

## Self-Efficacy and Mathematics Achievement: The Mediating Role of Social Support

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### Article Info

#### Article History

Received:  
3 March 2026

Revised:  
18 May 2026

Accepted:  
4 June 2026

Published:  
10 June 2026

#### Keywords

Self-efficacy  
Social support  
Mathematics achievement  
Madrasah Ibtidaiyah  
Mediation analysis

### Abstract

Mathematics learning at the elementary level often requires students to understand abstract concepts, apply logical reasoning, and persist in solving difficult problems. This study examined the relationship between self-efficacy, social support, and mathematics achievement among Madrasah Ibtidaiyah students in Makassar City, Indonesia, with particular attention to the mediating role of social support. A quantitative cross-sectional correlational design was employed, involving 581 Grade V students selected through purposive sampling from 29 accredited Madrasah Ibtidaiyah schools. Data were collected using self-efficacy and social support questionnaires, while mathematics achievement was obtained from official school report card records. The data were analyzed using descriptive statistics and path analysis within a mediation model. The findings showed that self-efficacy was positively associated with mathematics achievement and that social support significantly mediated this relationship. The direct and indirect paths were both significant, indicating partial mediation. These results suggest that students' mathematics achievement is related not only to their confidence in learning mathematics but also to the support they perceive from their social environment. The study highlights the importance of strengthening students' self-efficacy and supportive learning environments in Madrasah Ibtidaiyah mathematics education.

**Citation:** Minarni, Yaumi, M., Rahman, U., & Saleh, C. (2026). Self-efficacy and mathematics achievement: The mediating role of social support. *International Journal on Studies in Education (IJonSE)*, 8(3), 837-856. <https://doi.org/10.46328/ijonse.8554>



ISSN: 2690-7909 / © International Journal on Studies in Education (IJonSE).  
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## Introduction

Mathematics education is widely recognized as essential because it develops reasoning, problem-solving, and sense-making skills beyond simple calculation. The National Council of Teachers of Mathematics (NCTM) highlights problem solving and reasoning as fundamental to building new knowledge, while the OECD describes mathematics as a basis for numeracy, critical thinking, and data literacy needed to address technological, economic, and social challenges (OECD, 2024). These perspectives show that mathematics is not only a school subject but also preparation for everyday life and future work, where competence in mathematics opens opportunities (OECD, 2023). Research reviews consistently confirm that teaching approaches focus on problem solving and reasoning, with recent studies identifying problem-based learning as central to fostering critical thinking (Nafiah et al., 2024; Sidenvall, 2019; Thanheiser & Mamolo, 2024). In this way, mathematics education supports intellectual growth and equips learners to participate meaningfully in a data-rich society.

Mathematics is difficult for some students because it is considered abstract. The symbols and procedures often have to be learned before they can be tied to concrete experience (Griffioen, 2015). Piaget's theory helps explain this gap, because children in the concrete operational stage begin to think more logically, but they still struggle with abstract and theoretical thought (Ghazi et al., 2014; Griffioen, 2015). A *Journal for Research in Mathematics Education* article likewise notes a strong relationship between arithmetic achievement and the logical concrete operational stage, which means instruction has to fit children's cognitive development if it is to be effective (Lemoyne & Favreau, 1981). The difficulty is also cognitive and not only conceptual. A review in *Reviews in the Neurosciences* explains that learning mathematical and numerical concepts depends on working memory, spatial skills, and language abilities (Moustafa et al., 2017). When these demands increase, mathematics anxiety can develop. Systematic reviews show that it blocks learning and makes it harder for children to understand new concepts and procedures in normal math lessons (Tomasetto et al., 2021; Yu, 2023). For elementary students, mathematics often feels difficult because they are asked to reason in a structured way with abstract symbols before those ideas have become clear and concrete in their thinking (Griffioen, 2015; Lemoyne & Favreau, 1981; Moustafa et al., 2017).

## Mathematics Learning and Academic Challenges

Despite its importance, mathematics learning still faces serious challenges in educational practice. Some students, particularly at the Islamic elementary level (Madrasah Ibtidaiyah (MI)), perceive Mathematics as a difficult and demanding subject because it requires the understanding of abstract concepts and systematic reasoning processes. At the elementary education level, students are still developing their cognitive abilities, making it difficult for them to fully comprehend complex mathematical concepts. As a result, many students experience problems in maintaining concentration, understanding mathematical material, and completing problem-solving tasks effectively. Early findings from interviews and school documentation also indicated that many students' Mathematics scores remained below the Minimum Mastery Criteria (KKM) of 70, reflecting relatively low academic achievement in Mathematics learning. This problem is also reflected at the national level. Based on the 2022 Programme for International Student Assessment (PISA), Indonesian students obtained an average

Mathematics score of 366, which is considerably lower than the OECD average score of 472 (Abdurrahman et al., 2021). These findings indicate that Indonesian students still experience difficulties in conceptual understanding, critical thinking, and mathematical problem-solving. Previous studies also reported that low Mathematics achievement is associated with low student engagement and limited active participation during the learning process (Anastasha et al., 2021). Therefore, improving Mathematics achievement requires not only instructional improvement but also greater attention to students' psychological and social conditions during learning activities.

### **Self-Efficacy in Mathematics Learning**

The difficulties experienced by students in Mathematics learning cannot be explained solely by instructional or pedagogical factors. Mathematics achievement is also strongly influenced by psychological factors that affect students' motivation, confidence, persistence, and learning behavior during academic activities (Xiao & Sun, 2021). Because Mathematics involves abstract reasoning and problem-solving processes, students are required not only to understand concepts cognitively but also to maintain confidence when facing difficult tasks and academic pressure. In this context, self-efficacy becomes an important psychological factor in determining students' academic performance. According to (Bandura, 1978), self-efficacy refers to individuals' beliefs in their capability to organize and perform actions required to achieve specific goals. Students with high self-efficacy tend to demonstrate stronger motivation, greater persistence, and better emotional control when encountering academic difficulties (Zimmerman, 2000). In Mathematics learning, students who believe in their abilities are more likely to participate actively (Bennett, 2014), persist in solving complex problems (Howard & Whitaker, 2011), and maintain effort despite experiencing failure or errors during the learning process (Kapur, 2014). Previous studies also reported that self-efficacy positively contributes to Mathematics achievement because it strengthens students' confidence and academic engagement during learning activities (Uran et al., 2019). Therefore, self-efficacy can be considered an important internal factor influencing Mathematics achievement among Madrasah Ibtidaiyah students.

### **Social Support and Mathematics Achievement**

Although self-efficacy plays an important role in students' academic achievement, internal confidence alone may not be sufficient to help students overcome the challenges of Mathematics learning. Students also require external reinforcement from their surrounding social environment to maintain motivation, emotional stability, and persistence during the learning process (LEONG, 2022). In educational settings, social support refers to emotional, informational, and instrumental assistance provided by parents, teachers, peers, and significant others that helps students manage academic difficulties more effectively (Estell & Perdue, 2013; Wentzel et al., 2010). Supportive learning environments may strengthen students' confidence (Aljohani et al., 2016), reduce academic anxiety (Voisin et al., 2023), and encourage greater participation in classroom activities ((Dalimunthe et al., 2024; Venugopal-Wairagade, 2016). In the context of Mathematics learning, social support becomes particularly important because some students experience pressure and fear when dealing with abstract concepts and difficult problem-solving tasks (Levpušček et al., 2013). Students who receive positive encouragement and academic

assistance from parents and teachers are more likely to remain calm and motivated when facing learning difficulties. Similarly, peer support may help students feel more comfortable discussing mathematical problems and sharing learning strategies during classroom activities. Previous studies reported that social support positively contributes to students' Mathematics achievement by strengthening learning motivation and persistence during academic activities (Uran et al., 2019). Therefore, social support can be considered an important environmental factor that may strengthen the influence of self-efficacy on Mathematics achievement among Madrasah Ibtidaiyah students.

### Research Gap and Madrasah Ibtidaiyah Context

Previous studies have widely reported that self-efficacy positively contributes to students' Mathematics achievement by strengthening motivation (Dalimunthe et al., 2024), confidence (Bendol & Dalayap Jr, 2025), and persistence during learning activities (Zakariya, 2022). Similarly, social support has been recognized as an important environmental factor influencing students' academic engagement and emotional stability during Mathematics learning (Levpušček et al., 2013). However, most previous studies primarily focused on the direct relationships between psychological variables and academic achievement, while the underlying psychological mechanisms explaining how self-efficacy influences Mathematics achievement through social support remain insufficiently explored. In other words, limited attention has been given to the mediating role of social support in connecting students' internal beliefs with their actual academic performance in Mathematics learning (see Table 1).

Table 1. Summary of Previous Studies and Research Gaps

Study	Variables	Context	Findings	Gap
Uran et al. (2019)	Self-efficacy, teacher support	Secondary school	Positive effect on achievement	No mediation model
Levpušček et al. (2013)	Social support, anxiety	General education	Support reduces anxiety	Not MI context
Dalimunthe et al. (2024)	Self-efficacy	Mathematics learning	Increased motivation	No integrative model
Present study	Self-efficacy, social support, achievement	MI students	Mediation model	Integrates internal and external factors

In addition, previous research on Mathematics achievement has generally been conducted in broader educational settings (Boadu et al., 2026; Cai et al., 2026; Wardat et al., 2026) and has rarely focused specifically on Madrasah Ibtidaiyah students within the Indonesian Islamic elementary education context. This context is important because Madrasah Ibtidaiyah not only emphasizes academic achievement but also promotes social, moral, and religious values that may influence students' psychological and learning experiences differently from general elementary schools (Hang, 2025; Safitri, 2021). Furthermore, although self-efficacy and social support have frequently been examined separately, studies integrating internal psychological factors and external social factors simultaneously

in explaining Mathematics achievement among Madrasah Ibtidaiyah students remain limited. Therefore, this study aims to examine the mediating role of social support in the relationship between self-efficacy and Mathematics achievement among Madrasah Ibtidaiyah students in Makassar City, Indonesia.

The context of Madrasah Ibtidaiyah (MI) is particularly important in understanding students' Mathematics achievement because MI emphasizes not only academic learning but also character formation, social development, and religious values within the educational process (Hasanah, 2021; Ratnawulan et al., 2026). Previous studies reported that character education in Indonesian Islamic elementary schools is integrated into the curriculum, school culture, mentoring activities, and individual student guidance rather than being treated as a separate instructional component (Cahyanto et al., 2024; Hang, 2025; Mohammad, 2025). In addition, MI learning environments are designed to support students' intellectual, social-emotional, spiritual, and behavioral development simultaneously (Sopandi & Siswanto, 2019). These characteristics suggest that students' academic experiences in MI are strongly influenced by interpersonal relationships, emotional support, and social interaction during the learning process.

Furthermore, teachers in Madrasah Ibtidaiyah play an important role not only as academic instructors but also as facilitators of students' emotional regulation, empathy, social interaction, and character development (Aisyah et al., 2025; Liawati, 2025; Sopandi & Siswanto, 2019; Usman et al., 2025). As a result, social support in MI may function differently from that in general elementary school settings because supportive relationships are embedded more deeply within the institutional culture and educational environment (Mohammad, 2025). From an educational psychology perspective (Schunk & DiBenedetto, 2020), this context provides an important setting for examining how internal psychological factors, such as self-efficacy, interact with external social support in influencing students' Mathematics achievement. Therefore, investigating the mediating role of social support among Madrasah Ibtidaiyah students may contribute to a more contextual understanding of Mathematics learning within Indonesian Islamic elementary education.

### Present Study

Based on these theoretical and contextual considerations, this study aims to examine the relationship between self-efficacy, social support, and Mathematics achievement among Madrasah Ibtidaiyah students in Makassar City, Indonesia (see Figure 1).

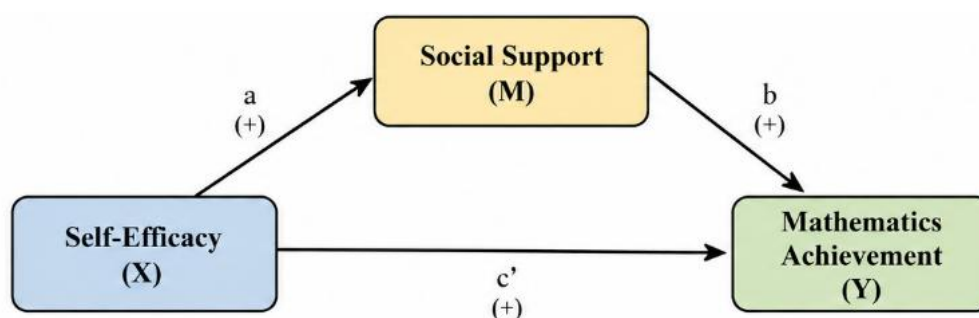


Figure 1. Proposed Mediation Model

Specifically, the study investigates whether social support mediates the relationship between students' self-efficacy and their Mathematics achievement. By focusing on the Madrasah Ibtidaiyah context, this study contributes to the limited literature examining Mathematics learning within Indonesian Islamic elementary education settings. The study also extends previous educational psychology research by integrating internal psychological factors and external social factors into a single mediation model of Mathematics achievement. Accordingly, this study addresses the following research question: Does social support mediate the relationship between self-efficacy and Mathematics achievement among Madrasah Ibtidaiyah students?

## Method

### Research Design

This study employed a quantitative cross-sectional correlational design with mediation analysis. The design was used to examine the relationship between self-efficacy, social support, and mathematics achievement among Madrasah Ibtidaiyah students. In the proposed model, self-efficacy was treated as the independent variable, social support as the mediating variable, and mathematics achievement as the dependent variable. Because the data were collected at one point in time, the findings were interpreted as predictive associations rather than experimental causal effects.

### Participants and Research Setting

The study was conducted in Madrasah Ibtidaiyah schools in Makassar City, Indonesia. The target population consisted of active students enrolled in accredited public and private Madrasah Ibtidaiyah schools (see Table 2). The population included 71 accredited Madrasah Ibtidaiyah schools with a total of 10,125 students.

Table 2. Participant and Sampling Information

Component	Description
Research setting	Madrasah Ibtidaiyah schools in Makassar City, Indonesia
Target population	Active students in accredited public and private Madrasah Ibtidaiyah schools
Population size	10,125 students from 71 Madrasah Ibtidaiyah schools
Sampling technique	Non-probability purposive sampling
Inclusion criteria	Grade V students; male and female students; active in learning; enrolled in A-, B-, or C-accredited Madrasah Ibtidaiyah schools
Final sample	581 students from 29 Madrasah Ibtidaiyah schools
Gender distribution	302 male students and 279 female students

Participants were selected using non-probability purposive sampling (Rai & Thapa, 2015; Subhaktiyasa, 2024). The inclusion criteria were Grade V students, male and female students, students who were actively involved in learning activities, and students from Madrasah Ibtidaiyah schools accredited A, B, or C in Makassar City. After data screening and outlier examination (Muthén & Muthén, 2002), the final sample consisted of 581 students from

29 Madrasah Ibtidaiyah schools. The sample included 302 male students and 279 female students.

## Measures

### *Self-Efficacy*

Self-efficacy was measured using a scale constructed based on Bandura's self-efficacy theory (see Table 1). The scale covered three dimensions: level, strength, and generality (Bandura, 1978). The initial scale consisted of 23 items using a five-point Likert-type response format ranging from strongly disagree to strongly agree. After construct validity testing through Confirmatory Factor Analysis, two items were removed because they did not meet the validity criteria. Therefore, 21 items were retained for the main analysis. Higher scores indicated stronger students' confidence in understanding mathematical concepts, completing mathematics tasks, and facing learning challenges.

Table 2. Initial Blueprint of the Self-Efficacy Scale Before Confirmatory Factor Analysis

Dimension	Indicator	Favorable Items	Unfavorable Items	Total Items
<b>Level</b>	Ability to complete problems	3, 13, 17, 19	–	4
	Ability to face challenges	15, 20, 21, 22	5, 10	6
<b>Strength</b>	Ability to understand concepts	8, 16, 18	7, 14	5
	Self-confidence	9	12	2
<b>Generality</b>	Independent learning ability	2, 6, 11, 23	1, 4	6
			<b>Total</b>	<b>23</b>

### *Social Support*

Social support was measured using a 21-item scale based on three dimensions of perceived support: family support, peer support, and support from significant others. Each dimension consisted of seven items (see Table 4). The scale used a five-point Likert-type response format. Higher scores indicated stronger perceived social support received by students from their surrounding social environment during the mathematics learning process.

Table 3. Initial Blueprint of the Social Support Scale Before Confirmatory Factor Analysis

No.	Dimension / Aspect	Favorable Items	Unfavorable Items	Total Items
1	Perceived support from family	2, 4, 7, 11, 13, 6, 20	–	7
2	Perceived support from friends	1, 5, 8, 10, 15, 18, 21	–	7
3	Perceived support from a significant other	3, 6, 9, 12, 14, 17, 19	–	7
			<b>Total</b>	<b>21</b>

*Note.* The social support scale was adapted from the multidimensional social support framework consisting of

family support, peer support, and support from significant others. The initial instrument consisted of 21 favorable items, and all items were retained after construct validity testing.

### *Mathematics Achievement*

Mathematics achievement was measured using students' final mathematics scores obtained from official school documentation (see Table 5). The scores were taken from students' end-of-semester report card records. These scores represented students' formal academic performance in mathematics based on the assessment system used by the participating schools.

Table 4. Research Variables and Measures

<b>Variable</b>	<b>Role in Model</b>	<b>Measurement</b>	<b>Dimensions / Source of Data</b>	<b>Number of Items / Score Source</b>
Self-efficacy	Independent variable	Self-report questionnaire	Level, strength, and generality	23 initial items; 21 retained after CFA
Social support	Mediating variable	Self-report questionnaire	Family support, peer support, and support from significant others	21 items
Mathematics achievement	Dependent variable	Academic documentation	Final mathematics score	End-of-semester report card score

### **Validity and Reliability**

The instruments were evaluated through content validity, face validity, construct validity, and reliability analysis. Content validity was assessed using expert judgment through Content Validity Ratio and Content Validity Index procedures. The self-efficacy scale obtained a Content Validity Index of 0.81, while the social support scale obtained a Content Validity Index of 0.70. Face validity was also examined to ensure that the items were clear, readable, and appropriate for Madrasah Ibtidaiyah students.

Construct validity was tested using Confirmatory Factor Analysis (Tojib & Sugianto, 2011; Umar & Nisa, 2020). The self-efficacy scale initially consisted of 23 items. The CFA results indicated that two items did not meet the validity criteria; therefore, these items were removed, and 21 items were retained for further analysis. The social support scale consisted of 21 items, and all items were retained after construct validity testing.

Reliability was examined using Cronbach's Alpha (Scholz et al., 2002). The initial self-efficacy item pool showed good internal consistency with a Cronbach's Alpha coefficient of 0.864 (see Table 6). The social support scale also demonstrated good internal consistency with a Cronbach's Alpha coefficient of 0.844. These values indicated that the instruments were reliable for measuring students' self-efficacy and perceived social support in the context of mathematics learning.

Table 5. Instrument Validity and Reliability Summary

<b>Instrument</b>	<b>Initial Items</b>	<b>Retained Items</b>	<b>Validity Evidence</b>	<b>Reliability Evidence</b>
Self-efficacy scale	23	21	Content validity, face validity, and CFA	Cronbach's Alpha = 0.864 for the initial item pool
Social support scale	21	21	Content validity, face validity, and CFA	Cronbach's Alpha = 0.844

*Note.* The self-efficacy reliability coefficient is reported for the initial item pool because the available validation report presents Cronbach's Alpha for the 23-item scale. The final analysis used 21 retained items after CFA.

### Data Collection Procedure

Data were collected using questionnaires and academic documentation (Creswell, 2017). The self-efficacy and social support questionnaires were distributed to eligible students after permission was obtained from the participating schools. Students were informed about the purpose of the study, the procedures involved, and their rights as participants. Participation was voluntary, and the confidentiality of students' responses was maintained throughout the research process. Mathematics achievement data were obtained from official school records with permission from the schools.

### Ethical Considerations

The study followed ethical principles of informed consent, confidentiality, fairness, scientific integrity, and accountability. Participants were informed about the purpose and procedures of the study before completing the questionnaires. Personal information was treated confidentially and used only for research purposes. The data were analyzed and reported honestly without manipulating or misrepresenting the findings.

### Data Analysis

The data were analyzed using descriptive statistics, assumption testing, and mediation analysis (see Table 7). Descriptive statistics were used to describe the participants' characteristics and the distribution of self-efficacy, social support, and mathematics achievement scores. Assumption testing included normality, linearity, multicollinearity, and heteroscedasticity tests to ensure that the data were appropriate for path analysis.

The mediation model was tested using path analysis within a Structural Equation Modeling framework. The analysis examined the direct path from self-efficacy to mathematics achievement and the indirect path from self-efficacy to mathematics achievement through social support. The relationships among variables were evaluated using standardized path coefficients, standard errors, z-values, and p-values. Model fit was assessed using fit indices such as RMSEA, CFI, TLI, and SRMR. A significance level of  $p < .05$  was used to determine whether the proposed relationships were statistically significant.

Table 6. Data Analysis Plan

Analysis Stage	Purpose	Statistical Procedure
Descriptive analysis	To describe respondent characteristics and variable distributions	Frequency, percentage, mean, standard deviation, minimum, and maximum
Assumption testing	To examine whether the data met requirements for path analysis	Normality, linearity, multicollinearity, and heteroscedasticity tests
Direct effect testing	To examine the association between self-efficacy and mathematics achievement	Path coefficient, standard error, z-value, and p-value
Mediation testing	To examine whether social support mediated the relationship between self-efficacy and mathematics achievement	Indirect effect through path analysis
Model fit evaluation	To assess the adequacy of the proposed model	RMSEA, CFI, TLI, and SRMR

## Results

### Descriptive Statistics of the Study Variables

Descriptive statistics were calculated to describe students' self-efficacy, perceived social support, and mathematics achievement. As shown in Table 8, the mean score of self-efficacy was 73.90, with a standard deviation of 11.04. The mean score of social support was 78.22, with a standard deviation of 10.86. Meanwhile, the mean score of mathematics achievement was 84.52, with a standard deviation of 9.84. These results indicate that the students generally demonstrated moderate levels of self-efficacy, perceived social support, and mathematics achievement.

Table 7. Descriptive Statistics of the Study Variables

Variable	N	Mean	SD	Minimum	Maximum
Self-efficacy	581	73.90	11.04	40	99
Social support	581	78.22	10.86	26	100
Mathematics achievement	581	84.52	9.84	30	100

The categorization results further showed that most students were in the moderate category across all variables (see Table 9). For self-efficacy, 400 students (68.84%) were in the moderate category, while 89 students (15.31%) were in the low category and 92 students (15.83%) were in the high category. For social support, 404 students (69.53%) were in the moderate category, 91 students (15.66%) were in the low category, and 86 students (14.80%) were in the high category. For mathematics achievement, 428 students (73.66%) were in the moderate category, 70 students (12.04%) were in the low category, and 83 students (14.28%) were in the high category.

Table 8. Categorization of Self-Efficacy, Social Support, and Mathematics Achievement

Variable	Category	Score Range	Frequency	Percentage
Self-efficacy	Low	$X < 62.93$	89	15.31%
	Moderate	$62.93 < X < 85.01$	400	68.84%
	High	$X > 85.01$	92	15.83%
Social support	Low	$X < 67.36$	91	15.66%
	Moderate	$67.36 < X < 89.07$	404	69.53%
	High	$X > 89.07$	86	14.80%
Mathematics achievement	Low	$X < 74.67$	70	12.04%
	Moderate	$74.67 < X < 94.36$	428	73.66%
	High	$X > 94.36$	83	14.28%

### Model Fit

The mediation model was examined using path analysis. The model showed strong fit indices, with RMSEA = 0.000, CFI = 1.000, TLI = 1.000, and SRMR = 0.000 (see Table 10). These values indicate that the proposed path model was statistically acceptable for examining the relationship between self-efficacy, social support, and mathematics achievement. However, because the model was relatively simple, the fit indices should be interpreted together with the path coefficients and hypothesis testing results.

Table 9. Model Fit Indices

Fit Index	Value	Interpretation
RMSEA	0.000	Good fit
CFI	1.000	Good fit
TLI	1.000	Good fit
SRMR	0.000	Good fit

### Direct and Indirect Effects

The path analysis results showed that self-efficacy had a positive and significant direct association with mathematics achievement,  $\beta = 0.114$ ,  $SE = 0.055$ ,  $z = 2.077$ ,  $p = .038$ . This result indicates that students with higher self-efficacy tended to have better mathematics achievement (see Table 11).

Self-efficacy also had a positive and significant association with social support,  $\beta = 0.183$ ,  $SE = 0.055$ ,  $z = 3.335$ ,  $p = .001$ . This finding suggests that students with stronger self-efficacy tended to report higher perceived social support. In addition, social support had a positive and significant association with mathematics achievement,  $\beta = 0.292$ ,  $SE = 0.040$ ,  $z = 7.388$ ,  $p = .001$ . This result indicates that students who perceived stronger support from

their social environment tended to achieve higher mathematics scores.

The indirect effect of self-efficacy on mathematics achievement through social support was also significant,  $\beta = 0.053$ ,  $SE = 0.018$ ,  $z = 3.031$ ,  $p = .002$ . This result supports the mediation hypothesis, showing that social support mediated the relationship between self-efficacy and mathematics achievement. In other words, self-efficacy was associated with mathematics achievement not only directly but also indirectly through students' perceived social support.

Table 10. Direct and Indirect Effects in the Mediation Model

Path	$\beta$	SE	z-value	p-value	Decision
Self-efficacy → Mathematics achievement	0.114	0.055	2.077	.038	Supported
Self-efficacy → Social support	0.183	0.055	3.335	.001	Supported
Social support → Mathematics achievement	0.292	0.040	7.388	.001	Supported
Self-efficacy → Social support → Mathematics achievement	0.053	0.018	3.031	.002	Supported

Overall, the findings indicate that self-efficacy was positively associated with mathematics achievement and that social support served as a significant mediator in this relationship. Students with stronger self-efficacy were more likely to perceive higher social support, which in turn contributed to better mathematics achievement.

## Discussion

### Interpretation of the Main Findings

This study examined whether social support mediated the relationship between self-efficacy and mathematics achievement among Madrasah Ibtidaiyah students. The findings showed that self-efficacy was positively associated with mathematics achievement, and social support significantly mediated this relationship. Because the direct path from self-efficacy to mathematics achievement remained significant while the indirect path through social support was also significant, the result indicates partial mediation. This means that students' confidence in their mathematical ability was related to achievement both directly and through the support they perceived from their social environment. These findings answer the main research question by showing that social support is an important psychological and social pathway in mathematics learning. Self-efficacy alone was associated with students' mathematics achievement, but its relationship with achievement became more meaningful when students also perceived support from parents, teachers, peers, and significant others. This pattern is consistent with the theoretical argument developed in the introduction that mathematics achievement is shaped not only by cognitive ability or instructional factors but also by the interaction between internal psychological beliefs and external social environments.

### Self-efficacy and Mathematics Achievement

The positive association between self-efficacy and mathematics achievement supports the view that students'

beliefs about their own capabilities are important for academic performance. In mathematics learning, students are often required to understand abstract concepts, follow symbolic procedures, and solve problems that may not have immediate concrete meaning. Students with stronger self-efficacy are more likely to approach these challenges with confidence, maintain effort after making mistakes, and continue working even when tasks become difficult. This interpretation is consistent with social cognitive theory, which explains that self-efficacy shapes motivation, persistence, emotional regulation, and task engagement (Bandura, 1978; Zimmerman, 2000; Schunk & DiBenedetto, 2020).

The finding also supports previous studies reporting that self-efficacy contributes positively to mathematics learning outcomes. Prior research has shown that students with stronger self-efficacy tend to demonstrate higher motivation, stronger confidence, and greater persistence during mathematics learning (Uran et al., 2019; Zakariya, 2022; Dalimunthe et al., 2024). In the present study, this relationship is particularly relevant because Madrasah Ibtidaiyah students are still developing their ability to reason with abstract mathematical ideas. When students believe that they can understand mathematical concepts and complete mathematics tasks, they may be more willing to participate in classroom activities and less likely to avoid challenging problems.

### **Social Support as a Mediating Mechanism**

The mediation result shows that social support helps explain how self-efficacy is connected to mathematics achievement. Students with higher self-efficacy may be more willing to seek help, communicate with teachers, cooperate with peers, and respond positively to encouragement from parents. These supportive interactions can strengthen students' motivation and emotional stability during mathematics learning. In this sense, social support functions as a bridge that helps transform internal confidence into actual learning behavior and academic performance.

This finding is consistent with studies showing that social support contributes to students' engagement, emotional adjustment, and achievement. Support from teachers, parents, and peers can provide emotional encouragement, academic guidance, and a sense of belonging, which are important when students face difficult learning tasks (Estell & Perdue, 2013; Wentzel et al., 2010). In mathematics learning, such support becomes more important because students may experience pressure, anxiety, or fear when dealing with abstract concepts and complex problem-solving tasks (Levpušček et al., 2013). Therefore, students who feel supported are more likely to remain calm, ask questions, discuss strategies, and continue practicing when they encounter difficult mathematics problems.

The result also extends previous studies that mainly examined the direct relationship between self-efficacy, social support, and achievement. While earlier research reported positive associations between self-efficacy, social support, and mathematics achievement (Uran et al., 2019), the present study clarifies the mechanism by showing that social support partially mediates the relationship between self-efficacy and mathematics achievement. This suggests that the role of self-efficacy should not be understood only as an individual psychological factor. It also operates within a social context where encouragement, feedback, assistance, and interpersonal relationships help

students sustain their learning effort.

### **Madrasah Ibtidaiyah Context**

The findings should also be interpreted within the specific context of Madrasah Ibtidaiyah. Unlike general academic settings, Madrasah Ibtidaiyah emphasizes not only academic learning but also character formation, social development, and religious values. In this context, learning is shaped by interpersonal relationships among students, teachers, parents, and the school community. Previous studies on Islamic elementary education have shown that character education, mentoring, school culture, and social-emotional development are integrated into the educational process rather than treated as separate components (Sopandi & Siswanto, 2019; Cahyanto et al., 2024; Hang, 2025; Mohammad, 2025).

This context may explain why social support becomes an important mediator in the present study. Teachers in Madrasah Ibtidaiyah are not only responsible for delivering subject content but also for guiding students' emotional development, social interaction, and learning attitudes. Parents and peers also contribute to students' sense of security and motivation in learning mathematics. Therefore, social support in Madrasah Ibtidaiyah may have a broader educational function because it is embedded in a school culture that values cooperation, care, responsibility, and moral development.

The result indicates that mathematics achievement in Madrasah Ibtidaiyah should not be viewed only as a product of students' cognitive skills. It is also related to how students experience support within their learning environment. Students who believe in their abilities and feel supported by others may be better prepared to deal with the abstract and demanding nature of mathematics. This finding strengthens the argument that mathematics learning in Islamic elementary education needs to integrate psychological reinforcement and supportive social relationships.

### **Theoretical and Practical Implications**

Theoretically, this study contributes to educational psychology by integrating internal and external factors into a single mediation model. The findings support the idea that self-efficacy and social support should be examined together rather than separately when explaining mathematics achievement. Self-efficacy reflects students' internal belief in their own capability, while social support reflects the environmental resources that help students maintain confidence and persistence. The significant mediation pathway suggests that academic achievement is shaped by the interaction between personal beliefs and social environments.

Practically, the findings suggest that improving mathematics achievement among Madrasah Ibtidaiyah students requires more than strengthening instructional strategies. Teachers need to build students' self-efficacy by providing constructive feedback, giving achievable challenges, recognizing effort, and helping students view mistakes as part of learning. At the same time, schools should create supportive learning environments where students feel safe to ask questions, discuss difficulties, and seek help from teachers and peers. Parents can also

support mathematics learning at home by providing encouragement, monitoring learning routines, and helping students develop positive attitudes toward mathematics.

These implications are especially important because many elementary students perceive mathematics as difficult and anxiety-provoking. When students receive support from their surrounding environment, they may become more willing to persist through difficult tasks. Therefore, interventions aimed at improving mathematics achievement should combine confidence-building activities with social support from teachers, families, and peers. This integrated approach is more consistent with the social and character-oriented learning environment of Madrasah Ibtidaiyah.

### **Limitations and Future Research**

Several limitations should be considered when interpreting the findings. First, this study used a cross-sectional correlational design, so the results should be interpreted as associations rather than causal effects. Although the mediation model was statistically supported, the design does not allow strong causal conclusions about whether self-efficacy produces social support or whether social support produces higher achievement over time. Future studies may use longitudinal designs to examine how self-efficacy, social support, and mathematics achievement develop across different stages of elementary education.

Second, self-efficacy and social support were measured using self-report questionnaires. Students' responses may be influenced by their personal perceptions, social desirability, or momentary emotional conditions. Future research may combine student questionnaires with teacher reports, parent reports, classroom observations, or interview data to provide a richer understanding of students' psychological and social learning experiences. Third, mathematics achievement was measured using school report card scores, which may differ across schools depending on assessment practices. Future studies may use standardized mathematics tests to provide a more comparable measurement of achievement.

Finally, this study focused on Madrasah Ibtidaiyah students in Makassar City. Although this context is important, the findings may not fully represent students in other regions or other types of elementary schools. Future research may compare Madrasah Ibtidaiyah and general elementary school contexts to examine whether social support functions differently across institutional settings. Further studies may also investigate other mediating or moderating variables, such as mathematics anxiety, learning engagement, teacher support, or parental involvement, to develop a more comprehensive explanation of mathematics achievement.

### **Conclusion**

This study examined the mediating role of social support in the relationship between self-efficacy and mathematics achievement among Madrasah Ibtidaiyah students in Makassar City, Indonesia. The findings showed that self-efficacy was positively associated with mathematics achievement, indicating that students who had stronger confidence in their ability to understand and complete mathematics tasks tended to achieve better

mathematics performance. The results also demonstrated that social support significantly mediated this relationship, suggesting that students' internal confidence was connected to mathematics achievement partly through the support they perceived from parents, teachers, peers, and significant others.

These findings indicate that mathematics achievement among Madrasah Ibtidaiyah students cannot be understood only through cognitive or instructional factors. Students' psychological beliefs and social environments also play important roles in supporting their academic performance. In the context of mathematics learning, which often involves abstract concepts and problem-solving challenges, self-efficacy helps students maintain confidence and effort, while social support helps them remain motivated, emotionally secure, and persistent when facing difficult tasks.

The study contributes to educational psychology by integrating self-efficacy and social support into a mediation model within the context of Indonesian Islamic elementary education. It also highlights the importance of strengthening both students' internal confidence and their external support systems to improve mathematics achievement. Therefore, teachers, parents, and schools should work together to create learning environments that encourage students to believe in their abilities, seek help when needed, and persist in learning mathematics despite difficulties.

## **Recommendations**

Based on the findings, mathematics teachers in Madrasah Ibtidaiyah are encouraged to strengthen students' self-efficacy during the learning process. Teachers can provide gradual learning challenges, constructive feedback, and opportunities for students to experience small academic successes in mathematics. These practices may help students build confidence, reduce fear of difficult tasks, and develop stronger persistence when solving mathematical problems.

Schools should also create a supportive learning environment that involves teachers, parents, peers, and other significant people around students. Since social support was found to mediate the relationship between self-efficacy and mathematics achievement, support systems should not be treated as additional factors outside learning but as part of the mathematics learning process itself. Parents can support students by providing encouragement at home, monitoring learning routines, and helping students develop positive attitudes toward mathematics.

For Madrasah Ibtidaiyah institutions, mathematics learning programs should integrate academic instruction with social-emotional support and character-oriented guidance. This is important because students at the elementary level often need emotional security and interpersonal encouragement when dealing with abstract mathematical concepts. Collaboration between teachers and parents may help students feel more supported and more willing to continue learning despite difficulties.

Future research is recommended to examine this mediation model using longitudinal or experimental designs.

Such designs may provide stronger evidence regarding how self-efficacy, social support, and mathematics achievement develop over time. Future studies may also use standardized mathematics tests, classroom observations, teacher reports, or interviews to complement students' self-report data and provide a richer understanding of mathematics learning in Madrasah Ibtidaiyah contexts.

Further studies may also compare Madrasah Ibtidaiyah students with students from general elementary schools to examine whether social support functions differently across institutional settings. In addition, future research may include other psychological and instructional variables, such as mathematics anxiety, learning engagement, teacher support, parental involvement, or classroom climate. These variables may help develop a more comprehensive model of mathematics achievement among elementary-level students.

## Statements and Declarations

**Acknowledgments/Notes:** This article was developed from selected findings of a doctoral dissertation entitled “Pengaruh Efikasi Diri dan Grit Melalui Dukungan Sosial terhadap Prestasi Belajar Matematika pada Peserta Didik di Madrasah Ibtidaiyah Kota Makassar.” The authors express their sincere appreciation to the participating Madrasah Ibtidaiyah schools in Makassar City, including the school principals, teachers, students, and all parties who supported the data collection process. During the preparation of this article, the authors used ChatGPT to provide language proofreading support. After using ChatGPT, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

**Supplementary Materials:** Not applicable.

**Author Contributions:** All authors contributed to the conceptualization, writing, review, and revision of the manuscript. All authors have read and agreed to the submitted version of the manuscript. The authors take collective responsibility for the integrity and accuracy of the article.

**Funding:** Not applicable.

**Data Availability:** The data used in this study are not publicly available because they contain student-level educational information. Anonymized data may be made available from the corresponding author upon reasonable request and with appropriate permission from the relevant parties. Any data sharing will follow confidentiality and ethical research principles.

**Ethics Approval:** Not applicable.

**Informed Consent:** Informed consent was obtained before data collection. Participants were informed about the purpose of the study, the research procedures, and their rights as participants. Participation was voluntary, and the confidentiality of participants' responses was maintained throughout the research process.

**Conflicts of Interest:** The authors declare no conflicts of interest.

## References

- Abdurrahman, A., Lubis, S. H., & Sahputra, D. (2021). Hubungan kecerdasan emosi dengan efikasi diri pada siswa. *Edukasi Islami: Jurnal Pendidikan Islam*, 10(2).
- Aisyah, I. N. N., Setiawan, D., & Fadilah, L. (2025). Role of Islamic religious education teachers in instilling empathy in vocational high school students. *Journal of Contemporary Islamic Education*, 5(2), 133–145.
- Aljohani, A. S., Karim, Q., & George, P. (2016). Students' satisfaction with simulation learning environment in relation to self-confidence and learning achievement. *Journal of Health Science*, 4(5), 228–235.
- Anastasha, D. A., Movitaria, M. A., & Safrizal, S. (2021). Peningkatan aktivitas dan hasil belajar matematika menggunakan model kooperatif tipe Student Teams Achievement Division di madrasah ibtidaiyah. *Jurnal Basicedu*, 5(4), 2626–2634.
- Bandura, A. (1978). Reflections on self-efficacy. *Advances in Behaviour Research and Therapy*, 1(4), 237–269.
- Bendol, R. L., & Dalayap, R. H., Jr. (2025). Self-efficacy as a mediator between motivation and confidence in mathematics. *ASEAN Journal of Science and Engineering Education*, 5(1), 47–58.
- Bennett, C. A. (2014). Creating cultures of participation to promote mathematical discourse. *Middle School Journal*, 46(2), 20–25.
- Boadu, S. K., Boateng, F. O., & Obeng, B. A. (2026). Modeling students' interest in mathematics: The role of self-efficacy, mathematics anxiety, cultural and societal perceptions, and relevance of mathematics. *[Nama jurnal tidak tersedia]*, 11, 1732581.
- Cahyanto, B., Indana, F. M., Fiveronica, I., Salamah, E. R., & Garbacz, N. A. (2024). Integration of religious character in school culture: An investigation of character development practices in Islamic elementary school. *ELEMENTARY: Islamic Teacher Journal*, 12(1), 49.
- Cai, J., De Backer, F., Vandermeersche, G., Li, S., & Lombaerts, K. (2026). Unpacking the effect of classroom social environment on self-regulated learning in mathematical education: The mediation of self-efficacy. *Educational Studies in Mathematics*, 1–23.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Dalimunthe, H. A., Dewi, I. K., Yunita, Y., Faadhil, F., & Lubis, D. M. G. S. (2024). Building a supportive learning environment: The role of psychology in increasing student motivation and engagement. *OPSearch: American Journal of Open Research*, 3(4), 934–939.
- Estell, D. B., & Perdue, N. H. (2013). Social support and behavioral and affective school engagement: The effects of peers, parents, and teachers. *Psychology in the Schools*, 50(4), 325–339.
- Ghazi, S. R., Khan, U. A., Shahzada, G., & Ullah, K. (2014). Formal operational stage of Piaget's cognitive development theory: An implication in learning mathematics. *Journal of Educational Research*, 17(2).
- Griffioen, O. (2015). *Examining Nova Scotia's learning outcomes framework and the developmental appropriateness of specific curriculum outcomes*.
- Hang, N. T. T. (2025). Character education strategies in shaping noble morality of students in madrasah ibtidaiyah. *International Journal of Islamic Education, Research and Multiculturalism*, 7(3), 1139–1157.

- Hasanah, N. (2021). The role of madrasah ibtidaiyah in building student characters in the era of the 4.0 industrial revolution. *Nazhruna: Jurnal Pendidikan Islam*, 4(2), 310–319.
- Howard, L., & Whitaker, M. (2011). Unsuccessful and successful mathematics learning: Developmental students' perceptions. *Journal of Developmental Education*, 35(2), 2–16.
- Kapur, M. (2014). Productive failure in learning math. *Cognitive Science*, 38(5), 1008–1022.
- Lemoyne, G., & Favreau, M. (1981). Piaget's concept of number development: Its relevance to mathematics learning. *Journal for Research in Mathematics Education*, 12(3), 179–196. <https://doi.org/10.5951/jresmetheduc.12.3.0179>
- Leong, D. C. P. (2022). Emotional stability and motivation of 21st century learners: A comparative review of learning theories. *Quantum Journal of Social Sciences and Humanities*, 3(6), 68–80.
- Levpušček, M. P., Zupančič, M., & Sočan, G. (2013). Predicting achievement in mathematics in adolescent students: The role of individual and social factors. *The Journal of Early Adolescence*, 33(4), 523–551.
- Liawati, L. (2025). The role of madrasah ibtidaiyah teachers in developing students' character in the digital era. *Indonesian Journal of Islamic Education and Learning*, 1(1), 41–46.
- Mohammad, Y. (2025). The synergy of moderate Islam and curriculum reform in character education. *Sinergi International Journal of Education*, 3(2), 82–93.
- Moustafa, A. A., Tindle, R., Ansari, Z., Doyle, M. J., Hewedi, D. H., & Eissa, A. (2017). Mathematics, anxiety, and the brain. *Reviews in the Neurosciences*, 28(4), 417–429. <https://doi.org/10.1515/revneuro-2016-0065>
- Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling*, 9(4), 599–620.
- Nafiah, S., Kusumah, Y. S., & Afgani Dahlan, J. (2024). Enhancing students' critical thinking in mathematics education: A systematic literature review. *Jurnal Pendidikan MIPA*, 25(4), 1925–1938. <https://doi.org/10.23960/jpmipa/v25i4.pp1925-1938>
- OECD. (2023). *Education at a glance 2023: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/e13bef63-en>
- OECD. (2024). *An evolution of mathematics curriculum: Where it was, where it stands and where it is going*. OECD Publishing. <https://doi.org/10.1787/0ffd89d0-en>
- Rai, N., & Thapa, B. (2015). A study on purposive sampling method in research. *Kathmandu School of Law Review*, 5(1), 8–15.
- Ratnawulan, T., Hidayati, A., Badrudin, B., Ahmad, A. C., Syam, R. Z. A., & Achmad, W. (2026). Integrating Islamic values and individual characteristics to overcome learning difficulties in Islamic boarding schools. *Munaddhomah: Jurnal Manajemen Pendidikan Islam*, 7(2), 308–321.
- Safitri, A. (2021). Comparational analysis of students' learning achievements from ibtidaiyah elementary school and madrasah in learning Islamic religious education at SMP Negeri 4 Rantau Aceh Tamiang Regency. *International Journal of Islamic Education, Research and Multiculturalism*, 3(1), 35–48.
- Scholz, U., Doña, B. G., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment*, 18(3), 242–251.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational*

- Psychology*, 60, Article 101832. <https://doi.org/10.1016/j.cedpsych.2019.101832>
- Sidenvall, J. (2019). Literature review of mathematics teaching design for problem solving and reasoning. *Nordic Studies in Mathematics Education*, 24(1), 51–74.
- Sopandi, E., & Siswanto, A. (2019). Religious curriculum implementation: Between character learning, spirit of religiosity, and modernization of education in Madrasah Ibtida'iyah Jakarta Pusat. *Akademika*, 8(2), 156–168.
- Subhaktiyasa, P. G. (2024). Menentukan populasi dan sampel: Pendekatan metodologi penelitian kuantitatif dan kualitatif. *Jurnal Ilmiah Profesi Pendidikan*, 9(4), 2721–2731.
- Thanheiser, E., & Mamolo, A. (2024). Introduction to the virtual special issue: Mathematics that underpins social issues. *The Journal of Mathematical Behavior*, 75, Article 101176. <https://doi.org/10.1016/j.jmathb.2024.101176>
- Tojib, D. R., & Sugianto, L.-F. (2011). Construct validity assessment in IS research: Methods and case example of user satisfaction scale. *Journal of Organizational and End User Computing*, 23(1), 38–63.
- Tomasetto, C., Morsanyi, K., Guardabassi, V., & O'Connor, P. A. (2021). Math anxiety interferes with learning novel mathematics contents in early elementary school. *Journal of Educational Psychology*, 113(2), 315–329. <https://doi.org/10.1037/edu0000602>
- Umar, J., & Nisa, Y. F. (2020). *Uji validitas konstruk dengan CFA dan pelaporannya*.
- Uran, A. L., Leton, S. I., & Uskono, I. V. (2019). Pengaruh efikasi diri dan dukungan sosial guru terhadap prestasi belajar matematika siswa. *Asimtot: Jurnal Kependidikan Matematika*, 1(1), 69–76.
- Usman, D., Yaumi, M., Mawardi, A., Malli, R., Al, M., & Yaumi, H. (2025). Designing character building: Effective strategies with rewards and punishments. *Journal of Information Systems Engineering and Management*, 10(32S), 5432.
- Venugopal-Wairagade, G. (2016). Creating a supportive learning environment for better student engagement (pp. 71–75).
- Voisin, L. E., Phillips, C., & Afonso, V. M. (2023). Academic-support environment impacts learner affect in higher education. *Student Success*, 14(1), 47–59.
- Wardat, Y., Elsayed, A. M., Alali, R., & Ismail, A. F. (2026). Exploring mathematics self-efficacy levels among ninth-grade girls: A quantitative study. *Journal of Education and E-Learning Research*, 13(2), 124–132.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology*, 35(3), 193–202.
- Xiao, F., & Sun, L. (2021). Students' motivation and affection profiles and their relation to mathematics achievement, persistence, and behaviors. *Frontiers in Psychology*, 11, Article 533593. <https://doi.org/10.3389/fpsyg.2020.533593>
- Yu, H. (2023). The neuroscience basis and educational interventions of mathematical cognitive impairment and anxiety: A systematic literature review. *Frontiers in Psychology*, 14, Article 1282957. <https://doi.org/10.3389/fpsyg.2023.1282957>
- Zakariya, Y. F. (2022). Improving students' mathematics self-efficacy: A systematic review of intervention studies. *Frontiers in Psychology*, 13, Article 986622. <https://doi.org/10.3389/fpsyg.2022.986622>
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91.