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Evaluating Learning Motivation as a Mediator Between Family Environment and Academic Achievement: Evidence from Indonesian Secondary Students

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Abstract: Evaluating Learning Motivation as a Mediator Between Family Environment and Academic Achievement: Evidence from Indonesian Secondary Students. Objective: This study aims to investigate the role of motivation as a mediating factor in the relationship between family environment and academic achievement in the Indonesian context. Previous studies have examined the relationships between family environment and academic achievement, as well as the connection between learning motivation and academic achievement. However, based on a literature review, a study investigating the relationship between family environment and academic achievement with learning motivation as a mediating variable has not yet been conducted in Indonesia. **Methods:** A quantitative approach using Structural Equation Modeling (SEM) was applied to a sample of 156 students from a junior high school in West Java. **Results:** The results show a significant effect of family environment on learning motivation (â: 0.502, $p < 0.001$), and a significant effect of learning motivation on academic achievement (â: 0.276, $p = 0.030$). However, the effect of family environment on academic achievement was not significant, confirming the full mediation of learning motivation. However, the influence of the family environment on learning achievement is not significant, as evidenced by the full mediation of learning motivation (Indirect Effect: 0.129, $p = 0.046$). Therefore, educational interventions that combine family awareness and student engagement strategies are necessary to help students achieve satisfying academic performance in school. **Conclusion:** Although the family is the primary environment in the process of student growth and development, its influence on learning achievement occurs indirectly. This influence becomes significant only when the family environment fosters students' motivation to learn. Educational interventions need to strategically integrate increased awareness and the active role of the family with programs to strengthen students' learning motivation, as motivation is a key link between family support and academic success.

Keywords: learning motivation, family environment, academic achievement, students.

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INTRODUCTION

Academic achievement is the result of a formal educational process that reflects the extent to which students have attained learning objectives (Qi, Ma, & Wang, 2024; Ishartono, 2023). This concept encompasses not only exam

scores or grades, but also the achievement of individual and societal goals, as well as personal growth and development. Academic achievement is important to study because it serves as a key indicator of the education system's success in optimally developing students' potential. Therefore, understanding the factors that influence academic achievement is essential for educators, policymakers, and educational institutions in designing effective interventions to improve overall educational quality (Nirwana, 2025).

Indonesia is currently experiencing a decline in the education sector (Kholid & Aisyah, 2025). According to Madhakomala, the country is facing an educational crisis marked by a decrease in student achievement and character development among the nation's youth (Madhakomala, Widianti, & Zahra, 2022). This is supported by findings that indicate Indonesian students are showing a decline in academic performance, particularly in cognitive aspects (Garad, Al-Ansi, & Qamari, 2021). As a result, Indonesia now ranks 67th globally and 6th in Southeast Asia (Samala, Sokolova, Grassini, & Rawas, 2024). A similar decline in student academic or cognitive performance has also occurred in other countries such as China (Q. Zhao, Wang, & Rozelle, 2019), Japan, China, and the United States (J. D. Williams, 2021). One of the contributing factors is the lack of support and harmony within the family environment (Fu, Pan, Yuan, & Chen, 2022).

The family environment is the first and most important environment for a child (Febriandika, Ihsan, Inayati, & Ramadhan, 2024). It represents the strong relationship or bond between parents, father and mother, and their child (Bosqui et al., 2024). Through this strong bond, parents can instill values in their children that influence their academic performance at school (Grusec & Davidov, 2019). Numerous studies have highlighted the impact of the family environment on academic achievement. (Gu, Hassan, & Sulaiman, 2024; Hanh Van, Tran, Vy Nguyen, & Le, 2025; Mendes-Sousa & Perrone, 2025). In addition to the family environment, which is an external factor that impacts student learning achievement (L. Zhao & Zhao, 2022). Learning motivation factors, as an internal factor, cannot be forgotten in their impact on student achievement (Sijabat, 2024). Yaftian mentioned that motivation is a stimulus that encourages both external and internal factors to move a person more optimally (Yaftian & Barghamadi, 2022). It is the encouragement/motivation that makes a person more enthusiastic and active in carrying out something (Azzahro, Maghfiroh, & Indriastuti, 2021). So learning motivation has a significant impact on student learning achievement (Thohir, Yanti, Handayani, & Halim, 2025).

Research on the impact of family environment or motivation as an independent variable on learning achievement is widely acknowledged, especially in Gu et al. (2024). However, the mechanism of the indirect impact of the family environment on learning achievement has not been widely explored in Indonesia, especially the role of learning motivation as a mediator. A study shows that placing motivation as a mediator between the family environment and learning achievement can have a significant impact (Otero, Moledo, Otero, & Rego, 2021). The cause is that internal factors, such as motivatio n, have a strong influence on a person's behavior rather than stimuli from outside (Markus, 2016).

In line with the Social Cognitive Theory by Bandura (1990), students' academic achievement is influenced by the reciprocal interaction between personal, behavioral, and social environmental factors, where the family plays an important role in shaping self-efficacy and learning motivation (Lu, Li, & Li, 2025). This is reinforced by the Ecological Systems Theory (Bronfenbrenner, 1979), which posits that the family is the primary microsystem influencing the cognitive and motivational development of children (Mayer,

2025). Thus, the family environment not only has the potential to have a direct influence on academic achievement, but can also affect it indirectly through learning motivation as a mediating factor. This theoretical foundation serves as the basis for formulating research hypotheses regarding the relationship between family environment, learning motivation, and student academic achievement.

Considering these conditions, this study aims to demonstrate that motivation is a full mediator of the relationship between the family environment and achievement. In addition, this study also reveals the relationship between the family environment and direct motivation for learning achievement, thereby illustrating the complex factors that affect student learning achievement.

■ LITERATURE REVIEW

Family Environment

A good country is built by a good society, a good family builds a good society, and a good family has a bond of affection within it (Cheng, 2021). A family is defined as a small-scale organization consisting of the father as the leader, the mother, and the children (Georgas, 2006). Aspects such as attention, affection, and love are indispensable (Øverup, Brunson, Steers, & Acitelli, 2017). The existence of mutual love, affection, and protection has a significant impact on children's growth and development, both psychologically and otherwise (A. I. Williams et al., 2024).

A contemplative atmosphere is also needed by children in the family environment (Aeschbach, Ehret, Post, Ruess, & Thomaschke, 2022). A conducive atmosphere is defined as the presence of parental support in children's activities (Noel A. Comeros, Jhordan T. Cuilan, & Jason V. Chavez, 2024). Previous research states that parents who have free time to chat and supervise their children are more likely to achieve good grades in school (Mendes-Sousa & Perrone, 2025), so that the family environment has a significant impact on student learning achievement (L. Zhao & Zhao, 2022).

In addition to having an impact on student achievement (L. Zhao & Zhao, 2022). The family environment also has an impact on students' motivation in learning (Febriandika et al., 2024; Harris, Vazsonyi, Özdemir, & Saðkal, 2020), as well as in other daily activities (Wahyuni, Azizah, & Septiana, 2022). Expressing appreciation for children's actions or achievements is a form of attention from parents to their children that has an impact on the child's level of enthusiasm and motivation (Xu, Mo, Pan, & Li, 2024). From the many theories above, the researcher takes the following hypothesis:

The family environment plays an important role in shaping students' motivation to learn because the family is in the microsystem layer within the framework of Bronfenbrenner's Ecological Systems Theory, which is the immediate environment that has a direct and intensive influence on individual development (Mayer, 2025). Daily interactions with parents, including parenting styles, emotional support, academic expectations, and family norms, form the initial foundation for the development of intrinsic and extrinsic motivations in children (Rivers, Mullis, Fortner, & Mullis, 2012).

Other studies have shown that parental education and family culture significantly influence children's learning motivation, both in the context of internal motivation (such as curiosity and self-confidence) and external goals, including academic achievement (Guo, Huang, Wang, & Yang, 2025). In the context of the mesosystem, the quality of the relationship between the home environment and the school environment also acts as a bridge that strengthens motivation, where the synergy of good communication between parents and teachers can increase student involvement and confidence in learning (Topor, Keane, Shelton, & Calkins, 2010).

In addition, active family involvement in school activities has been shown to increase academic motivation and learning achievement, suggesting that intersystem connectivity supports the creation of a holistic and meaningful learning environment (Senior, 2010). Thus, learning motivation is not only influenced by internal factors of students, but is the result of complex interactions between individuals and their ecological environment, especially the family environment, which is the starting point in forming attitudes and beliefs towards the learning process.

Student Learning Motivation

The stimulus that appears in a person, making him more enthusiastic and active in carrying out activities, is called self-motivation (Yaftian & Barghamadi, 2022). Another definition terms motivation as a person's fuel for activities aimed at achieving something (Haq, 2020). In the world of education, motivation is defined as the encouragement from within students to achieve learning goals (Cordovani, Jack, Wong, & Monteiro, 2025)

The triggers for the emergence of motivation in students include various factors, such as desires, aspirations, and expectations, which are the main sources of motivation in a person (Pranitasari & Noersanti, 2017). However, other studies have shown that a conducive environment, a sense of appreciation by others, and an interesting process are great triggers for children's learning motivation to emerge (Vella-Brodrick & Gilowska, 2022). From the various factors that make up the basis for the emergence of motivation in students, researchers conclude that both internal triggers (internal factors) and external triggers (external factors) for motivation to emerge (Hendijani, Bischak, Arvai, & Dugar, 2016). This aligns with the theory proposed by Purba et al. (2019), which posits that both internal factors, such as ideals and the desire to succeed, and external factors, including interesting learning and appreciation from others, must be present for students' motivation flourish (Purba et al., 2019).

Previous research has stated that there is a significant impact the learning motivation on student learning achievement. Motivation is the factor that has the most impact on student achievement development (Amandus et al., 2025; Marlina, 2025). The greater a student's motivation to learn, the more active and enthusiastic they will be in their learning, resulting in increased achievements (Seli, Wammes, Risko, & Smilek, 2016). With these findings, the researchers hypothesized as follows:

Student Learning Achievement

The word "learning achievement" is composed of two syllables: "learning" and "achievement." The meaning of achievement is the results obtained and evidence of the efforts that have been made (Sirait, Siregar, & Adawiyah, 2024). Meanwhile, in the Great Dictionary of the Indonesian Language (KBBI), achievement is defined as the result obtained from something that has been done or accomplished (Nyström, Jackson, & Salminen Karlsson, 2019).

Learning achievement refers to the level of knowledge, indicating the extent to which students understand the material presented (Fatoni & Subando, 2024). In another sense, learning achievement refers to the results obtained by students that lead to changes in themselves (Gamage, Dehideniya, & Ekanayake, 2021). According to Mustafa Yaðcý, learning achievement is defined as learning outcomes that can be known through an evaluation process (Yaðcý, 2022). However, to understand how these achievements are achieved, a deeper examination of the psychosocial mechanisms within the family is needed. Within the framework of this study, we explored the role of learning motivation as a full mediator in the relationship between the family environment and academic achievement, demonstrating that family support

is only effective when it fosters student motivation. These findings are in line with previous research that showed a mediating role of motivation in the relationship between parental support and student academic outcomes (Gu et al., 2024; Tian & Zhang, 2025).

The learning achievements obtained by students are closely related to the learning carried out (Fatoni & Subando, 2024). In other words, learning achievement is absolute proof of a student's ability (Fleur, Bos, & Bredeweg, 2023). In learning achievement, teachers typically consider cognitive, affective, and psychomotor aspects, which are then combined and calculated into a score on a scale of 1-100 or a letter grade (A-E) (Ozdemir, 2021). In addition to academic scores, according to Guoaqiang Li, the achievements obtained by students through competitions are included in learning achievements (Wu & Zhen, 2022).

Theoretical Framework

The study is theoretically based on Bandura's Social Cognitive Theory (1990), which emphasizes the reciprocal interaction between personal, behavioral, and social environmental factors (Lu et al., 2025). In this framework, the family environment is seen as the main context that forms the self-efficacy beliefs and motivational orientation of learners. Supportive parenting practices, such as emotional warmth, communicati on, and academic engagement, serve as social conditions that affect learners' confidence in their ability to learn and succeed. This interaction aligns with Bandura's assertion that self-efficacy is the primary determinant of individual behavior and academic achievement.

Furthermore, this study draws on Bronfenbrenner's Ecological Systems Theory (1979), which situates the family at the most direct and influential microsystem or layer in child development (Mayer, 2025). According to this theory, the quality of interaction in the family directly affects the cognitive and motivational development of children. Overall, this theory suggests that the family environment not only exerts a direct influence on academic achievement but can also exert an indirect influence through the mediation of learning motivation. This conceptual relationship is the basis for the hypothesis model tested in this study using structural equation modeling.

Research Question

Does the family environment have a significant impact on student learning achievement? Does learning motivation mediate the full relationship between the family environment and student learning achievement?

Hipotesis Research

H1 : Family environment has a positive impact on students' motivation to learn

H2 : Learning motivation has a positive impact on student learning achievement

H3 : Family environment has a positive impact on student learning achievement

H3a : Learning motivation becomes a full mediator between the impact of the family environment on student learning achievement

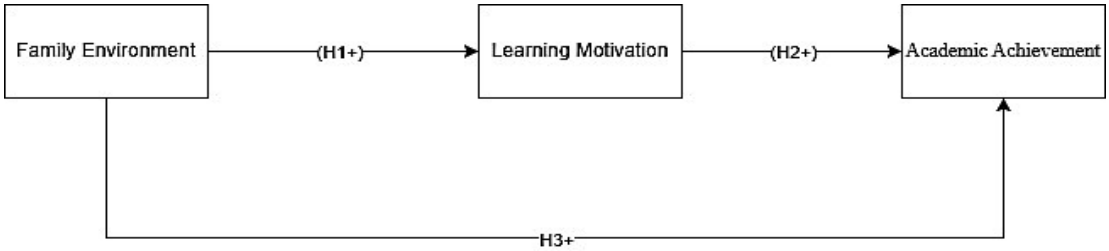

Figure 1. Conceptual model

METHOD

Population, Sampling, and Sample

The population in this study consisted of students from a *private madrasah tsanawiyah* (secondary school) in Banyuresmi District, West Java, totaling 300 students. Sampling was conducted using the convenience sampling technique, which involves selecting subjects based on specific objectives to obtain data that aligns with the research focus (Campbell et al., 2020). The sample used in this study was 156 students. This is based on Ling Ding's theory, quoted by Priyanath, that the minimum sample size limit for Structural Equation Modeling (SEM) analysis is around 100-150 respondents (Priyanath, RVSPK, & RGN, 2020).

Research Design

This research employed a quantitative approach, utilizing SEM analysis. SEM analysis is a multivariate analysis whose purpose is to analyze the relationship between variables (latent with manifest) (Febriandika, Utam, & Millatina, 2023). The choice of SEM over multiple regression was based on several scientific considerations. First, SEM allows for the analysis of complex relationships, including mediation tests. Second, SEM can simultaneously test measurement models and structural models, thus providing more comprehensive validation of the developed theoretical model (Afthanorhan, Awang, & Aimran, 2020). This research began by reviewing and applying existing theories, followed by the development of a research instrument based on theories found in Scopus-indexed journals. Next, the researchers collected data from students using Google Forms over a period of two to three weeks. After the research data were collected, the researcher conducted data analysis, which began with validity and reliability testing, followed by Exploratory Factor Analysis (EFA) tests, Confirmatory Factor Analysis (CFA) tests, hypothesis tests, and Mediation analysis (using bootstrapping). The last step involves drawing the conclusion of the study (Afthanorhan et al., 2020).

Research Instrument

In this study, the author raised several variables, including:

Family Environment

Family environment variables were measured through four questionnaires that covered several important dimensions, including parental support, academic supervision, availability of learning resources at home, and parental attention. Parental support refers to the extent to which parents provide emotional encouragement and practical assistance for their children's learning, and is measured using a single item, namely, "My parents always give me advice about my studies." Academic supervision involves monitoring children's learning activities and school performance, which is assessed by a single item: "My parents reprimand me when my grades drop." The dimension of availability of learning resources describes the provision of facilities and materials that support the learning process at home, which is measured by a single item: "My parents provide the school supplies I need." Parental attention refers to the level of care and attention a mother and father provide to create a conducive environment for children. At the same time, they study at home, as measured by a single item: "My family members turn down the TV volume when I am studying." All items are assessed using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). This construct was modeled as a latent variable in SEM analysis, and the measurement instrument was adapted from previous studies (Maulidiya, Marsofiyati, & Wolor, 2021; Wahyuni et al., 2022; A. I. Williams et al., 2024).

Learning Motivation

Learning motivation was measured using eight questionnaires covering both intrinsic and

extrinsic motivational dimensions. The intrinsic motivational dimension refers to internal drives such as the desire to succeed, aspirations, and expectations for academic achievement, and is measured with four items. An example of an item representing this construct is, "I make time to study again at home to deepen my understanding of the subject matter." Another item describing intrinsic motivation is, "I aspire to be the best in class." The extrinsic motivational dimension describes drives that originate from external factors, such as recognition, competition with friends, rewards, and the appeal of the learning process itself, and is assessed using four items. An example of an item for this dimension is, "I compete with my friends for grades." Another item reflecting the broader motivational construct is, "I get rewards when I do well in school." All items are rated on a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Learning motivation was modeled as a latent variable in the SEM analysis, and the measurement instrument was adapted from Purba's research (Amabile, Hill, Hennessey, Tighe, & M., 1994; Purba et al., 2019).

Academic Achievement

Academic achievement was measured using official school records obtained from the previous school year. The content reflects three important dimensions: report card grades, extracurricular grades, and moral values. Report card grades represent the average score in core subjects in the most recent semester and serve as an indicator of student academic mastery. This dimension is assessed through a single indicator item, for example, "The student's average score in core subjects on the final report card." Extracurricular grades capture student performance and participation in school-based extracurricular activities, measured through a single indicator item, such as "The student's grades in extracurricular activities are reflected in the final report card grade." Moral values refer to teachers' evaluations of students' attitudes and behaviors in the school environment, and this dimension is also assessed through a single indicator item, illustrated by the statement, "The student's moral attitudes and behaviors are reflected in the moral values on the report card." All three indicators were converted to a four-point Likert scale. For report card grades, scores of 50–60 were coded as 1, 61–70 were coded as 2, 71–80 were coded as 3, and 81–100 were coded as 4. For extracurricular and moral grades, the conversion followed the existing grade categories, where D was coded as 1, C was coded as 2, B was coded as 3, and A was coded as 4. These indicators are based on research by Fan & Chen (2001a).

Instrument Validity and Reliability Test

The research instrument underwent validity and reliability testing to ensure that each item accurately measures the intended construct and consistently reflects the underlying dimensions. The pilot test involved 51 respondents outside the main study. Validity was assessed through corrected item-total correlations, with most items exceeding the minimum threshold of 0.30 (Melkamu, Gelaye, Matebe, Lindgren, & Erlandsson, 2022), and reliability was assessed using a Cronbach's Alpha value of at least 0.5 (Govindasamy, Cumming, & Abdullah, 2024).

Family Environment

Specifically, the corrected item-total correlations for the Family Environment variable were 0.358 for LK1, 0.250 for LK2, 0.377 for LK3, and 0.376 for LK4. These results indicate that three items (LK1, LK3, and LK4) met the validity criteria, while one item (LK2) fell slightly below the recommended threshold. However, based on theoretical considerations and the item's contribution to the construct, LK2 was retained for further analysis. Reliability testing using Cronbach's Alpha yielded a coefficient of 0.540, which exceeds the minimum acceptable standard

of 0.50 for early-stage research, thus indicating that the instrument has sufficient internal consistency for use in the main study.

Learning Motivation

The analysis results showed that the corrected item-total correlations for the Learning Motivation variable were 0.424 for MB1, 0.490 for MB2, 0.503 for MB3, 0.580 for MB4, 0.467 for MB5, 0.148 for MB6, 0.595 for MB7, and 0.651 for MB8. These results indicate that seven items met the validity criteria, while one item, MB6 (with a correlation of 0.148), fell below the recommended threshold of 0.30. However, considering the theoretical importance of the item and its role in capturing the dimensions of learning motivation, it was retained for further analysis. Reliability testing using Cronbach's Alpha yielded a coefficient of 0.773, which exceeds the minimum threshold of 0.50 for early-stage research, thus indicating that the instrument exhibited acceptable internal consistency and could be used reliably in the main study.

Table 1. Corrected item–total correlation and reliability coefficient of family environment

Variables	Corrected Item-Total Correlations	Cronbach's Alpha
LK1	0.358	0.540
LK2	0.250	
LK3	0.377	
LK4	0.376	

Table 2. Corrected item–total correlation and reliability coefficient of learning motivation

Variables	Corrected Item-Total Correlations	Cronbach's Alpha
MB1	0.424	0.773
MB2	0.490	
MB3	0.503	
MB4	0.580	
MB5	0.467	
MB6	0.148	
MB7	0.595	
MB8	0.651	

Academic Achievement

The analysis of the Academic Achievement variable showed corrected item-total correlation values of 0.661, 0.717, and 0.767. All items were above the required cutoff of 0.30, confirming that each item is valid in measuring the construct. In addition, the reliability test using Cronbach's Alpha produced a coefficient of 0.846. This figure not only surpasses the minimum criterion of 0.50 for exploratory research but also exceeds the widely accepted benchmark of 0.70, indicating a high level of internal consistency. Therefore, the Academic Achievement instrument can be considered both valid and reliable for application in the main research.

Data Analysis

The data analysis in this study was conducted using SPSS version 24 and AMOS version 24 through a sequence of statistical procedures. Prior to the main survey, a pilot test was conducted involving 51 respondents to assess

Table 3. Corrected item–total correlation and reliability coefficient of academic achievement

Variables	Corrected Item-Total Correlations	Cronbach's Alpha
PB1	0.661	0.846
PB2	0.717	
PB3	0.767	

the quality of the instrument. Validity was tested using the Corrected Item-Total Correlation method, with a minimum threshold of 0.30 (Melkamu et al., 2022). Reliability was assessed using Cronbach's Alpha, with coefficients above 0.50 considered acceptable for early-stage studies (Govindasamy et al., 2024). This preliminary test ensured that the instrument was sufficiently robust to be used in the main study.

In the next stage, validity and reliability were re-examined using the full sample of 156 respondents. Exploratory Factor Analysis (EFA) was employed to test construct validity and to identify the underlying factor structure. Items with standardized loadings greater than 0.50 were considered valid, while items with lower loadings were reviewed for potential removal (Sürücü, Yýkýlmaz, & Maþlakçý, 2022). Internal consistency reliability was assessed using Cronbach's Alpha, with coefficients above 0.70 considered acceptable for social science research (Mohajan, 2017).

Subsequently, Confirmatory Factor Analysis (CFA) was conducted to evaluate the measurement model. Model fit was assessed using multiple fit indices. Following Hu and Bentler (1999) and Hair et al. (2019), acceptable thresholds were: $\div^2/df < 3.00$, GFI > 0.80, CFI > 0.90, TLI > 0.90, and RMSEA < 0.06 (Xiao et al., 2023; Goretzko, 2024).

Structural Equation Modeling (SEM) was then performed to test the hypothesized relationships among variables. Path coefficients were examined, with p-values below 0.05 indicating statistical significance (Dash & Paul, 2021). To further assess mediation, a bootstrapping procedure with 5,000 resamples was applied. Bias-corrected and accelerated 95% confidence intervals (BCa) were calculated, and mediation was considered significant when the confidence interval did not include zero (Preacher & Hayes, 2008).

Research Tool

This study employed a questionnaire on a 1-4 Likert scale (1 = strongly disagree to 4 = strongly agree) (Benidiktus, Prahmana, & Mumu, 2022). The questionnaire was distributed to respondents using Google Forms. The instruments in each variable were adapted from previous research as follows: 1) Family environment from the study (Hartoyo & Indriyani, 2024; Maulidiya et al., 2021; Wahyuni et al., 2022). Learning motivation is raised from Amabile and Purba (Amabile et al., 1994; Purba et al., 2019). 3) Student learning achievement from research by Fan & Chen (2001b).

Data Collection Procedure

Data collection was carried out directly through the distribution of online questionnaires to students who had been determined as a sample. After the data is collected, the researcher conducts an initial examination to ensure the data's completeness.

■ RESULT AND DISCUSSION

In this study, 156 valid respondents, students who were still attending junior high school/*MTs* equivalent in Bayuresmi District, West Java, were collected through an online questionnaire. The demographic results of the

respondents showed that there were 72 male students (46.2%) and 84 female students (53.8%). In terms of age, 13 years: 30 people (19.2%), 14 years: 80 people (51.3%), 15 years: 46 people (29.5%). For the data on the distance traveled by students to school, as follows: < 5 KM 48 students (30.8%), 6-8 KM 37 students (23.7%), 9-10 KM 34 students (21.8), and 11-12 KM 37 students (23.7%).

Furthermore, descriptive statistical analysis was conducted to examine the characteristics of the main research variable, Creative Personality. This analysis included the mean, standard deviation, minimum, and maximum scores. The overall mean score for Creative Personality was M = 3.42 (SD = 0.58) on a 5-point Likert scale, indicating that most students tended to have strong intrinsic and extrinsic motivations for participating in learning activities. The standard deviation of 0.812 indicates relatively moderate variation in motivation levels among students. Although the majority were highly motivated, some students performed below the group average.

For the family environment variable, the mean score was 3.17 (SD = 0.81), indicating a high level of satisfaction. This means that most respondents felt they received attention, guidance, and support from their parents or family members in their learning activities. However, the standard deviation of 0.81 indicates considerable variation in assessments. This suggests that although many students perceived family support as strong, some still felt that it was less than optimal.

Academic achievement had a mean score of 3.27 (SD = 0.807), reflecting that most students achieved good academic performance according to the measured indicators. The standard deviation of 0.807 indicates moderate variation in academic achievement among students. Although the majority were in the high category, there were also students with lower-than-average achievement.

Validitas dan Reliabilitas Measurement Model

Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) was conducted to test the construct validity of the research instrument.

Table 4. Measurement model: exploratory factor analysis

Variables	Component			Cronbach's Alpha	Variance Extracted Explained	KMO
	1	2	3			
MB2	.540			.722	42.925	.805
MB3	.686					
MB4	.657					
MB5	.596					
MB7	.640					
MB8	.623					
LK1			.732	.594	71.222	.500
LK4			.863			
PB1		.614		.724	64.821	.614
PB2		.862				
PB3		.861				
Total				.754	56.460	.761

Table 4 shows the results of the EFA test conducted on four variables. It can be seen that the overall KMO index for this model is 0.761, which exceeds the threshold of 0.5. Therefore,

the results of the factor analysis model are reliable, and the sample size is sufficient (Güvendir & Özkan, 2022). The data obtained can be factored with a p-value of 0.00, producing a total variance of 56.460%. This was obtained after excluding four items from the variables of learning motivation and family environment. This exclusion is still in the normal category (below 50% of items) (Hatz, Sonnenschein, & Blankart, 2017).

Table 5. Measurement model: exploratory factor analysis

Variables	Component			Cronbach's Alpha	Variance Extracted Explained	KMO
	1	2	3			
MB2	**.540**	.424	.000	.722	42.925	.805
MB3	**.686**	.000	.000			
MB4	**.657**	.133	.248			
MB5	**.596**	.000	.417			
MB7	**.640**	.000	.000			
MB8	**.623**	.240	.162			
LK1	.276	.136	**.732**	.594	71.222	.500
LK4	.000	.000	**.863**			
PB1	.189	**.614**	.000	.724	64.821	.614
PB2	.000	**.862**	.195			
PB3	.000	**.861**	.000			
Total				.754	56.460	.761

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 4 iterations.

Table 5 shows the results of the EFA test conducted on four variables. It can be seen that the overall KMO index of this model is 0.761, which exceeds the threshold of 0.5 (Güvendir & Özkan, 2022). The total explained variance was 56,460%, exceeding the minimum threshold of 50% (Hair, Ringle, Sarstedt, & Ringle, 2019). This variance is obtained after removing the four items related to learning motivation and family environment variables. This exception is still in the normal category (below 50% of items) (Hatz et al., 2017).

Reliability Test

Reliability testing was conducted to ensure the internal consistency of the research instrument.

Table 6. Reliability test (cronbach's alpha)

No	Variables	Cronbach's Alpha
1.	Learning Motivation	.722
2.	Family Environment	.594
3.	Academic Achievement	.727
Total		**.754**

Table 6 presents the results of the reliable factor analysis model, which is based on an adequate sample size. The total Cronbach's Alpha value is 0.754, which means it meets the data reliability standard of 0.7 (Considine, Botti, & Thomas, 2005). However, there is one variable

that has a Cronbach's Alpha value below 0.7, namely the family environment, with an alpha value of 0.594. This is certainly a limitation due to the limited number of items and the variation in respondents' answers. However, according to Wu, Feng, & Sun (2020), a Cronbach's Alpha value of 0.5-0.6 is still considered appropriate and acceptable, allowing it to be maintained.

Confirmatory Factor Analysis (CFA)

CFA analysis using AMOS 24 to test convergent and discriminant validity. The goodness-of-fit (GOF) test results indicated a good fit for the model:

Figure 2 and Table 7 present the results of the CFA analysis, which was assisted by *Amos 24* software. The ×2/DF value was 1.60 (lower

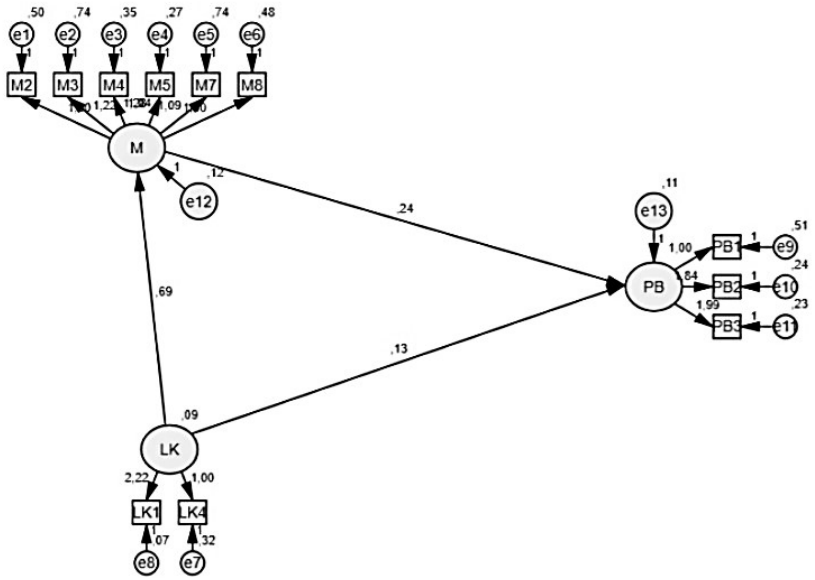

Figure 2. CFA models tested using AMOS 24

Table 7. Confirmatory factor analysis (CFA)

GOF Index	Acceptable Value	CFA Model	Result
x^2 (Chi-square)		65.623	Good Fit
Df (degree of freedom)		41	
x^2/df	< 3	1.60	Good Fit
GFI	> 0.8	0.945	Good Fit
CFI	> 0.9	0.945	Good Fit
TLI	> 0.9	0.926	Good Fit
RMSEA	< 0.06	0.055	Good Fit

than 3.0), the GFI value was 0.945 (higher than 0.8), the CFI value was 0.945 (higher than 0.9), the TLI value was 0.926 (higher than 0.9), and the RMSEA value was 0.055 (less than 0.06). According to Hu & Bentler's theory, the CFA model demonstrates a good fit or a reliable fit (Dash & Paul, 2021).

Structural Equation Modeling Results

SEM analysis was conducted to test the causal relationship between variables. The path estimation results are shown in Tables 7 and 8.

The hypothesis analysis is presented in Tables 7, 8, and 9, indicating that the average hypothesis is fulfilled. First, the findings revealed

Table 8. SEM results for testing the hypothesis

Hypothesis	Path	β	S.E.	P-Value	Result
H1	LK → M	0.502	0.177	***	Supported
H2	M → PB	0.276	0.112	0.030	Supported
H3	LK →PB	0.106	0.135	0.339	No Supported

*p<0.05, **p<0.01, ***p<0.001

Table 9. Bootstrapping results for mediation effect

Hypothesis	Path	Indirect Effect	P-value	Lower Bound CI	Upper Bound CI
H3a	LK → M → PB	0.169	0.046	0.035	0.445

Bootstrap estimates based on 5,000 resamples; CI = Bias-Corrected and Accelerated (BCa).

that the family environment had a positive and significant impact on the level of student learning motivation with a standardized coefficient (â) value of 0.502 or 50.2% and a p value of < 0.001 (H1). Second, student motivation has a positive and significant impact on student learning achievement, with a standardized coefficient (â) value of 0.276, corresponding to 27.6% of the variance, and a p-value of 0.030 (H2). The third hypothesis was rejected, with the family environment not having a positive impact on student learning achievement, a standardized coefficient (â) value of 0.106, and a p-value of 0.339 (H3). However, with the rejection of hypothesis 3, hypothesis 3a is accepted, namely that the motivation to learn serves as a full mediator between the family environment and the student's learning achievement, with a t-count of 1,862 < 1.96, and a power of influence of 56.7% (H3a). The bootstrapping test with 5,000 resamples indicated that the indirect effect of LK on PB through M was significant (â = 0.169, p = 0.046; 95% BCa CI [0.035, 0.445]), as the confidence interval did not include zero. This finding supports Hypothesis 3a, indicating that M fully mediates the relationship between LK and PB.

Analysis of the Impact of Family Environment on Student Learning Motivation

The results of the first analysis show that the family environment has a positive and significant influence on the level of student learning motivation, with a standard coefficient value (â) of 0.502 or 50.2% and a p value <0.001. This means that by creating a comfortable, conducive, and supportive environment in a family, children's motivation to learn will also be higher (Wahyuningtyas, Arifin, & Wahyono, 2022). These results are consistent with previous studies that explain that the family environment has a positive effect on learning motivation (Maulidiya et al., 2021; Nugrahini & Margunani, 2015; Whitaker, Graham, Severtson, Furr-Holden, & Latimer, 2012; A. I. Williams et al., 2024).

The family is the first educational institution that children encounter from the beginning of their life phase (Slaughter & Epps, 1987). A study revealed that family influences the nature, character, and outlook on life, including educational aspects (Kotomina & Sazhina, 2021). However, the effectiveness of this influence is primarily determined by the quality of interaction, affection, attention, and free time with the child needed in the process of education with the child, so that a strong bond is established both emotionally and otherwise (Wahyuni et al., 2022; A. I. Williams et al., 2024).

Affection and attention should not only be given by one parent, but also by both, so that the child becomes a good person; it must be balanced (Uusiautti, Määttä, & Määttä, 2013). If a child loses the affection and attention of his father, he

will lose a figure. He can cause the child to look for other figures who are not necessarily in accordance with the values instilled by the family, so that it will hinder the process of internalizing character values in children (Uusiautti et al., 2013).

In the cultural context, the findings of this research hold special significance for Indonesia, a collectivist society (Tambun, Yudoko, & Aldianto, 2025). In contrast to Western culture, which emphasizes individual independence, Indonesian culture prioritizes the family and social group in shaping children's motivation and behavior. This aligns with research indicating that Indonesians tend to emphasize the value of togetherness, cooperation, and emotional attachment within the family, reflecting a collectivist orientation (Ford & Honan, 2019).

This cultural orientation makes family support have a stronger role in influencing learning motivation compared to individualistic contexts, where personal achievement is more prominent (Tarjiah, Supena, Pujiastuti, & Mulyawati, 2023). Thus, the results of this study not only affirm the importance of families in improving academic achievement through motivation but also highlight how Indonesia's collectivist cultural context provides a different working mechanism compared to Western countries.

Analysis of the Impact of Learning Motivation on Student Learning Achievement

The analysis results show that student learning motivation has a positive and significant influence on student achievement, with a standardized coefficient (â) of 0.276 or 27.6% and a p-value of 0.030. These results align with research by Nur'azizah, Utami, & Hastuti (2021), which suggests that individuals with high motivation in the learning process tend to achieve higher results. Thus, children's learning motivation has a significant impact on student learning achievement (Dwinalida & Setiaji, 2022). These results are consistent with those of previous studies, which explain the significant impact of learning motivation on student learning achievement (Amandus et al., 2025; Marlina, 2025).

Motivation is like fuel that moves a person to complete tasks with enthusiasm (Deckers, 2018). Without strong motivation, a person will not be optimal in completing tasks. Low motivation to learn in students tends to reduce their academic involvement, which has a direct impact on their academic achievement (Collie & Martin, 2019). The motivations present in students are influenced by internal and external factors, such as a supportive environment, peer social support, a caring family, and high ideals or expectations about the future (Purba et al., 2019). If students have enthusiasm for learning, they will be more serious, which in turn will lead to higher high school scores (Amandus et al., 2025; Marlina, 2025).

It is important to understand that students' learning motivation in Indonesia is influenced by collectivistic values that place family and social groups at the center in shaping academic behavior and orientation (Liem, Martin, Porter, & Colmar, 2012). In contrast to Western culture, which is more individualistic and emphasizes independence and personal achievement, Indonesian culture tends to emphasize togetherness, cooperation, and emotional attachment to family and social environment as the main drivers of motivation (McInerney, 2019). This makes family support and social expectations have a stronger influence on learning motivation than personal rewards alone.

Cross-cultural research shows that in collectivist societies, academic motivation is often directed towards meeting family expectations and maintaining group harmony. In contrast, in individualistic contexts, motivation is more oriented towards individual self-achievement and autonomy (X. Li, Han, Cohen, & Markus, 2021). Therefore, the results of this study make a unique contribution by showing that learning motivation

in Indonesia is not only an individual factor, but also a reflection of collectivist cultural values that link the role of family to student academic success.

Analysis of the Impact of Family Environment on Student Learning Achievement

The results of the analysis show that the family environment does not have a significant impact on student learning achievement; the standard coefficient value (â) is 0.106, and the p-value is 0.339. Not having a significant impact does not mean having no impact, but the resulting impact is very small. This finding aligns with Rutter's research (1985), which suggests that the family environment has no significant impact on learning achievement. The reason, according to Joshua Jeong, is that the older the child, the less influence parents have (Jeong, Pitchik, & Fink, 2021). While the age of the respondents in this study was mostly within the vulnerable age range of 13-15 years, the interaction tended to decrease in general (Van Ouytsel & De Groote, 2024). Eventually, the influence of the elderly will gradually weaken (Goede, Branje, Delsing, & Meeus, 2009).

In addition to the aspect of students' age development, the presence of technological factors also contributes to reducing the impact of parents. According to Serra (2021), the presence of mobile phone technology among students reduces the influence of parents. This, coupled with the fact that parents who are busy or do not have time to spend together further minimizes the impact that parents have on their students (Subrahmanyam & Greenfield, 2008).

Meanwhile, based on the framework of Ecological Systems Theory from Bronfenbrenner, the finding that the family environment does not have a direct effect on students' academic achievement can be understood as a shift in family functions from a direct influencer to a facilitator for children's internal development, especially learning motivation (Mayer, 2025). In adolescence, direct interaction with parents tends to decrease. However, the family remains instrumental in providing emotional support, values, and structures that encourage the emergence of internal factors such as self-efficacy and academic motivation (Wilson, 2019).

In other words, the family operates as part of a microsystem that indirectly influences students through the internalization of motivation. In contrast, other factors, such as technology, school, and peers in the mesosystem, also play a role (Cicek & Nazli, 2023). Recent studies have also shown that supportive ecological contexts, while not directly related to academic achievement, can still increase motivation that ultimately impacts achievement (Stefes, 2024). This confirms that, in adolescence, the primary function of the family in the context of education is more appropriately viewed as an ecological facilitator that fosters learning motivation, rather than as a direct determinant of students' academic achievement.

Analysis of the Impact of Learning Motivation as a Mediator Variable Between Family Environment Relationships on Student Learning Achievement

The results of the test of the Learning Motivation variable as a Mediator Variable of the Relationship between Family Environment and Student Learning Achievement using the bootstrapping test with 5,000 repeated samples showed that the indirect effect of LK on PB through M was significant (â = 0.169, p = 0.046; 95% BCa CI [0.035, 0.445]). These results are supported by the Trevino & DeFreitas study (2014), which shows that parental support significantly affects students' intrinsic learning motivation, which ultimately has a positive impact on academic achievement. However, when learning motivation was included as a mediating variable, the direct influence of parental support on academic achievement became insignificant, suggesting that learning motivation mediates the relationship entirely (Wang & Cai, 2017).

This finding is also in line with Markus's view (2016), which explains that internal factors, such as motivation, have a stronger influence on a person than external stimuli. In line with this, Bandura (1990) explains in social cognitive theory that an individual's belief in their abilities (self-efficacy) can affect students' motivation and achievement. Therefore, parents, as part of the family environment, who provide attention, support, and affection can increase students' self-efficacy, which in turn encourages higher learning motivation and learning achievement (Ro'u et al., 2024). Indirectly, students with high motivation for learning tend to have a positive family environment (Erdogdu & Erdogdu, 2015).

While this study found that learning motivation fully mediates the relationship between the family environment and learning achievement, this does not necessarily mean that all effects of the family environment operate exclusively through motivation. Previous studies have identified other potential mediators, such as self-regulated learning strategies (Zimmerman, 2002), self-efficacy (Schunk & DiBenedetto, 2020), and emotional well-being (Suldo et al., 2009), which may also link family support to academic outcomes.

Furthermore, although the direct path from the family environment to learning achievement was statistically insignificant in this dataset, it is possible that a small direct effect exists but was not detected due to sample characteristics or statistical power. Therefore, while our findings support the full mediation role of learning motivation in this context, future research should examine additional mediators and consider possible direct influences to provide a more comprehensive understanding of how the family environment impacts student achievement.

This research has practical implications for parents, schools, and teachers. For parents, the results of this study confirm the importance of not only providing material support but also fostering children's motivation to learn through warm communication, involvement in academic activities, and appreciation for learning efforts. For schools, these findings serve as the basis for designing programs that integrate family roles, such as parenting classes, parent training, and a curriculum that emphasizes student motivation development. Meanwhile, for teachers, this research suggests the need for learning strategies that encourage active student engagement, provide positive feedback, and foster a supportive classroom climate, thereby allowing students' intrinsic motivation to grow. This, in turn, enables the connection between the roles of family and school in enhancing academic achievement.

Research Limitations

This study has several limitations that need to be considered in the interpretation of the results: (1) Population and Sample Limitations. This research was conducted exclusively with students in one area (for example, Banyuresmi District). Therefore, the results cannot be generalized to the entire student population in other areas or at different educational levels. Although the sample size of 156 students meets the minimum criterion suggested by Ling Ding's theory (100–150 respondents for SEM), it remains a relatively moderate number in terms of statistical power. This limitation may reduce the ability to detect small-to-moderate effects, increasing the possibility of a Type II error (failing to detect an existing effect). Therefore, non-significant findings in this study are interpreted with caution, considering the effect estimates, confidence intervals, and effect sizes rather than relying solely on p-values. Future research with larger samples or meta-analytic approaches is recommended to confirm the robustness of these findings. (2) Untested Contextual Factors. The study did not include other variables such as peer influence, psychological condition, teacher quality, or technology use, which may also play a role in shaping student motivation and achievement. These factors can be considered in follow-up

research. (3) "Moderate Reliability of the Learning Motivation Construct". One construct, Learning Motivation, had moderate reliability (á = 0.594). This was likely due to the limited number of items and the variation in respondents' responses. This limitation needs to be addressed in further research, for example, by adding or modifying items to increase reliability.

CONCLUSION

The results of this study show that students' learning motivation mediates the full influence of the family environment on learning achievement. Thus, although the family is the primary and most significant environment in the process of student growth and development, its influence on learning achievement occurs indirectly. This influence becomes significant only when the family environment fosters student motivation to learn. These findings indicate that a supportive family environment and good environmental conditions alone cannot automatically improve learning achievement, unless they can encourage students' enthusiasm and motivation to learn. These findings confirm that efforts to improve students' academic achievement must prioritize strategies that integrate family roles with strengthening learning motivation, because family support is only effective if it fosters motivation, which is the main link to learning success.

This study has several limitations that need to be considered, including only involving students from one region, so that the results cannot be generalized to other populations or education levels, and does not test other contextual factors such as peer influence, psychological conditions, teacher quality, or the use of technology, which also has the potential to affect student motivation and achievement. Further research is suggested to test a model of mediating learning motivation in a more diverse population and educational level by including contextual variables such as peer influence, teacher quality, psychological condition, and technology utilization, in order to build a more comprehensive and generalist model of predicting academic achievement.

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