FACTORS AFFECTING STUDENTS LEARNING BEHAVIOUR IN MATHEMATICS AMONG SENIOR HIGH SCHOOLS IN THE TAMALE METROPOLIS

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ABSTRACT

Understanding the factors that influence learning behaviour in mathematics among senior high school students is crucial for addressing challenges that hinder academic achievement and overall educational success. This study examined the factors affecting students' learning behaviour in mathematics among selected Senior High School (SHS) in the Tamale Metropolis. The research design was a descriptive survey. A sample of 385 students selected using Stratified and simple random sampling techniques participated in the study and responded to adapted questionnaire in a survey. Descriptive statistics in the form of percentages, mean, and standard deviation were used to analyse the data. The findings revealed that Senior High School Students in the Tamale Metropolis experience test anxiety, which affect their learning behaviour. Peer relationships were also found to positively influence learning behaviour. Further, a positive classroom atmosphere, including strong teacher-student relationships, was shown to affect students learning behavior in mathematics. Finally, Parental support was revealed as a vital factor that affects students learning behaviour, with active parental participation and family support in their child's academic life significantly enhancing motivation and performance. Based on the results a, it was recommended that, the Ministry of Education should introduce mental health and test anxiety reduction strategies into teacher training curricula and secondary school programs. Additionally, the Ghana Education Service and school administrators should prioritize the provision of basic learning materials for students from low income families, particularly in mathematics.

KEYWORDS: Learning Behavior, Test Anxiety, Classroom Atmosphere, Parental Support, Senior High Students.

1.0 INTRODUCTION

The study of learning behaviour in mathematics among senior high school (SHS) students is an important area of education research, as many students struggle with mathematics, which is often associated with poor attitudes towards the study of the subject (Ashcraft, Kirk, & Hopko, 2022). This often leads to poor academic performance in the subject. It is critical to examine the variable among SHS students as past researches indicate that they often face difficulties in cultivating effective learning behaviours in mathematics (Kibici, 2022). Learning behaviour in mathematics refers to the cognitive, affective, and social processes engaged in acquiring mathematical knowledge and skills (Hui & Mahmud, 2023). Understanding the factors that influence learning behaviour in mathematics among senior high school students is crucial for addressing challenges that hinder academic achievement and overall educational success (Mabena, Mokgosi, & Ramapela, 2021). Developing a strong understanding of mathematics is vital for acquiring essential skills such as critical thinking, problem-solving, and analysis. Mathematics fosters cognitive skills like reasoning, analytic, critical, and abstract thinking abilities (Cresswell & Speelman, 2020), and is fundamental in understanding and excelling in other scientific and artistic fields. As Ashcraft et al. (2022) notes, many pupils hold unfavorable attitudes towards mathematics, and numerous students encounter substantial challenges in this area, adversely affecting their academic achievements and future opportunities (Frank et al., 2021). Therefore, examining the factors influencing learning behaviour in mathematics is essential to address obstacles and improve educational outcomes (Johnson, Christenson, & Johnson, 2020). Despite the critical nature of students learning behavior in mathematics in grasping critical concepts in the subject and by extension essential skills necessary for academic success, few studies have examined the variable and the factors that influence it. Previous studies that have examined factors influencing the variable have mainly been in western countries and not on Senior High School students in developing countries in deprived areas such as the Northern Region of Ghana. Additionally, very few previous studies examined the relationship between the specific factors of this study (test anxiety, parental support, classroom climate, peer relationships) and learning behavior in mathematics. The studies of Onoshakpokaiye (2023), Stapp and Lambers, (2020), Yang et al. (2023), Kong and Yasmin, (2022), Amerstorfer et al. (2021) and Victor-Edema (2024) are examples in this regard.

As indicated in the forgoing paragraph, some empirical studies have identified test anxiety, classroom atmosphere, parental support, and peer relationships, as influencing students' learning behaviour in mathematics. Senior high school students often face difficulties in cultivating effective learning behaviours in this domain (Kibici, 2022). Test anxiety, according to Onoshakpokaiye (2023), refers to the feeling of apprehension, worry, or fear experienced when faced with a mathematics test or assessment. This anxiety manifests physically, emotionally, and cognitively, leading to decreased motivation, avoidance behaviours, and poor performance (Onoshakpokaiye, 2023). Mathematics, often perceived as high-stakes, can intensify anxiety, especially among

students who struggle or feel they are not performing well (Stapp & Lambers, 2020). Factors such as prior experience with tests, teacher expectations, and peer pressure influence this anxiety (Stapp & Lambers, 2020). The negative effects include impairments in cognitive functioning, such as memory retrieval and problem-solving, and avoidance behaviours like procrastination and disengagement (Korhonen et al., 2018; Ober et al., 2021). Supportive classroom environments and positive parental reinforcement can mitigate test anxiety (Salter et al., 2024).

Parental support, as defined by Đurišić et al. (2023) involves parents' behaviours and participation in their children's learning, such as helping with homework, attending parent-teacher meetings, providing educational resources, and fostering a positive learning environment at home. High levels of parental involvement are associated with better academic achievement and motivation (Yang et al., 2023; Kong & Yasmin, 2022). When parents offer positive and precise comments, children tend to develop a favourable self-perception regarding their academic ability (Ragnarsdottir et al., 2024). Classroom atmosphere, which encompasses the emotional, instructional, and organizational tone within a learning environment, significantly shapes students' motivation, engagement, and behaviour (Luo & Derakhshan, 2024). A positive classroom setting, where students feel respected and supported, encourages participation and reduces anxiety, facilitating better learning behaviour in mathematics (Victor-Edema, 2024). Conversely, negative environments characterized by strict discipline and lack of encouragement can hinder learning and lead to withdrawal and poor performance (Janius et al., 2024; Saadu, 2024).

Peer relationships, defined by Shao et al. (2024), as social interactions and emotional bonds among students, are fundamental to adolescent development and influence attitudes, behaviours, and academic outcomes. Positive peer relationships marked by cooperation and empathy enhance motivation, reduce anxiety, and improve problem-solving skills (Amerstorfer & Freiin von Münster-Kistner, 2021); Wilson, 2022). Strong peer bonds in mathematics classrooms have been linked to better academic achievement and motivation, while negative peer interactions, including bullying and conflict, can impair learning behaviour and achievement (Klee, Buehl, & Miller, 2022; Wolf & Brown, 2023). Teachers can support positive peer relationships by fostering social skills and cooperation through targeted interventions (Majeed, Munir, & Malik, 2022).

Other studies across different locations have examined these factors. For instance, Bornaa et al. (2022) in Northern Ghana found that peer influence, parental support, study behaviour, and self-efficacy significantly affect academic performance. Njiru (2022) in Kenya established that classroom atmosphere, study attitudes, motivation, and locus of control influence students' academic success. Okoye, Asogwa and Ugbala, (2023) in Nigeria highlighted the role of peer relationships, while Wang (2024) in the United States found that school environment shapes students' sense of belonging and learning behaviour in mathematics. Akindipe (2025) in Western Nigeria reported that family involvement and parents' educational levels significantly influence mathematics learning behaviour and achievement. These findings highlight the significant role these factors play in shaping students' learning behaviour. However, very little research has been conducted in the Tamale Metropolis to explore these influences. Understanding how factors such as test anxiety, peer relationships, classroom atmosphere, and parental support affect learning behaviour in mathematics among senior high school students is vital. This study therefore seeks to

examine how these factors affect students learning behaviour in mathematics among senior high schools in the Tamale Metropolis.

1.1 The Aim of the Study

The main aim of the study was to investigate the factors affecting students' learning behaviours in mathematics among Senior High Schools in the Tamale Metropolis.

1.3 Research Questions

The specific objectives of the study were to:

1. What is the relationship between test anxiety and learning behaviour in mathematics?
2. How do peer relationships affect the student's learning behaviour in mathematics?
3. What effect does the classroom atmosphere have on students' learning behaviour in mathematics?
4. How does parental support affect students' learning behaviour in mathematics?

2.0 RESEARCH METHOD

2.1 Research Design

Descriptive survey design was used by the researcher in this investigation. Mwansa et al. (2022) defines descriptive study design as a methodology that involves systematic processes of measurement, classification, analysis, comparison, and interpretation of data to describe and understand the characteristics of a particular phenomenon or population. Descriptive surveys help us understand patterns, opinions, or attitudes within a group by collecting data from a sample of people. This way, researchers can make informed guesses or generalizations about the larger population based on what they find (Creswell & Creswell, 2014).). The researchers believed that using a descriptive survey would enable them to explore the factors affecting students' learning behaviors in mathematics among Senior High Schools in the Tamale Metropolis.

2.2 Population of the Study

The study's population comprised six (6) public Senior High Schools situated in the Tamale Metropolis. The population comprised 8,378 year one and two students, including students from St. Charles Senior High, Business Senior High, Anbariya Senior High, Ghana Senior High, Vittin Senior High, and Tamale Girls Senior High School comprising 3,916 males and 4,462 females as at the time of the study. The second -year students were not used because they were not present in school because of the double track system. Table 1 presents the distribution of second-year senior high school students by gender across the three selected schools in the Tamale Metropolis.

Table 1: Distribution of First and Third-Year Senior High School Students in Tamale Metropolis.

Students	Frequency	%
SHS 1	3916	46.7
SHS 3	4462	53.3
Total	8378	100.0

2.3 Sample and Sampling Technique

The population for the research is all first- and third-year students from six senior high schools in the Tamale Metropolis in Northern Ghana. A stratified random sampling technique was used to divide the SHSs into distinct subgroups or strata based on school type, single-sex schools (all-boys and all-girls) and mixed-sex schools. The approach guarantees that each sub division within the population is sufficiently represented in the sample to enhance the accuracy of the findings (Creswell, 2017). From the stratification, six schools out of the eleven (11) SHSs were randomly selected: one boys' school, one girls' school, and four mixed schools. Within each selected school, only SHS1 and SHS3 students were considered due to the operational constraints of the double-track system. To minimize bias, a simple random sampling technique was employed, starting with a randomly chosen number on the table and selecting subsequent students by sliding the finger horizontally to the next number if a repeated number was encountered. This method ensured a precise sample size from each school, resulting in a total of 385 participants. Table 2 illustrates the sample distribution of students.

Table 2: Sample Distribution

Students	Frequency	%
SHS 1	176	45.7
SHS 3	209	54.3
Total	**385**	**100.0**

2.4 Research Instrument

This study employed an adapted questionnaire in addition to collecting demographic data such as gender, age, school name, and class level. The questionnaire which was adapted from Amuaful (2011) is made up of four (4) different scales with each consisting of 10 items. The scales are test anxiety and its effect on Learning Behaviour, classroom atmosphere and its influence on learning behaviour, parental support (availability of learning facilities, parental involvement, and parental educational levels) and its effect on learning, and peer relationships and its effects on learning. In each scale respondents were asked to indicate the extent to which the statement or variable affects their learning behavior in mathematics. A sample item of the test anxiety on learning behavior scale is "I have severe fear when presented with the thought of taking mathematics exams which affects my learning". An example of items of the Classroom Atmosphere and learning behavior is "I have difficulties concentrating in class due to the distracting behavior of some of my classmates". similarly, an example of items on the parental support's influence on learning behavior is " My parents supply virtually all the necessary learning materials I need for my studies"   and finally a sample item on Peer Relationships and its effect on Learning Behaviour is " I have group studies with my friends, which influence my learning"   The Response category of the original scales by Amuaful (2011) was measured on a 5-point likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). However, the present study modified the response category into 4 ranging from Strongly Disagree (1) to Strongly Agree (4).

It should be noted that Learning Behaviour as a variable was not measured separately but was integrated into each of the scales and so the influence of each of the variables on learning behavior can best be described as perceived.

2.5 Pre-Testing of the Instrument

To help determine the suitability of the adapted questionnaire, a pilot test was conducted at Tamale Senior High School. The pre-test involved a sample of 35 students (15 males and 20 females), who were not part of the sample but shared similar characteristics. Based on the pretesting of the instruments, the researchers found that the items were generally valid, reliable and understandable in the present context. As a result, minor adaptations were made. Modifications included for example changing the response category from 5 to 4 by removing the "undecided" response from the original scale. Some statements were also rephrased to capture learning behavior in mathematics instead of learning behavior in general, thus aligning to the objectives of the present study. For example, "Thoughts of doing poorly in exams interfere with my learning" was modified as, "the presence of negative thoughts towards my performance in mathematics tests affects my ability to learn mathematics"

2.6 Reliability and Validity of the instrument

For reliability, the study employed Cronbach's Alpha to measure internal consistency. The researcher used a test-retest to estimate the reliability using the 35 students of Tamale senior high school. According to Kennedy (2022), reliability refers to the extent to which an instrument produces stable and consistent results over repeated applications. The test-retest gave a reliability score of 0.85, which is quite good. Based on Ahmad et al. (2024), values above 0.70 are generally considered acceptable, so this confirmed that the questionnaire was reliable and suitable for use in the main study.

2.7 Data Collection Procedure

The researchers obtained consent from the headmasters of the Senior High Schools visited, using a letter of introduction provided by the Tamale Metro Office and Department of Educational Foundations of the University for Development Studies. The headmasters referred the first author to the head of department of the subject area to assist in administering the questionnaires.

The first author developed a positive relationship with the participants, building trust and motivating them to actively engage and complete the questionnaire. The first researcher explained the objective of the study and guaranteed the participants that their identities would remain anonymous. All participants completed the questionnaires in one session and returned them, resulting in a response rate of 100%.

2.8 Data Analysis

Data was analysed to assess the four research questions using means and standard deviations with the aid of SPSS (Statistical Package for the Social Sciences, version 26). The data was carefully cleaned to remove any errors prior to the analysis.

2.9 Results

The results of the study are presented systematically in the following paragraphs based on the research questions of the study aimed at providing answers to the research question concerned.

Research Question One: What is the relationship between test anxiety and learning behaviour in mathematics? This research question aimed to find out the relationship between test anxiety and learning behaviour in mathematics.

The criterion value for the scale is set at 2.50, which was calculated by adding the values of all four points on the Likert scale (4+3+2+1=10) and dividing it by 4 (10/4=2.50) if the Likert scale has four scales as supported by Frimpong and Osei (2021). A mean value below 2.5 indicates disagreement with the statement, while a mean value equal to or above 2.5 indicates agreement. This criterion value was utilized to determine whether Respondents' responses fell within the range of agreement or disagreement with the statements presented. Results are as presented in Table 3.

Based on the data presented in Table 3, Items 1, 2, 3, 5, 6, 8, 9, and 10 have mean scores above 2.5, suggesting that respondents generally agreed with the statements and Items 4 and 7 have the least mean score below 2.5, suggesting that respondents generally disagreed with the statements. It is evident that among these factors affecting students' learning behaviour in mathematics, the most predominant one reported by respondents due to test anxiety is "During examination, I experience a state of anxiety that causes me to forget things that I am already familiar with." with (M=2.93, SD= .851).

Table 3: Participants' Responses to the relationship between test anxiety and learning behaviour in mathematics.

Items	N	Mean	Std. Deviation
1. The presence of negative thoughts toward my performance in mathematics tests affects my ability to learn.	385	2.70	1.008
2. During examination, I experience a state of anxiety that causes me to forget things that I am already familiar with.	385	2.93	.851
3. I have severe fear when presented with the thought of taking mathematics examination which affects my learning.	385	2.68	.966
4. Math examination brings severe anxiety and worry, affecting my ability to concentrate on my studies afterwards.	385	2.32	.979
5. I wish math examination didn't stress me out so much, so I could relax and concentrate on learning other subjects without anxiety	385	2.89	1.004

6. Before a math exam, I usually stay up late studying objective test questions because the complex format makes it difficult for me to identify the correct answers.	385	2.81	.990
7. The thought of taking a math exam causes me to feel afraid, making it difficult for me to study	385	2.18	1.016
8. There is always tension when I am completing math questions because the time given is very short.	385	2.82	.930
9. I find it difficult to cope with the tension and anxiety related to math examination, which affects my success in my math studies	385	2.61	.901
10. I often struggle to finish my math examination due to tension	385	2.87	.934

The second most frequently reported factor related to test anxiety, as disclosed by the respondents is " I wish math examination didn't stress me out so much, so I could relax and concentrate on learning other subjects without anxiety (M = 2.89, SD = 1.004). The third most predominant reported factor related to test anxiety, as disclosed by the respondents, am "I often struggling to finish my math examination due to tension." (M = 2.87, SD = .934). Lastly, the lowest value among the predominant statements on test anxiety is "The thought of taking a math exam causes me to feel afraid, making it difficult for me to study (M=2.18, SD=1.016) was reported by students as a factor affecting their learning behaviour.

Research Question Two: How do peer relationships affect the student's learning behaviour in mathematics?

The research question examined the effect of peer relationships on student's learning behaviour in mathematics. The criterion value for the scale was set at 2.50, based on the average score of the four Likert scale items, to assess participants' agreement or disagreement with the statements. Results are as presented in Table 4.

Table 4: Participants' responses to how Peer Relationships affect their Learning Behaviour in Mathematics.

Items	N	Mean	Std. Deviation
1. Peer teaching among my friends influences my learning	385	2.92	.991

2.	My friends place a high value on their academic work, which positively influences my studies.	385	2.38	.939
3.	I frequently spend too much time with my friend, which affects my performance in math	385	2.69	.983
4.	My friends provide me with most of the materials I learn, which contributes to my studies	385	2.75	.999
5.	My friends' interruptions make it hard for me to focus and learn.	385	2.82	.956
6.	The distractions from my friends make it difficult for me to concentrate while solving math questions.	385	2.96	.933
7.	I have group studies with my friends, which influence my learning	385	2.85	.943
8.	I often solve math past questions with my friends, which positively affects my learning	385	2.69	.997
9.	I often have difficulties choosing appropriate times to spend with my friends, and this has a negative effect on my academic performance	385	2.48	.976
10.	My classmates motivate me to learn, which positively affects my studies	385	2.67	1.110

As shown in Table 4, participants indicated that peer relationships affect their learning behaviour in mathematics. Eight results were above the cut-off value of 2.50, including items such as peer teaching influencing learning (M=2.92, SD=.991), spending time with friends affecting performance (M=2.69, SD=.983), friends providing learning materials (M=2.75, SD=.999), interruptions and distractions from friends (M=2.82, SD=.956 and M=2.96, SD=.933), group studies (M=2.85, SD=.947), solving past questions with friends (M=2.69, SD=1.997), and classmates motivating them (M=2.67, SD=1.110). Two items were below the cut-off: difficulties in choosing appropriate times with friends (M=2.48, SD=.976) and friends valuing academics (M=2.38, SD=.939).

Research Question Three: What effect does the classroom atmosphere have on students' learning behaviour in mathematics?

This question focused on aspects such as teachers' competence, the importance they placed on student input, and monitoring of students' academic progress. For this discussion, a mean value equal to 2.50 or above indicated agreement with a statement, while a value below 2.50 signified disagreement (Frimpong & Osei, 2021). This value was obtained by summing the scores of all four points on the Likert scale (4+3+2+1=10) and dividing it by 4 (10/4=2.50), as the Likert scale consists of four scales. This criterion was used to determine if participants' responses agreed or disagreed with the statements. Results are as presented in Table 5.

Table 5: Participant responses to the effect of Classroom Atmosphere on students' Learning Behaviour in Mathematics.

Items	N	Mean	Std. Deviation
1. Teachers appreciate how I participate in class, which serves as a source of motivation for me to study hard in math and other subjects	385	3.21	.876
2. I regularly solve math problems to improve my problem-solving skills	385	3.21	.767
3. The way teachers teach math affects how well I learn and understand the topic.	385	2.53	1.041
4. The effectiveness of the teacher in managing classroom activities significantly affects my academic performance.	385	2.78	.931
5. My learning quality is directly influenced by the mutual respect and rapport between me and my math teachers	385	2.23	1.032
6. I have difficulties concentrating in class due to the distracting from of some of my classmates	385	3.06	.938
7. Regular feedback and support from teachers, along with their encouragement and guidance in the classroom, motivate me to take my learning seriously	385	3.46	.746
8. My learning in math is influenced by how students in my class interact with and impact the academic performance of students of a different sex	385	2.73	.961
9. The classroom environment that involves math competitions impacts my learning behaviour	385	3.06	.865

10. The distracting noise level in the classroom hinders my ability to learn	385	2.99	.991

In Table 5, Items 1, 2, 3, 4, 6, 7, 8, 9, and 10 have mean values equal to or above 2.5, indicating that respondents generally agreed with these statements. Item 5 has a mean below 2.5, suggesting disagreement. The overall mean (M=3.21) and standard deviation (SD=0.876) demonstrate that the majority of respondents believe teachers in the metropolis appreciate students' participation in class, which motivates them to study hard in math and other subjects. Many students also believe that regular feedback; support, encouragement, and guidance from teachers motivate them to take math lessons seriously, supported by a mean of 3.46 and SD of 0.746. Many students strongly disagreed with the statement that mutual respect and rapport between themselves and their math teachers has no impact on their learning, with a mean of 2.23 and SD of 1.032, indicating this statement did not significantly influence their learning experience.

Research Question Four: How does parental support affect students' learning behaviour in mathematics?

This study aims to examine how parental support affects students' learning behavior in mathematics. To examine this, a criterion value of 2.50 on the Likert scale was established as a benchmark for analysis. The criterion is derived by summing the scores of all four scales (4+3+2+1=10) and dividing the sum by the number of scales (10/4=2.50) supported by Frimpong and Osei (2021). In the presented Table 9, a mean value equal to or above 2.50 indicates agreement with a statement, while a value below 2.50 denotes disagreement. Result as presented in Table 6.

From the data presented in Table 6, Six results were above the cut-off value of 2.50, including items such as "The relationship between my parents and my teachers serves as an inspiration for my motivation to study hard," with a mean (M) of 3.03 and SD of 0.960, indicating that the interaction among students, parents, and teachers plays a crucial role in academic achievement. Additionally, a significant proportion of students reported that their parents provided most of the necessary learning materials (M=2.92, SD=0.950), suggesting strong parental support and encouragement. Students also agreed that "The extent of my learning is affected by the support and motivation given to me by my parents" (M=2.74, SD=1.036), indicating that parental influence impacts their learning. Furthermore, students believed that "As a result of my parent's high level of education, they assist me in my studies" (M=2.74, SD=1.027). Conversely, respondents disagreed with statements such as "Both of my parents are employed on a full-time basis and do not have enough time to supervise my studies" (M=2.32, SD=0.979), "The presence of siblings at home affects my studies" (M=2.346, SD=1.025), "I have sufficient amenities, such as a library and computers" (M=2.30, SD=1.088), and "My parents rely on me to take care of my younger siblings" (M=2.28, SD=1.015), indicating these factors do not significantly hinder their studies.

Table 6: Responses to how Parental Support affect students' Learning Behaviour in Mathematics.

Items	N	Mean	Std. Deviation
1. Both my parents are employed on a full-time basis and do not have enough time to supervise my studies	385	2.32	.979

2. The presence of siblings at home affects my studies as I am entitled to assist in taking care of them — 385 — 2.36 — 1.025

3. I have sufficient amenities, such as a library and computers, that assist me in my studies — 385 — 2.30 — 1.088

4. As a result of my parent's high level of education, they assist me in my studies — 385 — 2.74 — 1.027

5. The occasional provision of sufficient incentives by my parents has had a significant effect on my academic success — 385 — 2.72 — .949

6. My parents supply virtually all the necessary learning materials I need for my studies — 385 — 2.92 — .950

7. My learning is influenced by my parent's incapacity to address my educational requirements — 385 — 2.66 — .995

8. The relationship between my parents and my teachers serves as an inspiration for my motivation to study hard — 385 — 3.03 — .960

9. The extent of my learning is affected by the support and motivation given to me by my parents — 385 — 2.74 — 1.036

10. My parents rely on me to take care for my younger siblings, which makes it challenging for me to focus on my own learning and academic responsibilities — 385 — 2.28 — 1.015

3.0 DISCUSSION OF RESULTS

The study examined the relationship between test anxiety and learning behaviour in mathematics. How peer relationships affect student's learning behaviour in mathematics and the effect of classroom atmosphere on students' learning behaviour in mathematics. It further examined the effect of parental support on students' learning behaviour in mathematics. The findings were that test anxiety, Classroom Atmosphere, Peer Relationships and Parental Support influence respondent's learning behavior in mathematics in various ways. The results have been discussed in the following paragraphs based on the research questions of the study.

Research Question One: What is the relationship between test anxiety and learning behaviour in mathematics?

The findings reveal that test anxiety is a significant factor affecting students' learning behaviour in mathematics among Senior High School students in the Tamale Metropolis. Students generally reported experiencing high levels of anxiety, fear, and tension related to mathematics examinations, which undermine their ability to effectively engage with content and perform optimally. Many acknowledged that anxiety during exams cause them to forget information, indicating cognitive

disruption. These results align with prior studies emphasizing the detrimental effects of test anxiety on academic performance. For instance, Caviola et al. (2022) suggest that high anxiety impairs encoding, storage, and retrieval processes, decreasing working memory and interfering with problem-solving. Morse (2022) found that cognitive aspects of test anxiety (worry and negative thoughts) predict lower achievement, as students' anticipations of failure disrupt study habits. Students in this study expressed a desire for less stressful exams to improve focus, supporting Jaradat (2024), who reported that high test anxiety leads to avoidance and procrastination. Amoah (2024) also found that mathematics induces significant anxiety, with emotions like worry and fear affecting performance. Students described struggling with tension and often failing to complete tasks on time, reflecting physiological symptoms of anxiety. The impact of structure and time constraints on anxiety is consistent with Jenifer, Rozek, Levine and Beilock (2022), who noted that timed tests increase anxiety and lead to avoidance behaviors. While some students do not feel afraid, indicating variability, Tan and Pang (2023) concluded that test anxiety's impact varies among students. Amuaful (2011) highlighted that emotional distress during assessments correlates with lower achievement, a finding reinforced by the current study. Generally, the results confirm that test anxiety adversely affect students' learning and academic behaviour in mathematics.

Research Question 2: How do peer relationships affect the student's learning behaviour in mathematics?

The analysis affirms that peer relationships significantly influence students' learning behaviour in mathematics. A majority of respondents acknowledged both positive and negative roles played by peers in shaping their academic engagement and achievement. Peer relationships, such as peer teaching, shared learning materials, group studies, and distractions, contribute substantially to performance by either enhancing motivation and support or reducing focus and study time. Mulaudzi (2023) states that peer relationships serve as a key motivational milieu for learning, fostering shared responsibility and encouragement, which support collaborative learning models. Thurston et al. (2020) validate that learning occurs through social interaction, with peer tutoring and group learning benefiting students' mathematics behaviour. Similarly, Hidayat et al. (2023) found that structured peer collaboration improves problem-solving skills.

However, the study also highlights the negative impact of peer influence, with many students admitting that socialization and distractions from friends disrupt their focus and study routines. Shao et al. (2024) support this, noting that unregulated peer distraction can lead to a decline in academic performance. The low score on the item about friends valuing academics indicates that not all peer groups contribute positively, aligning with Zhao and Zhao (2022), who found peer norms significantly impact academic behaviour. When peers do not value achievement, motivation and performance may decrease. Saha, slam, Akhi, and Saha (2024) emphasized that peer-led distractions and poor time regulation can diminish students' capacity to dedicate adequate time for studying, especially in difficult subjects like mathematics. Amuaful (2011) also noted that students engaged with academically inclined peers are more likely to develop positive learning behaviour, which is consistent with students reporting motivation and academic support from classmates.

Research Question 3: What effect does the classroom atmosphere have on students' learning behaviour in mathematics?

The analysis revealed that classroom atmosphere has effect on students' learning behaviour in mathematics among Senior High Schools in the Tamale Metropolis. Respondents indicated that factors such as teacher support, instructional practices, classroom management, peer interaction, and environmental factors significantly influence their learning behaviour. The positive impact of teacher appreciation for student participation highlights the motivational role of teacher-student interaction, supported by Frommelt, Schiefele and Lazarides (2021), who emphasized that perception of teacher support enhances motivation, especially in challenging subjects like mathematics. Rich, Mason, and O'Leary (2021) also found that feeling acknowledged by teachers fosters greater self-efficacy and persistence.

Respondents acknowledged the importance of teacher feedback and guidance, aligning with the findings of Liu, Du and Lu (2023), who identified that consistent feedback and emotional support positively influence learning behaviour. Classroom management and peer distractions affected concentration, consistent with Wilkins, Verlenden, Szucs, and Johns (2023), who noted that effective management improves focus and academic behaviour. Dada, Laseinde and Tartibu (2023) observed that interactive, student-centered strategies such as real-life applications and cooperative learning enhance understanding and learner involvement. Many students reported that classroom activities like math competitions and peer-based interactions positively impact their learning behaviour, supporting Puntambekar (2022), who argued that social interaction and scaffolding promote deeper learning. Conversely, students did not strongly support mutual respect and rapport with teachers; this may reflect differing interpretations or gaps in relational dynamics. Wang (2023) found that respectful, empathetic teacher-student relationships are linked with positive behaviours, suggesting a need for improved affective interactions. Finally, Blazar (2021) emphasized that the emotional climate and interpersonal behaviour in classrooms influence students' attitudes and performance, with well-organized, inclusive environments fostering better achievement and a culture of academic seriousness.

Research Question 4: How does parental support affect students' learning behaviour in mathematics?
The study revealed that parental support significantly effects students' learning behaviours in mathematics among Senior High Schools within the Tamale Metropolis. Students indicated that various forms of parental involvement, both material and emotional, positively impact their motivation, focus, and performance. Specifically, providing essential learning materials and incentives encourages more serious studying, aligning with Yang et al. (2023), who emphasized that parental provision of resources and emotional support enhances cognitive engagement. When students have textbooks, stationery, and a supportive home environment, they are more attentive and invested.

Additionally, students value the relationship between their parents and teachers, considering it a motivational factor. This supports Yulianti, Denessen, Droop and Veerman (2021) who found that parental communication with school personnel positively impacts learning behaviour by creating a supportive network that reinforces accountability. The educational level of parents also influences students as those with more educated parents reported receiving better academic assistance at home, which improves learning. Mensah, Acquah, and Mensah, (2024) validate the fact that parental

education level is a strong predictor of academic success due to increased engagement in enriching activities and guidance.

Conversely, respondents disagreed with statements suggesting household responsibilities and lack of academic amenities significantly hinder their learning. While these factors can pose barriers, their limited influence may be due to effective parental strategies. This align with Kong and Yasmin (2022), who found that excessive home responsibilities and limited supervision could negatively affect academic performance.

4. CONCLUSIONS AND RECOMMENDATIONS
4.1 Conclusion
The study concluded that, students in the Tamale Metropolis generally experience test anxiety during exams which affect their learning behaviour and cause physiological symptoms. Peer relationships were found to positively influence learning behaviour, with peer learning and social support playing a significant role in academic success. A positive classroom atmosphere, including strong teacher-student relationships, was shown to affect students learning behavior and encourage students to study hard and excel academically. Parental support was found as vital factors that affect students learning behaviour, with active parental participation and family support in their child's academic life significantly enhancing motivation and performance.

4.2 Recommendations
Based on the findings of the research, the researchers recommend that the Ministry of Education of Ghana should introduce mental health and test anxiety reduction strategies into teacher training curricula and secondary school programs. The Ghana Education Service and school administrators should prioritize the provision of basic learning materials for students from low income families, particularly in mathematics, to bridge the resource gap and enhance equity. Schools should actively engage parents through regular communication, PTA meetings, and community forums that educate them on their role in supporting their children's learning, even if they have limited formal education themselves. For future research, it is recommended that the subject matter be explored using mixed method approach involving interviews and focus group discussions and should expand the sample to include teachers of SHS as this may elicit richer data. The use of larger samples in future research could also be explored.

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