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Psychosocial Predictors of Students' Achievement in Mathematics: A Path-Analytical Study

Habeeb Omoponle Adewuyi
Department of Educational Psychology,
University of Johannesburg, South Africa

Opesemowo Oluwaseyi Aina Gbolade
Department of Science and Technology Education,
University of Johannesburg, South Africa

Abstract. Almost everything a person does involves mathematics, especially in this day and age of science and technology. Therefore, it is essential to ensure success among students regarding achievement in mathematics learning. This study explored how psychosocial variables (self-efficacy, motivation, locus of control, anxiety, and peer influence) contribute to student achievement in Mathematics. Two hundred and forty secondary school students participated in this study. The study employed the correlational design, and data was collected using reliable instruments: (mathematics anxiety scale α = 0.82; academic self-efficacy scale α = 0.79; academic motivation scale α = 0.81; locus of control scale α =0.84; peer influence inventory α=.76; and achievement test in mathematics α =0.88). The model displayed a goodness-of-fit index of 1.000 and a comparative fit index of 1.000, both of which are regarded as perfect fits, according to path analysis. In this model, every path has high significance ($p < .01$) except for the path coming from motivation to self-efficacy and locus of control ($p = .053$ and .493), respectively. The study recommended that efforts be made to increase mathematics achievement, emphasising how the many elements considered interact with one another.

Keywords: anxiety; locus of control; Mathematics achievement; motivation; peer influence

1. Introduction

Mathematics is essential in almost every field and event, such as daily transactions involving money exchange, measurement in carpentry workshops, fashion, technology and economics. Mathematics has been described as the mother of all learning, from which other subjects derive their basis, both in the arts and sciences

(Chang & Beilock, 2016; Opesemowo et al., 2023). One of the main influences on how people navigate the many facets of private, social, and civic life is mathematics. Because of its application and understanding, mathematics is essential to every aspect of human activity. To handle life's problems is a prerequisite in every area of intellectual pursuits and human development. Since mathematics revolves around the use of numbers, a fundamental component of all fields of knowledge, it is relevant to humankind's economic, political, geographical, scientific, and technical features. Engineering, accounting, statistics, and arithmetic are a few more fields where numbers are frequently used. Since ancient times, basic arithmetic and counting systems have been important for tasks like agricultural planning, trade, and record-keeping (Gilar-Corbi et al., 2019).

Mathematics is a science that is applied to other fields and the physical sciences. Mathematics and other physical science courses form the foundation of national capacity building globally. This is because mathematics gives people the ability, among other things, to count, calculate, measure, compile, group, analyse, and relate quantities and ideas (Adewuyi & Oluwole, 2016). Since mathematics is essential to any country's scientific, economic, and technological advancement, it is impossible to overstate the need for exceptional mathematical knowledge and learning achievement. Without addressing the issues of mathematics underachievement in secondary schools, future biologists, physicists, chemists, engineers, economists, and numerous other professionals will never develop (Peixoto et al., 2017). Mathematical knowledge is comprehensive, procedural, and systematic, which helps students develop skills that they can use throughout their lives, including critical thinking, reasoning, interaction, collaboration, tolerance, fact searching, decision-making processes and information consumption (Opesemowo & Ndlovu, 2023). Therefore, we must ensure that learners receive mathematics instruction adequately. This cannot be accomplished until the causes of underachievement are found and addressed (Rosário et al., 2012).

Various studies (DiPerna, Galass, & Galassi, 2017; Mahatan & Isla, 2018; Namkung et al., 2019; Suárez-Pellicioni et al., 2015) have been carried out with students, teachers, and societal variables in other to improve students' achievement in mathematics. Yet the problems persist. This issue has numerous root causes that affect all parties involved in education. The government, teachers, students, and schools all contribute to the low math achievement among students. The relationship between senior secondary students' self-concept and mathematics achievement; junior secondary students' self-concept and mathematics achievement is examined in Kung and Lee (2016); PISA (2018) examines the reciprocal relationship between students' self-concept and achievement in mathematics in an African context; and Bolaji (2015) examines how students' self-efficacy, self-concept, and mathematics anxiety influence mathematical literacy. Gilar-Corbi et al. (2019) and Henschel and Roick (2017) claim that an improvement in student achievement in mathematics is not limited to teacher factors alone but also to students' psychological and social factors in mathematics classrooms. Hence, this study seeks to investigate the effect of self-

efficacy, motivation, locus of control, anxiety and peer influence on student achievement in mathematics.

Research Questions

The general purpose of this study is to examine the effect of some psychosocial variables (self-efficacy, motivation, locus of control, anxiety, and peer influence) on student achievement in mathematics. Specifically, the following research questions guided the study:

i. What is the effect of motivation on students' achievement in mathematics?
ii. What is the relationship pattern between the psychosocial variables and students' achievement in mathematics?
iii. What model would best fit the structure of students' achievement in mathematics considering the psychosocial variables?

2. Theoretical Framework

This study supports Bronfenbrenner's ecological systems theory of human development, which holds that people actively participate in their development and are both influenced and affected by their surroundings. In 1979, Bronfenbrenner presented his ecological paradigm, which he intended to use to clarify human development in terms of nested systems of interpersonal relationships that take place in physical environments.

3. Literature Review

Self-efficacy and student's achievement in Mathematics

Ain individual's attitude and convictions about their capacity to carry out domain-specific tasks successfully correlate with their expectations of doing well in mathematics (self-efficacy). Pupils with higher levels of self-efficacy tend to be more positive, set higher goals, put forth more effort, persevere longer when faced with challenges, and use self-regulated learning strategies more frequently. Students assess their mathematical prowess based on their experiences and growing knowledge (Cerezo et al., 2019). They typically categorise themselves as either reluctant or inclined toward mathematics. Numerous behavioural, environmental, and personal factors influence these perceptions of mathematics efficacy. In the academic setting, students evaluate their abilities based on peer performance assessments, successful and unsuccessful results on authentic and standardised assessments, and comments from peers, parents, and teachers (Jain & Dowson, 2009). These sources of knowledge about their abilities shape their attitudes toward mathematics. Pérez-Fuentes et al. (2020) state that students with high self-esteem frequently push themselves to persevere through adversity and exhibit a positive outlook and increased effort, all of which lead to more successful experiences (academic achievement).

Previous studies have consistently demonstrated that self-efficacy in mathematics achievement refers to an individual's perception of their capacity to achieve a desired result (Stevens et al., 2014). They state that while low self-efficacy is linked to poor academic achievement in mathematics classes, high self-efficacy is linked to high academic achievement in those courses. This association highlights that some students do not make enough effort to meet the demands of challenging

classes. The situation can be explained simply by the possibility that students will adopt performance-avoidance goals, which entails trying to conceal their perceived lack of ability and purposefully undermining their learning and success in the assigned courses. The belief is that failing owing to a lack of effort is more acceptable than acknowledging any intellectual deficiencies (Pajares, 2008; Zimmerman, 2010). In summary, students who overcome fear and commit to learning will have high levels of self-efficacy and achieve well academically.

Motivation and Student Achievement in Mathematics

Motivation is another factor considered in this study. It is a crucial metric for gauging student accomplishment. Reports and observations suggest that students have found it extremely difficult to succeed academically in recent years, especially when their motivation is low (Regueiro et al., 2015). Over the years, developing self-determination among students as a form of academic motivation has been immensely helpful in understanding students' optimal school functioning by studying high and low academic achievement, particularly in mathematics. This is evident as academic motivation is reported to be very low both at the secondary and tertiary levels of education, indicating that the educational system is having challenges and, therefore, requires considerable effort to identify the challenges with a view to proffering solutions (Hammoudi, 2019).

Research conducted in non-Western nations like Malaysia, Japan, and China has also shown through empirical studies that motivation is a crucial factor influencing students' academic success. In particular, a strong and positive correlation exists between students' motivation and mathematical achievement, according to a recent study conducted on a sample of Malaysian university students (Zimmerman, 2010). While external control of extrinsic motivation positively and significantly predicted work-avoidance direction and had a significant and negative association with mathematics learning, Suárez-Alvarez et al. (2014) found that self-motivation had a significant and beneficial impact on anxiety, deep-level processing, and mastery orientation.

Additionally, students' academic motivation, particularly in secondary education, indicates how effective institutions are and plays a significant role in determining students' overall academic success. Learning, which results from learning motivation, is the means by which individuals and the country's educational goals can be accomplished. Furthermore, a large body of research has been done on the connection between math achievement and motivation (Danesty, 2013; Olanrewaju & Omoponle, 2017; Osterloh et al., 2011). It is commonly known that motivation improves students' attitudes and academic performance. Attitudes and academic performance positively and negatively correlate with motivation (Adewuyi, 2021). Being incapable of making decisions for oneself or being competent in a particular behaviour leads to amotivation, which is followed by feelings of hopelessness, depression, and self-loathing. When someone feels that they consistently fail or do not receive positive feedback about their performance, they become unmotivated. According to Wigfield et al. (2015), motivation significantly impacts academic achievement.

Locus of control and student's achievement in Mathematics

When it comes to a student's academic success, locus of control is crucial. The degree to which people feel they have control over what happens to them is known as their locus of control in personality psychology. Rotter (1966) developed an understanding of the concept in 1966, and it has since been integrated into personality studies. According to Choudhury and Borooah (2017), a person's "locus" (Latin for "place" or "location") can be internal, indicating they believe they have control over their life, or external, meaning they believe chance, fate, or external variables control their choices and life. With a strong internal locus of control, individuals think that their actions are mainly responsible for the events in their lives. For instance, when they receive exam results, they often compliment or criticise their abilities. Individuals with a strong external locus of control frequently extol or blame outside forces like the instructor or the test.

Both academic achievement and students' attitudes toward academic pursuits are influenced by locus of control. Students are able to succeed if they make a goal to achieve success and use their skills sufficiently to accomplish it. Minority students' performance and ability are negatively impacted by loci of control (Raheem & Abdulkadir, 2018). One of the causes of parents' ignorance and lack of communication with educational institutions is the adverse association between the locus of control and a student's performance failure. However, positive outcomes can be achieved if students are individually motivated to participate in educational activities. Students at the minority level can attain internal and external locus of control if they use their innate intelligence and focus their studies in accordance with the specifications of the institute (Gujjar & Aijaz, 2014). Academic achievement and a meta-analysis (Valentine et al., 2016) found that the effect size was average. Still, greater magnitudes of effects were observed in multiple studies where the self-beliefs were domain-specific and well-matched to the achievement outcomes used in the study. When hierarchies have to be considered, this means that the indicator and the criterion variables should be drawn from the same level of the hierarchy. These results can be absorbed from the Brunswick Symmetry conceptual framework, which stipulates that predictive and criterion parameters must be symmetrical concerning each other.

Anxiety and Student's Achievement in Mathematics

An intense emotional feeling of worry about one's capacity to comprehend and attempt mathematics is known as mathematics anxiety. Individuals experiencing anxiety related to mathematics believe they are unable to perform tasks and engage fully in math-related classes. Anxiety related to mathematics can be crippling, leading to feelings of shame, anger, and even terror. It is impossible to ignore the connection between anxiety and mathematical academic performance. According to Buckley et al. (2016), fear and anxiety were the root causes of low math achievement. According to him, math anxiety is an issue that affects students academically and is always visible on their faces in the math classroom. According to Bieg et al. (2015), it is regrettable that students who find mathematics complicated must study the subject. This is due to the fact that mathematics is present in all educational settings. Anxiety related to mathematics is one of the

biggest obstacles to learning. While attending school, a lot of adolescents and teens come to fear math. Many people are impacted by mathematics anxiety and low self-concept, which manifests as tension, apprehension, or fear that interferes with manipulating numbers and solving mathematical problems in various real-world and academic contexts (Ashcraft, 2015).

When faced with mathematical problems, students feel as though they are incapable of solving them, and their minds just shut down. They frequently even struggle to recall how to do the most basic computations. Some students often think that there is only one correct answer in mathematics and that you are unsuccessful if you cannot find it. Chang & Beilock (2016) also performed a meta-analysis based on 562 studies. Performance indicators included grades, achievement tests, problem-solving exercises, and cognitive ability assessments. Test anxiety showed a negative correlation (uncorrected r = -.8) with both test performance and overall achievement. After conducting a second metal-analysis on 126 publications published between 1975 and 1988, she narrowed her search to studies that looked into the connection between test anxiety and academic success.

Additionally, a weak negative relation was found (corrected r = -.23). This implies that low achievement is correlated with high test anxiety. By administering an employee selection stimulation to 15% of the students, Dowker et al. (2016) investigated test anxiety in their study's context of personnel selection. The School and College Ability Test (SCAT) and test anxiety were found to be negatively correlated. This aligns with the findings of Henschel and Roick's (2017) study, which looked at 263 candidates for a financial worker position and found a negative relationship between test anxiety and math test scores (uncorrected r = -.35).

Peer influence and student achievement in Mathematics

Peer pressure is a natural part of adolescence; studies from many cultures have demonstrated that a child experiences the need to fit in and be accepted by the group from birth to adolescence. It has been noted that a child's accomplishments and attitudes may be influenced by the group to which they belong. Becoming affiliated with a group in society is a basic human need. Peer relationships are prevalent in homes and schools, significantly impacting academic achievement (Uzezi & Deya, 2017). When in a group, students become the absolute representation of themselves; they are more at ease with their peers but may feel depressed when they are alone or with teachers. Peer pressure is more significant than teachers in influencing students' behaviour and academic performance. Therefore, determining the impact of peer group relationships on academic achievement is necessary, particularly in mathematics (Adelana et al. 2023; Omoponle & Olanrewaju, 2019).

In their study, Clotfelter et al. (2006) found that a peer group's characteristics influence its members' motivation and accomplishments. A group's likelihood of having a positive or negative effect on its team members' motivation and achievement depends on several factors, including its morality, degree of

attractiveness and the kind of conformity it demands. Task performance and achievement are likely positively impacted by the group's influence and motivation if the environment is welcoming, compassionate and encouraging. A hostile environment, unrelenting frustration and a propensity for conflict harm a member's behaviour, growth and motivation to work hard. Children tend to imitate one another, which determines the kind of group they belong to. Adewuyi and Dwarika (2023) also found the same conclusion that when an individual behaves in a way that the group is likely to follow, behaviour imitation occurs. Encouragement to join a study-oriented group is necessary for students who exhibit lively yet academic traits.

According to Cressey's (2012) research, peers play a crucial role in assisting new members in becoming socialised, engaging in casual conversations, and upholding a loose, unwritten code of conduct for those who want to stay in the group. Using the sum of math end-of-year test score levels as the outcome measure, Fagbule et al. (2021) evaluated the influence of classroom peers on students in Grades 4 through 8. To quantify the effects of classroom-peer interactions, they used a recent policy intervention, wherein some students were reassigned to different schools in an ostensibly random manner contingent on the students' fixed characteristics. Using the first-period scores and established features of the randomly assigned portion of the current school-by-grade peer group, they developed a measuring variable for the lagged scores among the current school peers. School and teacher effects were not included, but student-fixed and grade-level by year effects were. The findings indicated a strong relationship between math achievement and peer group.

4. Methodology

The study used a descriptive survey research approach. The approach allows the researcher to measure relationships, gather information, summarise and interpret data for clarification. Explaining the association between the variables influencing mathematics achievement through quantitative methods. It answered the questions about the respondents' mathematics achievement levels. Students in secondary schools made up the majority of the sample. The study used path analysis to check if the proposed model fit the data (Figure 1). According to the model, students' mathematics achievement is directly or indirectly influenced by self-efficacy, motivation, locus of control, anxiety and peer group influence. Path analysis, which Sewall created, uses a path diagram as a visual representation to provide estimates of the impact and significance of a theoretical structural model (Stage et al., 2004). A path diagram shows the relationships between variables, their correlations' directions, and the "paths" that these relationships follow. Path analysis was used in this study to test the a priori model using information from 240 senior secondary school respondents in the city of Ibadan.

The ethical committee of the University of Ibadan's Faculty of Education approved this study in Nigeria. Every student in the sample who took part in the research completed the authorisation form. In addition, the American Psychological Association's guidelines were adhered to. Before distributing the questionnaires, the respondents were asked for their consent and were assured

that their answers would be kept private. As decided upon with the school research director, the questionnaires were given out during the visits to each school. The participants were not offered any monetary reward or other forms of reinforcement to encourage them to participate in the study: taking part was entirely voluntary.

The structural model demonstrates how both exogenous and endogenous variables affect mathematical achievement. Anxiety, self-efficacy, locus of control, and peer group influence were positioned as exogenous variables that led to mathematics achievement and motivation. Mathematical achievement was predicted by a path that included motivation as an intermediate variable. To confirm that the presumptions of multicollinearity, equality of variance, a regular distribution, and outliers had been satisfied, we checked the variables.

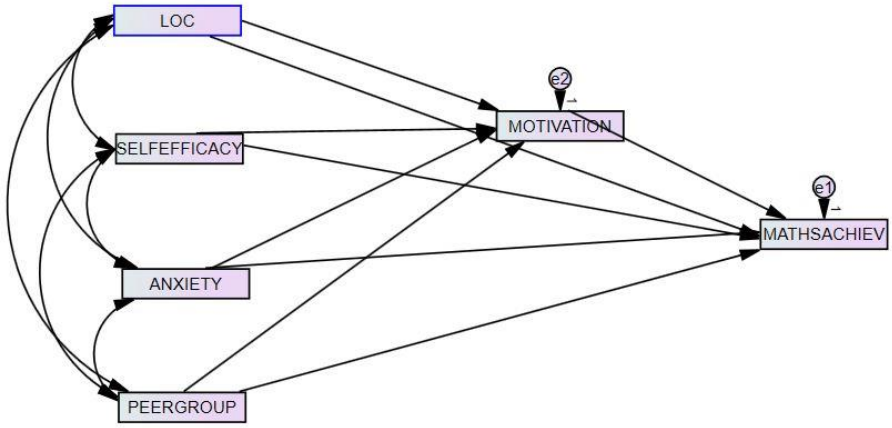

Figure 1. Hypothetical model: locus of control, self-efficacy, anxiety, peer group influence, motivation, towards achievement in Mathematics

Participants

Two hundred and forty students in total were chosen for the study. The participants were chosen using the multistage sampling technique. This study used six Local Government Areas in the Ibadan metropolis. Four (4) secondary schools from each of the six (6) Local Government Areas where the study was conducted were chosen using a simple random sampling technique. Ten (10) pupils were purposefully selected from each randomly chosen school. The sample size was established using Cochran's (1977) sample size formula for a finite population.

Measures

A survey was selected to gather information about the variables affecting the mathematics achievement of secondary school students. Section A of the survey asked questions about demographic profiles. Both primary and secondary data were crucial to explain the results of our investigation. Part B of the survey included a math achievement test and additional items scored on a Likert scale

from 1 (strongly disagree) to 5 (strongly agree). Content validity was further checked for both the specifications table and the questionnaire. To provide some initial evidence of construct validity, Rasch analysis was employed. Item fit statistics assess how much each item taps into a comparable construct, giving insight into the tool's validity. The Cronbach's alpha method was primarily used to ensure the reliability of the research instruments. To assess the validity of the research tool and meet the study's goals, a pilot study was carried out with 30 participants selected with consideration for gender balance. The chosen participants' responses were ranked to ascertain their relationships. The Cronbach alpha reliability coefficient for the questionnaire was found (academic self-efficacy scale α = .79; academic motivation scale α =0.81; locus of control scale α =0.84; mathematics anxiety scale α =0.82; peer influence inventory α=.76; and achievement test in mathematics α =0.88), which by Gamble (2019), were higher than the 0.7 cutoff. As a result, it is regarded as outstanding, and the research tools were trustworthy measurements for this investigation.

4. Results and Discussion

Table 1: Fit Index Table RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.000	1.000		
Saturated model	.000	1.000		
Independence model	289.089	.583	.417	.417

Table 2: Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	1.000		1.000		1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 3: Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.000	.000	.000
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

The final path model is obtained by eliminating the non-significant path toward mathematical achievement and testing the priori model with the data set (Figure 2). According to Uedufy (2023), this model is deemed a perfect fit with a comparative fit index 1.000 and a goodness-of-fit index of 1.000. Its parsimony comparative fit index of 0.000 is considered an acceptable error level. These indices suggest that the path model resulting in mathematics achievement fits the observed data from the 240 samples in this study reasonably well.

Table 4: Estimates and Path Label

			Estimate	S.E.	C.R.	P	Label
MOTIVATION	<---	PEERGROUP	-.244	.047	-5.138	***	par_1
MOTIVATION	<---	ANXIETY	.248	.064	3.886	***	par_4
MOTIVATION	<---	SELF-EFFICACY	.434	.225	1.932	.053	par_5
MOTIVATION	<---	LOC	-.148	.216	-.685	.493	par_6
MATHSACHIEV	<---	PEERGROUP	-.223	.036	-6.279	***	par_2
MATHSACHIEV	<---	ANXIETY	.213	.047	4.564	***	par_3
MATHSACHIEV	<---	MOTIVATION	.744	.046	16.176	***	par_7
MATHSACHIEV	<---	SELF-EFFICACY	-.673	.161	-4.181	***	par_8
MATHSACHIEV	<---	LOC	-.796	.154	-5.180	***	par_9

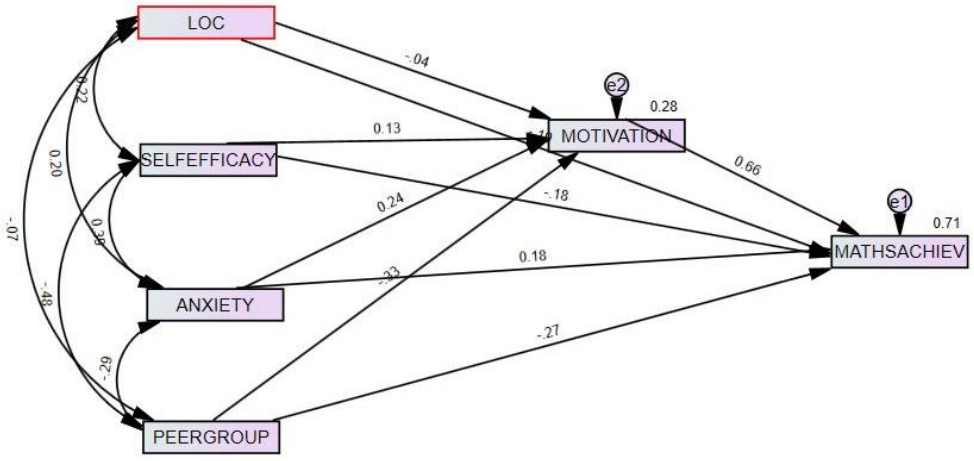

Figure 2. The final model for locus of control (LOC), self-efficacy, anxiety, peer group influence, and achievement in mathematics (Model Fit Indices: CFI = .1000; AGFI = .1000; RMSEA = .046)

In this model, every path is highly significant (p <.01), with the exception of the paths that lead from motivation to self-efficacy and locus of control (p =.053 and.493, respectively). When the fit indices are considered, the produced path

model appropriately fits the observed data from the sample of secondary school students. Anxiety, motivation and peer group all directly and indirectly impact math achievement, as the model illustrates. Adewuyi and Oluwole (2016) found that underachieving students are the hardest to deal with in the classroom, and this result supported their findings. They further reiterated that these pupils are disillusioned and uninterested, lacking the self-assurance and drive to study. Marlowe (2006) posited that the development of high-achieving students is contingent upon their motivation. Student motivation is primarily intended to support behavioural change and has a strong and positive relationship with students' performance in mathematics. Motivation is attributed to a person's ability to act toward a specific goal. Chetri's (2014) investigation into motivation among students claims that motivation compelled outcomes like performance, productivity, and absenteeism. In contrast to less motivated students, motivated students are more self-driven and directed toward autonomy and freedom, which leads them to take advantage of opportunities for growth more effectively (Wang et al., 2019). The findings of Wang et al.'s (2019) study, which examined students' motivation and mathematical achievement, indicate that while their achievement in math classes is impacted by acknowledgement, appreciation and rewards, the overall academic success of these students is significantly affected by the efficacy of motivation and the reward system in the math classroom.

The resulting model validated the body of literature indicating that a peer group's nature influences its members' motivation and academic performance. A group's propensity to positively or negatively affect its members' motivation and academic success depends on a number of factors, including the group's morality, degree of appearance, and the kind of conformity it demands. The group's impact on motivation, task completion and achievement are likely to be favourable if the environment is friendly, understanding and encouraging (Clotfelter et al., 2006; Kanmodi et al., 2022). Obiero (2017) investigates the impact of peer quality on kindergarten achievement by taking advantage of the random assignment in Tennessee's STAR class size experiment. Based on the observation that peer quality variance is higher within the subset of small classes than within the larger ones, he pursues an identification strategy in which class type is a likely exogenous variation source for peer quality variance. The study by Bergey et al. (2019) focuses on how peer behaviour affects student outcomes. He calculates the effect of disruptive behaviour by peers on the academic achievement of individual students and their math test scores using data from a single, sizeable educational facility in Florida. He does not use teacher controls or time-varying student covariates; instead, he uses student-fixed effects to account for student heterogeneity. He uses a unique identification technique in which the percentage of boys in the classroom with names that sound feminine is used as a gauge for peer behaviour that results in a student being suspended and a decline in math achievement test results.

Ogundokun (2011) found that while anxiety impacts academic achievement and the sense of personal control, the latter also influences subsequent academic achievement, which is consistent with the findings of this study. Additionally, Ayanwale et al.'s (2023) study examined the relationship between academic

success and anxiety in college students. Sixty-four school students' data were gathered, and a 2 x 2 mixed design factorial ANOVA was used to compare the pre-and post-test anxiety scale scores based on whether the learners received their actual exam results or a score reduction of ten points. The outcome showed a positive correlation between anxiety and academic success. According to the study, anxiety and specific aspects of success—whether verbal or intellectual—are related and that anxiety and academic performance are constantly interacting. O'Malley (1976) investigated the connection between anxiety and mathematical achievement in tenth-grade students through an eight-year causal longitudinal study. He demonstrated that external factors that affect academic achievement may become less strong over time and that, following five years of high school, there is no independent relationship between academic achievement in mathematics and anxiety.

Additionally, Onyemah and Omoponle (2022) examined the connection between locus of control and mathematics academic achievement in secondary school students. The results demonstrated a strong positive correlation between academic achievement in mathematics and locus of control. Studies conducted over many decades explicitly focusing on academic success have shown that the internality of control positively correlates with the academic achievement of university undergraduates, college students, high school students, and young people. Additionally, people with an internal locus of control are more likely to strive for higher levels of achievement among undergraduates and high school students. Students who performed better in the mathematics group also reported higher internal locus of control scores, according to research by Kumar and Asha (2017). Atetwe et al. (2018) examined the connection between students' locus of control and academic engagement by considering life satisfaction and quality. The study's findings showed a significant correlation between students' academic performance and locus of control. According to Fagbule et al. (2021), locus of control affects students' attitudes toward mathematics and their level of academic commitment. When a correlation is found between locus of control and academic engagement, adolescents exhibit a stronger correlation than adults or children.

Consistent with current research, self-efficacy was found to be related to math academic achievement in both direct and indirect ways. This implies that having self-efficacy enables a person to influence their environment and, in turn, their subsequent achievement. Therefore, confidence in one's abilities is essential for controlling and regulating the behaviour of an individual for effectiveness. This will influence their decision regarding accepting or declining a task based on his ability and self-assurance. A person's perceived self-efficacy will dictate how much resilience, perseverance and effort they put into a task; the higher their efficacy awareness, the more resilience, perseverance and effort they put in. In comparison to their peers who have low self-efficacy, students with a greater degree of self-efficacy typically exhibit positive attitudes regarding learning mathematics, tend to be more self-regulated and enduring in their learning, possess a greater desire to learn and succeed in their learning, confront less stress and anxiety, and as a result, have higher participation. These factors ultimately

improve students' performance in mathematics classes (Adeyemo, 2011; Omoponle & Dwarika, 2023).

5. Conclusion

This study examined how psychosocial variables contribute to student achievement in mathematics. Employing the path-analytical method, the researchers came to the conclusion that, whether directly or indirectly, the factors taken into consideration in this study interact to produce mathematics achievement. When examining mathematics achievement in students, it is best to look at the factors as a group (self-efficacy, motivation, locus of control, anxiety, and peer group influence). The findings of the study showed that every path has high significance except for the path from motivation to self-efficacy and locus of control.

6. Recommendations

The following recommendations are made:

- Integrating the value of mathematics into daily activities should transform students' attitudes and interest in the subject.
- Educators should devise strategies to inspire pupils to acquire mathematical knowledge despite obstacles. Since the performance expected of teachers working with students who perform below average is very low, they must exercise great diligence and patience in their interactions with the students.
- Since it is evident that no time or effort can make up for a student's lack of willingness and motivation to learn, students are urged to alter how they feel about mathematics education.
- NGOs, FBOs, and CBOs can also help by funding teacher training for short courses or long courses in in-service mathematics so that secondary school students receive high-quality instruction in the subject. It is recommended that school administrators implement specific programmes that facilitate the assessment and evaluation of students' mathematical knowledge.
- Other development partners, like the World Bank (WB), the International Monetary Fund (IMF), and the United Nations International Children Education Fund (UNICEF), could be asked for financial support as well as advice on how to enhance math instruction generally for students, teachers and civic and educational planners if needed.
- To decrease, if not eliminate, students' mathematical underachievement, relevant professional organisations such as the Science Teachers Association of Nigeria (STAN) and the Mathematics Association of Nigeria (MAN) should host courses or seminars during their annual conferences to teach teachers about the strategies that will be deployed to bring about a complete change in the mathematics curriculum.

7. Implications

The study's findings have consequences for parents, educators, policymakers, and other stakeholders in education, particularly those who specialise in assessment. Given that psychosocial factors like self-efficacy, motivation, locus of control, anxiety and peer group influence can predict mathematics achievement, educators and other stakeholders in the classroom should concentrate on

enhancing these factors as a means of fostering and sustaining students' academic behaviours and attitudes toward mathematics. Students' overall performance can be raised when they are motivated to enhance their emotional and social intelligence.

8. Limitations of the Study

The study relied on self-reported data obtained from questionnaires, which might contain biases related to social desirability or recall, among other potential sources of measurement error. It was also found that certain students did not complete the questionnaires thoroughly, and some did not respond to all the questions.

9. Ethics Statement

All procedures used in this study involving human subjects adhered to the National Research Committee's ethical guidelines. To participate in this study, each participant provided written, informed permission.

10. Acknowledgements

The authors are grateful to the scholars whose works they used as a resource and the students who responded to their instruments.

11. Availability of Data Statement

The corresponding author can be contacted for additional information. The original contributions to the study are included in the article and additional resources.

12. Funding

The study was carried out without financial support.

13. Competing Interests

The study's author asserts that no financial or business connections might be seen as having a potential conflict of interest.

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