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Research Article

Mediating role of student interest on the relationship between student mathematics perception and performance

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The study aimed to investigate the influence of student interest on the relationship between student perceptions of mathematics and their performance in the subject. The research involved 1050 students enrolled in Basic Statistics at levels 200 and 300, with a sample size of 290 students selected through stratified and simple random sampling methods. A structured questionnaire was employed for data collection, utilizing a descriptive-correlation design. The results revealed that positive perceptions of mathematics significantly predict both student interest and performance. Additionally, student interest significantly and positively predicts mathematics performance. Notably, the relationship between student perception of mathematics and performance is partially mediated by student interest, with a statistically significant indirect effect. The study suggests that educators should cultivate interactive learning environments in mathematics classes to effectively engage students. Incorporating hands-on activities, real-world applications, and collaborative projects can enhance students' comprehension and application of mathematical concepts in their daily lives.

Keywords: Mediating role, student interest, student perspective, mathematics performance

1. Introduction

Mathematics is frequently seen as indispensable for success in contemporary society, owing to its extensive utilization across diverse domains including science, engineering, finance, technology, and even routine activities (Belbase et al., 2022). Logical thinking and problem-solving abilities are taught in mathematics, and these are useful in overcoming challenging situations in the real world. It encourages the development of analytical thinking data analysis and interpretation skills, which are critical in a variety of fields, including business, research, and technology (Evendi et al., 2022). Making well-informed decisions in today's data-driven environment requires the ability to comprehend and evaluate quantitative data. Strong mathematical skills are necessary for many well-paying and in-demand careers, including actuarial science, software engineering, data analysis, and finance.

Certain mathematical ideas can be esoteric and challenging to understand, particularly for pupils who have trouble with abstract thought (Ocy et al., 2023). Since mathematics builds on earlier ideas, it may be difficult to move on to more complex subjects if there are conceptual gaps. If students don't think mathematics will be useful in their daily lives or future employment, they might not be motivated to learn it. Many people believe that mathematics is hard, which can cause worry and a fear of failing, which can impede confidence and learning. It may be challenging for pupils to comprehend and remember mathematical topics if there is a dearth of specialized education or ineffective teaching techniques.

Previous studies have emphasized the importance of how students view mathematics and how it influences their academic performance. Student involvement and performance in mathematics may be greatly impacted by their attitudes and beliefs about the topic, according to Segarra and

Julià (2022). It has also been shown that there is a high association between students' impressions of mathematics and their performance in the subject, indicating that favorable attitudes toward the subject lead to greater results (Wen & Dubé, 2022). Perceptions held by students and performance, however, might not be directly correlated. According to published research, one potential mediating element in this association may be students' interest in mathematics. For example, Wigfield and Cambria (2010) developed a model in which students' opinions about their worth and competency in a topic shape their interest in it, which in turn influences their academic achievement. Similarly, Oppong-Gyebi et al. (2023) highlighted how students' motivation and achievement are shaped by their interests and perceptions.

Previous research has shown that students' perceptions of mathematics significantly influence their engagement, motivation, and performance (Boaler, 2002; Dweck, 2006). Positive perceptions, such as viewing mathematics as relevant, enjoyable, and attainable, are associated with higher achievement levels and greater persistence in mathematical tasks (Christensen & Knezek, 2020). Conversely, negative perceptions, such as math anxiety and stereotypes about mathematical ability, can impede learning and hinder performance (Maloney et al., 2013). Extensive research in educational psychology underscores the significance of interest in fostering engagement, deep learning, and academic achievement (Groenewald et al., 2023). When students find mathematics interesting, they are more likely to invest effort, exhibit curiosity, and adopt a mastery-oriented approach to learning (Filgona et al., 2020). Moreover, sustained interest in mathematics has been linked to long-term academic success and career aspirations in STEM fields (Fong & Kremer, 2020).

Despite the acknowledged importance of both student perception and interest in mathematics education, there remains a dearth of empirical studies elucidating the mediating role of interest in the perception-performance relationship. Previous research has primarily concentrated on either the direct impacts of perception on performance or the individual influence of interest on achievement outcomes. Consequently, the nuanced mechanisms through which perception influences performance via interest remain underexplored. This study endeavors to fill this void by aiming to provide a more holistic comprehension of the factors influencing mathematics achievement. Its primary goal is to explore the degree to which student interest mediates the connection between perception and performance in mathematics, thus illuminating the mechanisms through which perceptions manifest into academic results.

1.1. Significant of Study

This research addresses the growing interest in understanding how students' attitudes toward mathematics, particularly their *perception of mathematics*, can shape their academic performance. *Student interest* has long been considered a critical motivational factor in the learning process. By investigating its mediating role, this study contributes to *educational psychology* and *motivation theory* by exploring how interest interacts with students' perceptions of a subject to enhance performance. For instance, Frenzel et al. (2021) emphasized that interest significantly predicts long-term academic success when paired with positive academic perception and self-concept. This study will strengthen these theoretical foundations and demonstrate their applicability in mathematics education. Moreover, the study's findings will provide educators with actionable insights into how they can enhance *students' interest* in mathematics, particularly by addressing *students' perceptions* of the subject. Teachers often struggle to maintain high levels of engagement in mathematics classrooms, and identifying how perceptions influence interest, which in turn impacts performance, can lead to more *student-centered instructional practices*. Studies such as Vandecandelaere et al. (2012) have shown that when students perceive mathematics as useful or enjoyable, their interest levels increase, which positively affects their overall performance. By identifying this mediating relationship, the study can help educators design interventions that positively shape students' math perceptions, fostering a more engaging and effective learning environment. Finally, this research also has implications for *curriculum designers* who aim to improve mathematics curricula by aligning content with students’ perceptions and interests. Findings from Anderson et al. (2014) indicated that when curriculum content connects with students’ interests, it stimulates deeper cognitive engagement and leads to improved performance. The study may offer guidelines for curriculum developers to create modules that appeal to students' interests while addressing negative perceptions they might have towards mathematics. In addition, by emphasizing the role of student interest as a mediator, this research provides a nuanced understanding of how curricular adjustments may lead to enhanced performance outcomes.

1.2. The Aim

This paper aims:

1) To determine the impact of students' perceptions of mathematics on their interest in the subject.

2) To ascertain the influence of student interest on mathematics performance.

3) To assess the impact of student perception of mathematics on mathematics performance.

4) To examine the mediating student interest in the relationship between student perception of mathematics and mathematics performance.

2. Literature Review and Hypothesis Development

2.1. Mathematics Perception and Mathematics Interest

The relationship between students' perception of mathematics and their interest in the subject has been widely studied, particularly in the context of improving mathematical achievement and engagement in learning. Perception shapes how students view mathematics whether as a valuable, interesting, or challenging subject—and has a profound impact on their motivation and interest in pursuing further studies in mathematics. A positive perception of mathematics is closely linked to higher levels of interest. Students who view mathematics as enjoyable and useful tend to be more engaged in learning activities and pursue mathematics-related subjects beyond compulsory education (Leijen et al., 2024). Research by Dare et al. (2021) found that students who perceived mathematics as a subject with real-world applications demonstrated a stronger interest in pursuing careers in STEM fields. This perception was particularly significant among students with high self-efficacy in mathematics. Doño and Mangila (2021) found that students' interest in mathematics increased when they perceived the subject as challenging yet rewarding. In this study, problem-solving tasks that promoted students' cognitive engagement led to enhanced perceptions of the subject, which in turn boosted their intrinsic interest. The research highlighted the importance of classroom environments that support a positive perception of mathematics as an intellectually stimulating subject. This hypothesized that;

Hypothesis 1: Student perception of mathematics significantly predicts mathematics interest.

2.2. Mathematics Interest and Performance

Interest in mathematics is a key factor influencing student engagement, persistence, and academic performance. Numerous studies have explored the role of interest as a motivational construct that drives academic behaviors, which in turn contribute to performance outcomes. For instance, Street et al. (2022) conducted a longitudinal study that demonstrated how students with a higher interest in mathematics were more likely to engage in problem-solving tasks and achieve higher scores on standardized tests. The authors attributed this to the students’ increased cognitive engagement and persistence in learning activities driven by their interests. Similarly, Gomes et al. (2020) found that interest in mathematics was a significant predictor of academic achievement in mathematics, particularly in secondary school students. Their study revealed that students with higher levels of interest were more likely to develop better problem-solving skills, a deeper understanding of mathematical concepts, and ultimately, improved academic performance. Interest fostered motivation to engage with complex tasks, which in turn contributed to better outcomes. Yu et al. (2021) examined university students and concluded that interest not only promotes academic engagement but also positively affects the quality of learning strategies. Students who were more interested in mathematics were more likely to employ deep learning strategies, such as critical thinking and concept application, leading to higher academic performance. Svoboda et al. (2016) investigated the role of interest in predicting long-term success in mathematics, particularly in STEM education. They found that students who reported higher levels of interest in mathematics were more likely to enroll in advanced mathematics courses and perform better in them. Moreover, interest was a stronger predictor of long-term success than prior achievement alone, indicating that fostering mathematics interest can compensate for early academic difficulties. These hypothesized that;

Hypothesis 2: Student interest significantly predicts mathematics performance.

2.3. Student Perception of Mathematics and Mathematics Performance

Students' perception of mathematics plays a crucial role in shaping their learning behaviors, motivation, and academic achievement in the subject. Perception can encompass attitudes, beliefs, and feelings toward mathematics, and this perception often influences how students engage with the subject. A strong body of research highlights a positive correlation between students' favorable perceptions of mathematics and their academic performance. For instance, Skilling et al. (2021) conducted a study with high school students and found that students who viewed mathematics as important and believed in their ability to succeed in the subject were more likely to engage actively and perform better. The study showed that students' positive self-perceptions (e.g., "I am good at math") significantly predicted higher achievement in mathematics assessments. Similarly, Hernández et al. (2020) examined the relationship between perception and performance among secondary school students and found that students who perceived mathematics as relevant to their future goals exhibited higher levels of motivation, persistence, and academic performance. The study suggested that students who see the practical applications of mathematics are more likely to invest time and effort in mastering mathematical concepts, leading to better outcomes. Berger et al. (2020) also demonstrated that students with positive perceptions of mathematics such as viewing it as interesting and important, students performed better in national mathematics exams. They found that perception influenced performance indirectly through increased engagement and effort. The study concluded that fostering positive perceptions of mathematics should be a priority for educators to improve student outcomes. Conversely, negative perceptions of mathematics often correlate with lower performance. Putwain and Wood (2023) found that students who held negative beliefs about mathematics, such as viewing it as too difficult or irrelevant were more likely to experience anxiety and avoid engaging with the subject. This avoidance, in turn, led to poorer academic performance. Their study also suggested that negative emotions such as fear or frustration toward mathematics can undermine students' confidence, making them less likely to persist when facing challenging mathematical tasks. These hypothesized that;

Hypothesis 3: Student perception of mathematics significantly predicts mathematics performance.

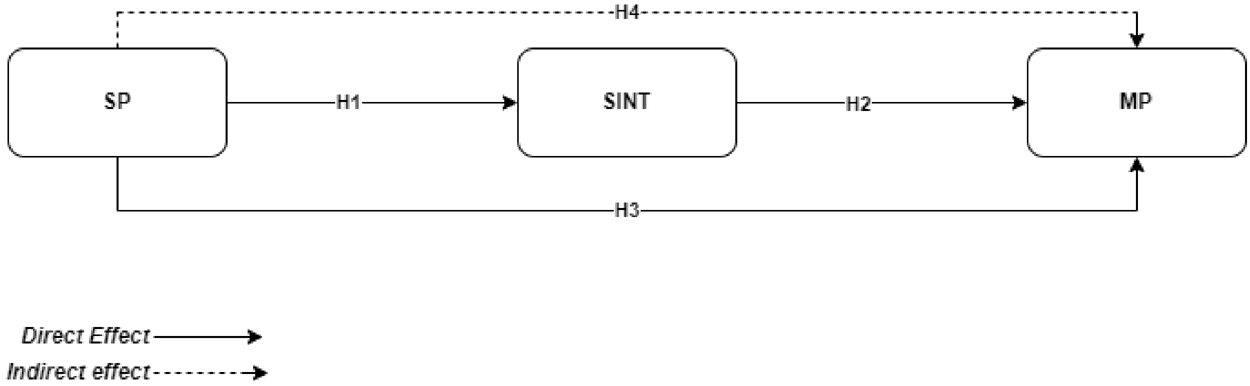
Based on hypotheses 1,2, and 3, the researcher then hypothesized that;

Hypothesis 4: Student interest acts as a mediator in the relationship between students' perceptions of mathematics and their performance in the subject.

2.4. Conceptual Framework

The study's conceptual framework is visually represented in Figure 1, where the student's perception of mathematics is presented as the independent variable, student interest serves as the mediating variable, and mathematics performance is depicted as the dependent variable. As depicted in Figure 1, the student's perception of mathematics exerts a direct influence on their math interest (H1). Additionally, student interest directly impacts mathematics performance (H2). Furthermore, the student's perception of mathematics directly influences mathematics performance (H3). Finally, student interest acts as a mediator in the relationship between student perception of mathematics and mathematics performance (H4).

Figure 1
Conceptual framework



3. Methods

3.1. Research Design

The research employed a descriptive-correlational methodology, often referred to as observational correlational design. This approach seeks to delineate and analyze connections between variables without altering their natural state. Its principal aim is to investigate and elucidate naturally unfolding phenomena, discerning patterns, and correlations among variables. According to Creswell (2014), correlational research is particularly useful when the aim is to predict outcomes or identify the direction and strength of relationships among variables.

3.2. Participants

The present study comprises 1050 students enrolled in Basic Statistics at levels 200 and 300 at Wisconsin International University College, Kumasi-Campus. These students incorporate mathematics into their academic curriculum.The sample size for the study was determined using Yamane's (1967) sample size determination. The sample size for the study was set at 290 pupils, determined using Yamane's (1967) formula. These 290 questionnaires will be evenly distributed between the two courses, with students from both level 200 and level 300 participating.

In this study, two sampling techniques were employed: stratified sampling and simple random sampling. Stratified sampling categorized students based on their educational level, or strata. Following this categorization, basic random sampling techniques were utilized to select students from each stratum. Simple random sampling was employed to ensure that every student had an equal chance of being chosen for the research.

3.3. Questionnaire and Design

A structured questionnaire was adopted for this study. When crafting the research questionnaire, the elements under investigation; student interest, perception of mathematics, and mathematical performance were carefully considered. Five student interest measurement items from Bright (2024)were revised and refined, which includes: "I am bored when working on mathematics," "I love studying mathematics, " "Ever since elementary school, I have enjoyed math", "I am happy to be in mathematics class", and "I like reading mathematics to another subject". Ten assessment questions regarding students' perceptions were adapted and updated from Arthur et al.'s (2022) research, which includes: "I believe I can understand most mathematics concepts easily", "I feel confident when doing mathematics assignments", "Mathematics is one of the most challenging subjects for me", "I feel anxious when it comes to solving mathematics problems", and "I feel comfortable asking questions during mathematics lessons". Furthermore, several assessment questions about arithmetic performance from Asare et al. (2024) work were modified and enhanced, which includes: "I can easily apply mathematical concepts to solve new problems", "I rarely need extra help to complete my mathematics homework", "I have improved my mathematics skills over the past school year", "I usually perform better in mathematics compared to other subjects", and "My overall performance in mathematics meets my academic goals". Each revised measurement item was evaluated using a five-point Likert scale, with 1 indicating strong agreement and 5 indicating strong disagreement.

3.4. Data Analysis

The analysis for this study was conducted using SPSS (ver. 23) and Amos (ver. 23). SPSS (ver. 23) facilitated exploratory factor analysis [EFA] and reliability analysis. Additionally, Amos (ver. 23) was utilized for path analysis, confirmatory factor analysis [CFA], and discriminant validity assessment.

3.4.1. Exploratory factor analysis

Exploratory Factor Analysis is a statistical technique commonly employed in educational and psychological research to uncover the underlying structure of a set of variables or items (Asare et al., 2024; Marsh et al., 2020). EFA allows researchers to reduce the complexity of the data by identifying the underlying factors or dimensions that account for the correlations among observed variables. By examining the pattern of factor loadings, researchers can determine the extent to which items designed to measure perception, interest, and performance in mathematics align with their respective underlying constructs. EFA can generate hypotheses about the underlying structure of the variables under investigation. By exploring the pattern of factor loadings and examining the interrelationships among variables, researchers can generate hypotheses about the nature of the relationships between perception, interest, and performance in mathematics. These hypotheses can then be tested using confirmatory factor analysis or structural equation modeling [SEM] in subsequent analyses. The outcomes of the exploratory factor analysis are presented in Table 1.

Table 1
Exploratory Factor Analysis

Rotated Component Matrix			
Measurement Items	*Component*		
	1	*2*	*3*
INT1			.731
INT3			.754
INT4			.798
INT5			.784
SP4		.770	
SP6		.789	
SP7		.717	
SP8		.755	
SP9		.743	
MP5	.746		
MP6	.770		
MP7	.726		
MP8	.826		
MP9	.734		

KMO and Bartlett's Test		
TVE		66.2027
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.882
Bartlett's Test of Sphericity	Approx. Chi-Square	1681.106
	df	91
	Sig.	<.001
Determinant		.001

Note. Extraction Method: Principal Component Analysis; a. 3 components extracted.

The Total Variance Extracted [TVE] amounted to 66.2027%, surpassing the minimum expected threshold of 50%, as outlined in Table 1's parameters from the Exploratory Factor Analysis. Sample adequacy was assessed using Kaiser–Meyer–Olkin [KMO], yielding a score of .882, exceeding the minimum expected value of 0.6. Bartlett's Test of Sphericity results were statistically significant, indicating sufficient correlation among the test items to meet EFA standards. The study's findings were deemed significant (χ^2 = 1681.106; $p < .01$). To ensure positive definiteness in the dataset, the determinant of correlation should equal zero; in this study, the determinant was .001.

3.4.2. Confirmatory factor analysis

Drawing on theoretical concepts and assumptions derived from prior research or theoretical frameworks, Confirmatory Factor Analysis allows researchers to evaluate a pre-established measurement model (Marsh et al., 2020). In the context of this study, scholars can construct a model incorporating latent variables such as students' mathematical performance, interest in mathematics, and perception of mathematics, along with their corresponding observable indicators (items). Through the assessment of data fit to the proposed structure by defining a confirmatory model, researchers can validate the measurement tools' validity and theoretical assumptions. Confirmatory Factor Analysis was conducted in Amos (v.23), utilizing the variables retained from the Exploratory Factor Analysis.

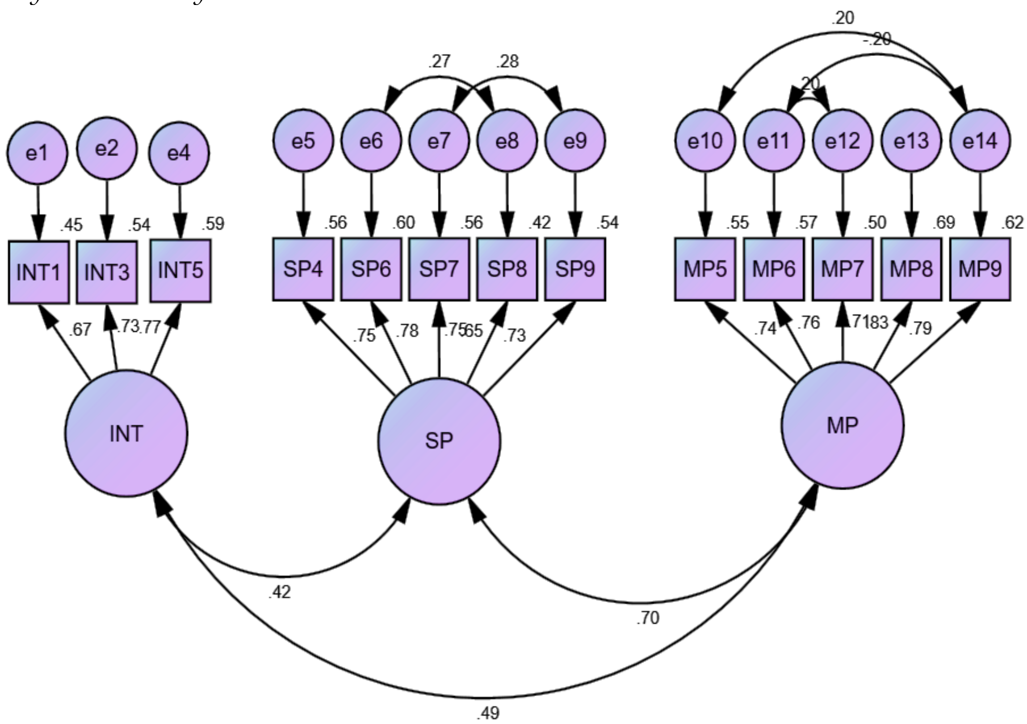
The standardized factor loadings obtained from the Confirmatory Factor Analysis were expected to be at least 0.5, aligning with the findings from the Exploratory Factor Analysis presented in Table 2. Using SPSS (v.23), Cronbach's Alpha [CA] was computed for the retained variables to ensure a minimum alpha value of .7. This analysis was applied to each of the three latent variables (refer to Table 2), indicating a high level of internal consistency or reliability for the measurement items.

Table 2
Confirmatory Factor Analysis

Model Fit Indices: CMIN = 113.321; DF = 57; CMIN/DF = 1.988; TLI = .949; CFI = .963; GFI = .933; RMR = .043; RMSEA = .064; PClose = .086;	*Std. Fact. Loadings*
Student Interest (INT): CR = .769; CA = .801; AVE = .527	
INT1: I am bored when working on mathematics.	.674
INT3: Ever since elementary school, I have enjoyed math.	.732
INT5: I like reading mathematics to another subject.	.768
Student Perception of Mathematics (SPM): CR = .852; CA = .861; AVE = .536	
SP4: I believe I can understand most mathematics concepts easily.	.748
SP6: I feel confident when doing mathematics assignments.	.777
SP7: Mathematics is one of the most challenging subjects for me.	.748
SP8: I feel anxious when it comes to solving mathematics problems.	.647
SP9: I feel comfortable asking questions during mathematics lessons.	.734
Mathematics Performance (MP): CR = .875; CA = .877; AVE = .585	
MP5: I can easily apply mathematical concepts to solve new problems.	.741
MP6: I rarely need extra help to complete my mathematics homework.	.757
MP7: I have improved my mathematics skills over the past school year.	.706
MP8: I usually perform better in mathematics compared to other subjects.	.828
MP9: My overall performance in mathematics meets my academic goals.	.786

For all latent constructs, the Variance Extracted [AVE] technique was used, with a minimum threshold of 0.5 as recommended by Fornell and Larcker (2014). Furthermore, it was expected that Composite Reliability [CR] would be at least 0.7, a requirement that was satisfied for all latent variables. In terms of model fit indices, Bamfo et al. (2018) said that RMSEA and SRMR should be less than .08, TLI and CFI should both exceed .9, PClose should be statistically insignificant (more than 0.05), and CMIN/DF should be below 3. For every latent variable in this dataset, these requirements were satisfied. Figure 2 illusterate the confirmatory factor analysis.

Figure 1
Confirmatory Factor Analysis



From Figure 2, studnets interest [INT] positively correlated with students math perception and mathematics performance. Moreover, students math perception positively correlated with mathematics performance. Finally, e1 and e8, e7 and e9, e10 ande14, e11 and e12, and e11 and e12 were all joined for model fitness as recommended by Asare et al. (2024).

3.4.3. Discriminant validity

Discriminant validity is a statistical concept used to ensure that the constructs being measured by different variables are distinct from each other (Rönkkö & Cho, 2022). In other words, it verifies that each variable in a study is capturing unique aspects of the phenomenon under investigation and not simply measuring the same underlying construct. Assessing correlations between variables and contrasting them with the square roots of each variable's average variance extracted is a standard technique employed to gauge discriminant validity.

Table 3
Discriminant Validity

Variables	*CR*	*AVE*	*INT*	*SP*	*MP*
INT	.769	.527	**.726**		
SP	.852	.536	.417***	**.732**	
MP	.875	.585	.492***	.704***	**.765**

Many studies (Dogbe et al., 2019) used a comparison between the squared root of the Average Variance Extracted (√AVEs) and the inter-correlation scores to assess the discriminant validity of the measuring items. It was anticipated that the lowest √AVE would outperform the greatest correlation score to demonstrate discriminant validity. Discriminant validity was achieved in the given table, where the greatest correlation score was 0.704 and the lowest √AVE was 0.726. Furthermore, as the dataset's greatest correlation coefficient of 0.704 did not surpass 0.726, it was determined that there was no indication of multicollinearity.

3.4.4. Path analysis

Path analysis enables researchers to concurrently model the interactions between several variables. In this instance, researchers in the same study, giving a thorough knowledge of the interactions between these elements, may include all variables like students' performance in mathematics, their perception of mathematics, and their interest in mathematics.

Table 4
Path Analysis

Direct Effect	*Std. Estimate*	*S.E.*	*C.R.*	*p-value*
SP→INT	.347	.072	4.832	***
SP→MP	.573	.080	7.145	***
INT→MP	.275	.084	3.268	.001
Indirect Effect	*Std. Estimate*	*Lower Bound*	*Upper Bound*	*p-value*
SP→INT→MP	.251	.157	.388	<.001

Note. ***: $p < .01$.

4. Results

4.1. Hypothesis 1: Student perception of mathematics significantly predicts mathematics interest

The first hypothesis of the study examines the extent to which students' perception of mathematics influences their interest in the subject. This was addressed through the direct impact of students' perceptions of mathematics on their interest (SP→INT). With a p-value below 1% (0.01) (β=.347; CR=4.832), as indicated in Table 4, the results demonstrated a direct, positive, and statistically significant effect of students' perceptions of mathematics on their interest. With an effect size of 34.7%, the findings suggested that students' positive perceptions of mathematics significantly contribute to their interest in the subject.

4.2. Hypothesis 2: Student interest significantly predicts mathematics performance.

Moreover, in line with the second research hypothesis, student engagement emerges as a robust predictor of mathematical achievement. The evident correlation between student interest and mathematical proficiency lends support to this hypothesis. With a p-value below 1% (0.01) (β=.275; CR=3.268), as revealed in Table 4, the results demonstrate that student engagement positively and significantly predicts mathematical performance. According to the findings, student involvement enhances math performance by 27.5%. These results reinforce the notion that student interest serves as a strong predictor of mathematical proficiency.

4.3. Hypothesis 3: Student perception of mathematics significantly predicts mathematics performance

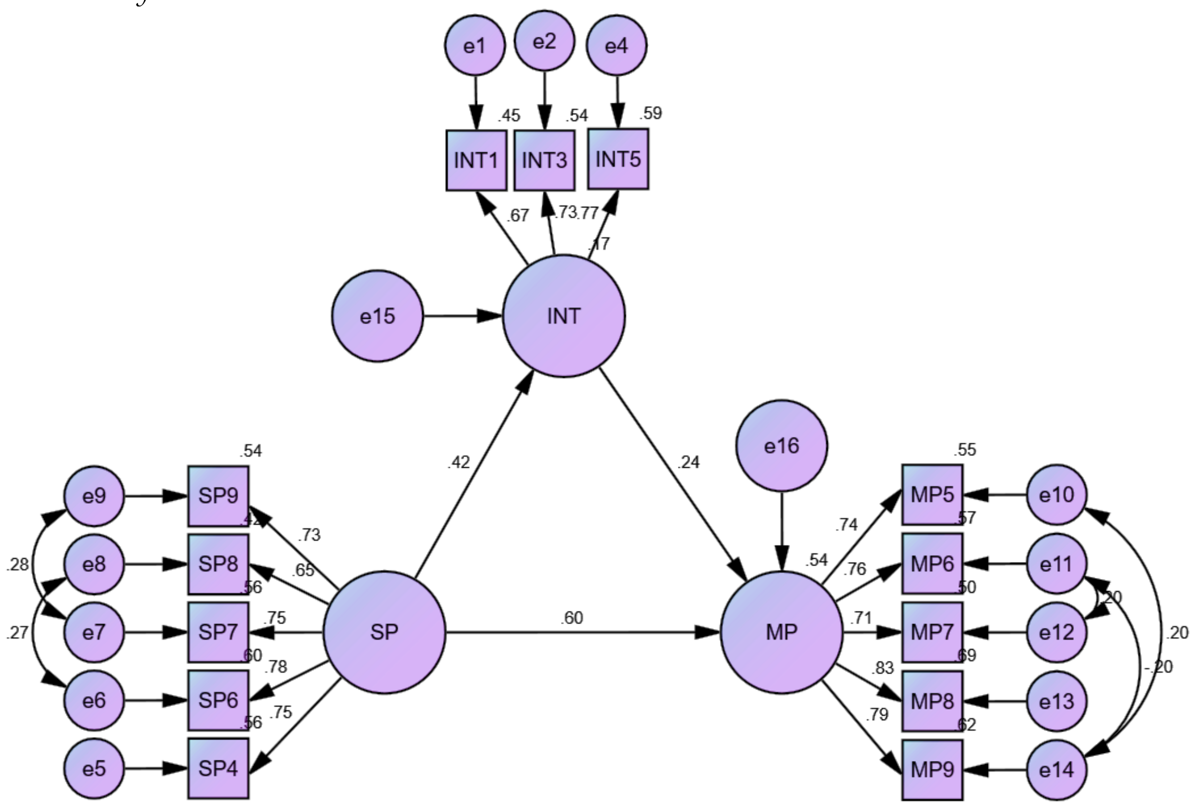
In line with the third research hypothesis, students' perceptions of mathematics strongly predict math performance. This was addressed through the direct influence of student perception on mathematical performance (SP→MP). The results from Table 4 indicate that students' positive perceptions significantly and directly impact their performance in mathematics, with a p-value of less than 1% (β=.573; CR=7.145). Specifically, the findings reveal that favorable perceptions of mathematics have a substantial positive effect, accounting for 57.3% of the variance in students' performance in the subject.

4.4. Hypothesis 4: Student interest acts as a mediator in the relationship between students' perceptions of mathematics and their performance in the subject

The fourth research hypothesis posits that students' perceptions of mathematics and their performance in the subject are influenced by their interest, acting as a mediator. The analysis results presented in Table 4 indicate that student interest exerts a positive and statistically significant indirect effect on the relationship between student perception and mathematical success. This effect is underscored by the computed p-value, which is below 0.01 (β = 0.251). Importantly, the upper bound (.388) and lower limit (.157) values fall outside the range of zero (0), indicating the robustness of this influence. Hence, it can be concluded that there exists a connection between student math perception and mathematical performance, with this relationship being partly influenced by student interest. Notably, the mediating function of student interest in the correlation between students' perspectives on mathematics and their performance in the subject has not been explored previously.

Figure 3 presents the graphical illustration fotr the path analysis.

Figure 2
Path summary



From Figure 3, students math perception had a significant direct effect on both students interest and mathematics performance. In addition, students interest had a significant positive effect on mathematics performance. Finally, mathematics interest patially mediates the connection between students math perception and their mathematics performance.

5. Discussion

The study findings revealed that students' mathematics perception has a significant positive effect on their mathematics achievement. This result is in line with those of Arthur et al. (2022), which revealed that students' favorable opinions of mathematics had a considerable impact on their interest in the topic (β=.472; CR = 7.174***). Furthermore, this study indicated that the link between peer-assisted learning and math interest was partially influenced by students' perceptions of arithmetic. Similarly, Arthur et al. (2017) identified that students' negative attitudes toward arithmetic negatively affected both their interest in and performance in the subject. Salifu and Bakari (2022) explored the connection between students' perceptions of arithmetic and their academic performance in the subject. Their results revealed a modest yet positive correlation between students' interest in mathematics and their perceptions of arithmetic.

The study result found that student engagement positively and significantly predicts mathematical performance. The findings of this study align with research conducted by Asare et al. (2023), which explored the moderating effect of students' mathematical interest on the relationship between ChatGPT and mathematical ability. Their findings underscored the significant influence of students' enthusiasm for mathematics on their success in the subject.

Similarly, Du et al. (2021) delved into the impact of worry, curiosity, and self-efficacy on mathematical success, drawing from longitudinal data from 2789 individuals. Their research revealed a strong and positive correlation between students' enthusiasm for mathematics and their mathematical ability. In a separate study, Arhin and Gideon (2020) explored the connection between students' academic achievements and their interest in mathematics. Their findings highlighted a robust association between the performance of math students and their level of interest in the subject. Nevertheless, Wong and Wong's (2019) investigation, which centered on the correlation between interest and mathematics performance in a technology-enhanced learning environment in Malaysia, found no significant association between interest and mathematics performance based on correlation analysis.

The result indicated that students' positive perceptions significantly and directly influence their performance in mathematics. This result supports the theory that students' perceptions wield significant predictive power over their mathematical performance. This outcome aligns with the conclusions drawn from Appiah's et al. (2023) study, which explored the mediating roles of students' perceptions of math, self-efficacy, and cooperative learning in the relationship between mathematical success and teacher-student interactions. Their findings revealed that students' positive attitudes toward learning mathematics significantly predicted their mathematical success ($\beta=0.384$; CR = 5.818***).

The fourth research hypothesis posits that students' perceptions of mathematics and their performance in the subject are influenced by their interest, acting as a mediator. The analysis revealed the connection between student math perception and mathematical performance, with this relationship being partly influenced by student interest. Notably, the mediating function of student interest in the correlation between students' perspectives on mathematics and their performance in the subject has not been explored previously.

6. Recommendations

A longitudinal study is essential to explore how changes in students' interest in mathematics over time influence the connection between their perception of mathematics and their performance. This could shed light on the dynamic nature of these relationships. A deeper comprehension of the connection between students' viewpoints and their mathematical performance could be achieved through the integration of quantitative data with qualitative research methodologies such as focus groups or interviews. This approach may uncover nuanced aspects that quantitative assessments might overlook. Additionally, further research should implement interventions aimed at enhancing student interest in mathematics and examine how these interventions impact the relationship between student perception and mathematics performance. Such investigations could yield practical implications for educators and policymakers.

Teachers must promote active learning practices in mathematics classes to pique students' attention. Hands-on exercises, real-world applications, and collaborative projects can help students understand and apply mathematical principles in their daily lives. Moreover, it is advised that mathematics instructors include technology tools and resources in their teaching to increase student involvement. Interactive simulations, instructional games, and online platforms can help students learn mathematics in a more engaging and pleasurable way. In addition, the government must offer educators professional development opportunities to improve their teaching approaches and ideas for increasing student engagement in mathematics. Training in effective teaching methods, differentiation, and student-centered approaches can help instructors fulfill the unique needs of their pupils.

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