students. The participants were 13-20 years old.

#### Research instruments

##### *Mathematics Anxiety Scale (MAS)*

Math anxiety was measured using an adapted 14 item Mathematics Anxiety Scale (Mahmood and Khatoon, 2011). There are 7 negatively worded items and 7 items positively worded used to measure students' Mathematics anxiety. The Mathematics Anxiety Scale (MAS) is 5- point Likert scale that were scored as 1- never, 2- rarely, 3- sometimes, 4-often and 5- always for the negative items and the scoring was reversed for the positive items in MAS. The scores ranged from 14-70 with high score indicating higher levels of math anxiety. The respondents who scored 14-32 were classified as low level of anxiety, 33-51 were classified as moderate in anxiety, while those who scored between 52-70 were high in anxiety. The MAS showed an acceptable consistency with a Cronbach's alpha of 0.719 which is within Cronbach alpha of 0.87 reported by Mahmood and Khatoon (2011).

##### *Attitude towards Mathematics Inventory (ATMI)*

Mathematics attitude was measured using an adapted 40 item Attitude towards Mathematics Inventory (Tapia and Marsh, 2004). The ATMI is a 4- point Likert scale that was scored as 1,2,3 and 4 to represent strongly agree, agree, disagree and strongly disagree respectively. The scores ranged from 40-160 with high score indicating negative attitude. The students' attitude was either positive or negative whereby the scores 40-86 had positive attitude and 87-160 had negative attitude towards Mathematics. The ATMI showed a good reliability with a Cronbach's alpha of 0.744 which is within Cronbach alpha of 0.93 reported by Tapia and Marsh (2004).

##### *Students' performance*

The opener mathematics scores were obtained from the respective teachers. The opener exam is an exam that is done at the beginning of a new term once students resume from holidays. The students' score ranges from 0 to 100% with their respective grade ranging from E to A. The higher score (41-100%) was regarded as high performance and the lower scores (0-40%) were regarded as low performance. The scores for the participants were obtained easily since the students were requested to write their admission numbers on the questionnaires for easy identification with what the teachers provided. The grading system as per Kenya Certificate of Secondary Education (KCSE) year 2019 is shown in Table 1.

#### Data collection procedure

An introductory letter received from the university of Embu enabled the researcher to acquire a research permit from the National Commission for Science, Technology, and innovations (NACOSTI). The researcher also obtained a consent letter from the County Director of Education, Meru County before seeking permission from the school principals in preparation for data collection. Thereafter, the researcher visited the schools in person and assured the study participants of total confidentiality with the information. Form three and form four students between 13 and 20 years old were randomly selected to participate in the study. The students from all the schools were presented with the scale during Mathematics class time in a regular school term. The participants were guided on how to fill the questionnaire by the researcher. The participants were asked to respond to questions independently. The questionnaire took 20 min to complete.

#### Data analysis

The edited data were coded and the analysis made by means of the statistics package for social sciences (SPSS). The students' demographic information was analyzed using descriptive statistics tables to get the percentages, means and standard deviations. The scatter plot diagram was used as it could give an outline about the relationship between mathematics anxiety, attitude and performance before the correlations were done. Spearman rho correlation coefficient was done so as to show whether there existed a relationship between mathematics anxiety, mathematics attitude and performance. The two tests were used to determine whether there was a significance relationship between mathematics anxiety, mathematics attitude and performance.

## RESULTS

### Students' demographic information

The results in Table 2 show that out of a total of 367 students, 53.7% were females and 46.3% were males. From the total, majority (82%) of the students were between 16-20 years old (Mean =1.546, S.D = 0.3354), 14.7% between 13-15 years (mean = 0.278, S.D = 0.0602), while (3.3%) were above 20 years (Mean= .062, S. D = 0.0134).

The results in Table 3 show that 33% of the students had low anxiety, 32.7%, moderate, and 34.3%, high anxiety. Further, females and males with low anxiety were 17.2 and 15.8%, respectively. In addition, moderately low anxiety was reported among the male students who scored 15% compared to females who scored 17.7%. The scores on high levels of anxiety further show that females scored 15% with males, 18.8%.

This implies that the three levels of anxiety were

**Table 2.** Students' demographic information.

| Students' demographic information | | Frequency | Percentage |
|---|---|---|---|
| Gender | Female | 197 | 53.7 |
| | Male | 170 | 46.3 |
| Age | 13-15 | 54 | 82 |
| | 16-20 | 301 | 14.7 |
| | Above 20 | 12 | 3.3 |

**Table 3.** Students' anxiety levels.

| Scores | Levels | Total | Gender | No. | Mean | SD |
|---|---|---|---|---|---|---|
| 14-32 | Low | 121(33%) | Male | 58 (15.8%) | 0.1580 | 0.2257 |
| | | | Female | 63(17.2%) | 0.1717 | 0.2451 |
| 33-51 | Moderate | 120(32.7%) | Male | 55(15%) | 0.2997 | 0.4306 |
| | | | Female | 65(17.7%) | 0.3543 | 0.5089 |
| 52-70 | High | 126(34.3%) | Male | 57(15.5%) | 0.4659 | 0.6453 |
| | | | Female | 69(18.8%) | 0.5640 | 0.7811 |

**Table 4.** Students' attitude towards mathematics.

| Scores | Levels | Total | Gender | No. | Mean | SD |
|---|---|---|---|---|---|---|
| 40-86 | Positive | 193(52.6%) | Male | 94 (25.6%) | 22.3 | 3.1 |
| | | | Female | 99(27.0%) | 23.5 | 3.3 |
| 87-160 | Negative | 174(47.4%) | Male | 76(20.7%) | 18.0 | 2.5 |
| | | | Female | 98(26.7%) | 23.3 | 3.4 |

**Table 5.** Students' mathematics performance .

| Scores | Levels | Total | Gender | No. | Mean | SD |
|---|---|---|---|---|---|---|
| 0-40 | Low | 186(50.7%) | Male | 93 (25.35%) | 10.2 | 4.4 |
| | | | Female | 93(25.35%) | 10.2 | 4.4 |
| 41-100 | High | 181(49.3%) | Male | 77(21%) | 8.5 | 3.6 |
| | | | Female | 101(28.3%) | 11.4 | 4.9 |

prevalent.

The results in Table 4 show that 52.6% of the students had positive attitude and 47.4%, negative attitude. Further, females and males who scored positive attitude were 27 and 25.6%, respectively. In addition, negative attitude was reported among the male students who scored 20.7% compared to females who scored 26.7%. This implies that the two types of attitude were prevalent. Though female students showed slightly higher scores than male students in all the types of attitude, this might have been random since there were more female students in the study.

The results in Table 5 show that 50.7% of the students had low performance and 49.3%, high performance. Females and males who scored low in performance were 25.4 and 25.4%, respectively. High performance was

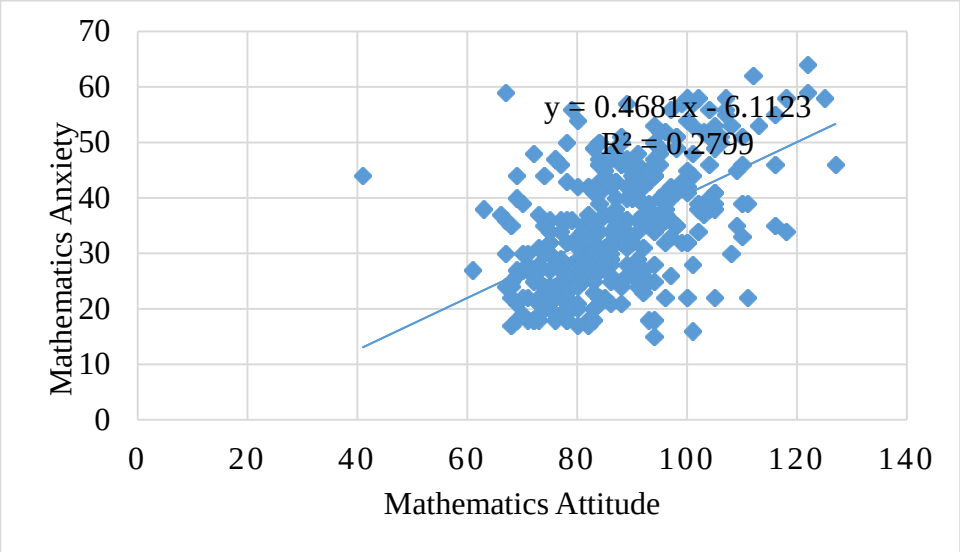


**Figure 1.** Scatter plot diagram showing the relationship between mathematics attitude and mathematics anxiety

**Table 6.** Spearman's rho correlation between mathematics attitude and mathematics anxiety

| | | Mathematics attitude |
|---|---|---|
| Mathematics anxiety | Spearman's Correlation coefficient | 0.538 |
| | Sig. (2-tailed) | 0.000 |
| | N | 367 |

reported among the male students who scored 21% compared to females who scored 28.3%. Though female students showed slightly higher scores than male students in high performance level, this might have been random since there were more female students in the study.

## Statistical analysis

### Relationship between mathematics anxiety and mathematics attitude

The results in Figure 1 indicate a monotonic relationship between mathematics anxiety and mathematics attitude.

The results in the figure 1 reveal that, $R^2$ linear =.280, which means that a variation of 28% of Mathematics anxiety is influenced by Mathematics attitudes with other factors influencing Mathematics anxiety with 72%. The linear regression equation implies that a unit increase in Mathematics attitude results in a 0.47 increase in Mathematics anxiety. This implies that when Mathematics attitude is high (negative attitude) the level of Mathematics anxiety is also high (Haciömeroğlu, 2017). This means there is a monotonic relationship between Mathematics anxiety and attitude towards Mathematics.

The results in Table 6 reveals that there is a significant relationship between mathematics anxiety and mathematics attitude ($r = .538$, $p<0.05$). The relationship between mathematics anxiety and mathematics attitude was positive and statically significant, suggesting that the more the students are anxious (high anxiety level) the high the mathematics attitude (negative mathematics attitude) and the lower the anxiety of students the lower the attitudes towards mathematics (positive attitude). Since the lower the scores for Mathematics attitude the positive the attitude and the higher the scores for Mathematics anxiety the high the anxiety level, then it implies that as the Mathematics attitude increases, the Mathematics attitude tends to be more negative.

### Relationship between Mathematics anxiety and performance

A scatter plot diagram was used to test for relationship between Mathematics anxiety and performance. The results were as below. The results in Figure 2 revealed that $R^2$ linear =. 557. This means that a variation of 56% of Mathematics performance is influenced by Mathematics anxiety with the remaining percentage (44%) of other factors influencing Mathematics performance. The linear

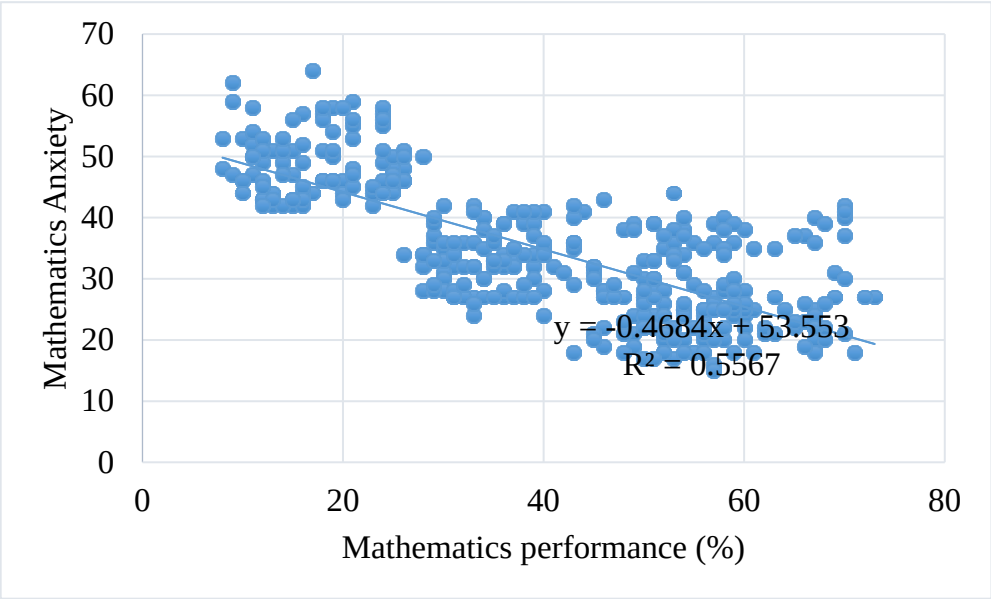


**Figure 2.** Scatter plot diagram showing relationship between mathematics anxiety and mathematics performance.

**Table 7.** Spearman's rho correlation between mathematics anxiety and mathematics performance.

| | | **Mathematics performance** |
|---|---|---|
| Mathematics anxiety | Spearman's rho Correlation coefficient | -0.723 |
| | Sig. (2-tailed) | 0.000 |
| | N | 367 |

regression equation implies that a unit increase in Mathematics anxiety results in reduction of Mathematics performance by 0.47. This implies that higher Mathematics anxiety level leads to poor performance in Mathematics (Reali et al., 2016). This means there is a monotonic relationship between Mathematics anxiety and performance in Mathematics.

The results in Table 7 revealed that mathematics anxiety was negatively correlated with mathematics performance, which means that the relationship was statistically significance ($r = -.723$, $p<.05$). This shows that the more the students are anxious (high anxiety level) the lower would be their Mathematics performance (low Mathematics performance), and as the anxiety goes down to moderate level the performance shift to high (Justicia-Galiano et al., 2017).

## DISCUSSION

The objective of the study was to examine the relation between Mathematics anxiety, Mathematics attitude and performance among secondary school students. Results have revealed significant relationship between Mathematics anxiety and Mathematics attitude. Students who happened to be more anxious towards mathematics had negative attitude towards Mathematics while low anxious students had positive attitude towards Mathematics. The study results are consistent with previous research (Chaman and Callingham, 2013; Akin and Kurbanoglu, 2011; Haciömeroğlu, 2017; Sahri et al., 2017). There was a positive correlation between Mathematics anxiety and Mathematics attitude. For instance, students with positive attitude towards Mathematics will be so strongly committed to their Mathematics class as compared to those with negative attitude (Kargar et al., 2010). Mathematics attitudes of high school students were linked to their Mathematics anxiety (Haciömeroğlu, 2017). The results of the analysis revealed that secondary school students with positive attitude towards Mathematics had lower level of Mathematics anxiety.

Past research showed that students with positive attitude towards Mathematics were likely to be less anxious with Mathematics (Briley, 2012; Swars et al., 2007; Swars et al., 2009). This means that both the students' anxiety and attitude can affect their ability to learn mathematics. Students with low anxiety are more confidence to carry out mathematical task. In addition, this current study showed the significant correlations

between anxiety and attitude towards Mathematics. This means that anxiety and attitude towards Mathematics can predict educational outcomes related to achievement in Mathematics.

Examining Mathematics anxiety and Mathematics performance among secondary school students, the results revealed that there was a negative association between Mathematics anxiety and Mathematics performance. The findings were consistent with past individual studies (Miller and Bichsel, 2004; Rodarte-Luna and Sherry, 2008; Reali et al., 2016; Justicia-Galiano et al., 2017; Lauer et al., 2018; Namkung et al., 2019) and a meta-analysis that consisted of 49 studies which showed an effect size ($r$ = −0.32) (Zhang et al., 2019). For instance, Reali et al. (2016) studied the relationship between Mathematics anxiety and math performance among Colombian students and obtained a negative correlation (r = −0.27) (Justicia-Galiano et al., 2017). Thus, the findings in the current study implied a negative math anxiety-performance relation.

Namkung et al., (2019) posited that there was a significant negative relationship between Mathematics anxiety and Mathematics performance. This is supported by Gunderson et al. (2018) who found out that students' math anxiety was negatively correlated to their mathematics performance. Past studies have documented a negative association between math anxiety and math achievement in students (Ganley and McGraw, 2016; Ramirez et al., 2013). Negative relation between mathematics anxiety and achievement can be developed in childhood and transferred to adulthood (Cargnelutti et al., 2017; Vukovic et al., 2013; Krinzinger et al., 2009).

For good and high performance in Mathematics, there is need to give attention to the high anxiety levels or negative attitudes and try to bring them to moderate or the required levels. These anxieties and attitudes can be stabilized by students, teachers and parents by use of strategies such as encouraging group work, active learning, use of a variety of assessment and also dispelling harmful misconception about Mathematics in societies during socialization activities (Blazer, 2011). This implies that teachers should play a greater role in reducing high anxieties to moderate levels and again alleviating negative attitude of students towards Mathematics to be positive.

The results showing correlations between Mathematics anxiety, attitude and performance are supported by Kenyan scholars' findings that there exists a correlation between Mathematics anxiety, Mathematics attitude and Mathematics performance (Githaiga, 2019; Ndinda 2016; Njaggah, 2003; Oyugi, 2018; Syokwaa et al., 2014). Syokwaa et al. (2014) agreed that high Mathematics anxiety had a negative effect on the academic achievement of students in Mathematics. Students with positive attitude towards Mathematics performed well in Mathematics (Langat, 2015; Mutai, 2011). Students' attitude towards Mathematics had effects on their Mathematics performances in Kenya Certificate of Secondary Education (KCSE) (Githaiga, 2019; Oyugi, 2018). Negative attitude towards Mathematics had negative impact on achievement in Mathematics geometry (Ndinda, 2016).

## Conclusion

This study has revealed that there is a relationship between Mathematics anxiety and Mathematics attitude of secondary school students. Mathematics anxiety can be in three levels: low, moderate, and high anxiety while Mathematics attitude can either be positive or negative towards Mathematics. The Spearman's correlation coefficient results revealed that there was a significant relationship between Mathematics anxiety and Mathematics attitude of the students in secondary schools. Specifically, negative attitude towards Mathematics is associated with high Mathematics anxiety while positive attitude towards Mathematics is associated with moderate or low Mathematics anxiety. There was a relationship between Mathematics anxiety and performance. Specifically, high Mathematics anxiety results in low performance in Mathematics and moderate Mathematics anxiety results in high performance in Mathematics. The two variables (anxiety and attitude towards Mathematics) need attention since they can predict students' performance and learning of Mathematics. Since this study does not examine the influence of test anxiety, it recommends a comprehensive study to examine the relationship between math tests, attitude and anxiety among secondary school students.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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