Jurnal Magister Pendidikan Matematika (Jumadika) | Mei 2025 | Volume 7 Nomor 1 | Hal. 96 – 106
p-ISSN 2684-8848; e-ISSN 2657-1986
DOI https://doi.org/10.30598/jumadikavol7iss1year2025page96-106

THE EFFECT OF STRESS AND ACADEMIC RESILIENCE ON MATHEMATICAL PROBLEM-SOLVING ABILITY WITH LEARNING MOTIVATION AS AN INTERVENING VARIABLE

Mirzanul Afidati[1*], Heru Agni Setiaji[2]

[1,2] Program Studi Tadris Matematika, Universitas Islam Negeri Sunan Kudus
Jalan Conge Ngembalrejo Bae Kudus, Jawa Tengah, Indonesia

e-mail: [1] mirzanulafidati10@gmail.com;

Submitted: March 23, 2025 *Revised: April 10, 2025* *Accepted: May 25, 2025*

*corresponding author**

Abstract

The success of students in solving mathematical problem-solving tasks is influenced by several factors. Charles and Lester explain that the factors influencing mathematical problem-solving abilities are experiential factors, affective factors, and cognitive factors. The main objective of this research is to determine the effect of academic stress on learning motivation, the effect of academic resilience on learning motivation, the effect of academic stress on mathematical problem-solving ability, the effect of academic resilience on mathematical problem-solving ability, the effect of learning motivation on mathematical problem-solving ability, the effect of academic stress on mathematical problem-solving ability through learning motivation, and the effect of academic resilience on mathematical problem-solving ability through learning motivation. The method used is a quantitative approach, with the population consisting of all eighth-grade students at SMP Negeri 2 Lasem. The sample was taken using the simple random sampling technique, and the sample determination was done using the Slovin formula with a minimum sample of 111 students. The instruments used were questionnaires and test questions that had been validated. Data analysis was conducted using the SEM PLS method with the SmartPLS version 4 application. Based on the research results, it can be concluded that there is an influence of academic stress on learning motivation with a p-value of 0.005; there is an influence of academic resilience on learning motivation with a p-value of 0.001; there is no influence of academic stress on mathematical problem-solving ability with a p-value of 0.111; there is an influence of academic resilience on mathematical problem-solving ability with a p-value of 0.000; there is an influence of learning motivation on mathematical problem-solving ability with a p-value of 0.000; there is an influence of academic stress on mathematical problem - Solving ability through learning motivation with a p-value of 0.014; there is an influence of academic resilience on mathematical problems - Solving ability through learning motivation with a p-value of 0.007

Keywords: motivation, problem-solving, academic resilience, SEM-PLS, academic stress

1. Introduction

Mathematics not only teaches calculation but also trains logical, analytical, and systematic thinking in solving various problems. Therefore, one of the mathematical skills that is a goal of mathematics education is problem-solving ability (Utami & Wutsqa, 2017). Problem-solving skills enable students to enhance their critical thinking abilities when facing new situations in everyday life. Supported by Hendriana in La'ia & Harefa (2021), problem-solving skills can help students make decisions and face new situations in daily lives.

The crucial of mathematical skills for solving problems in the education process makes it essential for students to master them. However, based on observations, students at SMP N 2 Lasem have relatively low mathematical problem-solving abilities. This finding is reinforced by interviews with mathematics teachers, who stated that most students still struggle with mathematical problem-solving.

Several factors influence students' success in solving mathematical problem-solving tasks. According to Charles and Lester in Jubaedah (2022), mathematical problem-solving ability is affected by experience factors, affective factors, and cognitive factors. Experience factors involve both environmental and personal aspects, such as age, knowledge content, understanding of problem-solving strategies, familiarity with problem contexts, and subject matter knowledge. Affective factors include interest, motivation, stress, anxiety, tolerance for ambiguity, resilience, and patience. Cognitive factors encompass reading ability, spatial ability, analytical thinking, numerical skills, and other related competencies.

Kudsiyah et al. (2017) identified fifteen factors that influence mathematical problem-solving ability, including learning difficulties, subject mastery, problem context, comprehension, long-term thinking, prior learning, formulas, attitude (like/dislike), mood, motivation, attention, laziness, response, activeness, and discussion. However, only eight factors were found to have a significant influence, namely: learning difficulties (25%), attitude (14.44%), attention (9.61%), laziness (9%), formulas (7.84%), response (7.29%), prior learning (6.76%), and motivation (5.76%).

Several studies have investigated the factors influencing mathematical problem-solving ability. Handayani (2017) found that experience, motivation, problem comprehension, and thinking skills positively influence students' ability to solve mathematical problems, with thinking skills being the most dominant factor. Nisrina (2020) concluded that both learning interest and motivation directly and significantly impact mathematical problem-solving abilities and that learning fascination indirectly influences problem-solving through motivation. Kurniawati & Siswono (2014) stated that anxiety and self-efficacy jointly affect problem-solving abilities in quadrilateral topics. Sari Nst et al. (2023) found that analytical reasoning ability, literacy ability, spatial ability, and mathematics communication competencies significantly impact students' problem-solving ability. Annikmah et al. (2020) reported that self-confidence and adversity quotient positively and significantly affect mathematical problem-solving ability. Despite these studies, academic stress and resilience have not been widely explored as influencing factors in mathematical problem-solving. Thus, this research aims to examine their effects.

Academic stress refers to the stress experienced by students in academic settings (Murniati, 2022). Rahmawati et al. (2021) define academic stress as a pressure condition resulting from a mismatch between received demands and the ability to manage them. Meanwhile, Ibrahim et al. (2013) describe academic stress as a state in which individuals struggle to manage academic tasks effectively due to excessive pressure and demands.

According to Sari & Indrawati (2016), resilience is closely related to psychological endurance. This idea is referred to as academic resilience in academic settings. Wulandari & Kumalasari (2022) define academic resilience as the ability of individuals to persist in completing their schooling despite difficult situations or unfavorable situations and to overcome academic challenges.

Besides academic stress and academic resilience, learning motivation also influences mathematical problem-solving abilities. Yaman et al. (2023) define learning motivation as a behavioral change in the learning process driven by an individual's desire to achieve a goal. Internal or external factors can drive learning motivation, resulting in changes in learning activities to achieve specific objectives. Puspitasari et al. (2024) found that academic stress affects learning motivation; increased academic stress leads to decreased motivation. Yaman et al. (2023) also concluded that there is a positive relationship between academic resilience and learning motivation during online learning among students at SMPN 1 Pinrang. Similarly, Khotimah et al.

(2022) found a significant relationship between learning motivation and students' academic resilience. Based on these findings, this study considers learning motivation as an intervening variable.

Given these findings, the researcher is interested in examining the influence of academic stress and academic resilience on mathematical problem-solving ability, as these factors have not been widely studied. Additionally, Robbani & Sumartini (2023) stated that higher learning motivation enhances students' mathematical problem-solving ability. Therefore, this study intends to investigate the influence of academic stress and academic resilience on mathematical problem-solving ability, with learning motivation as a mediating variable.

2. Method

This research is classified as a quantitative study. According to Sugiyono & Lestari (2021), the quantitative method is described as an inquiry approach based on positivism philosophy, which is used to study a specific population or sample, collect data through instruments for research, and analyze data quantitatively or statistically to describe and test predetermined hypotheses. The research variables include two independent variables: academic stress (X1) and academic resilience (X2); one dependent variable: mathematical problem-solving ability (Y); and one intervening variable: learning motivation (Z).

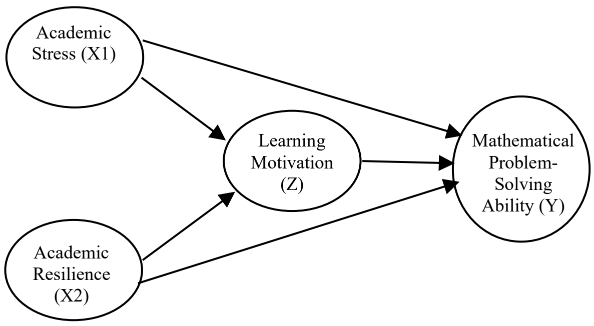

Figure 1. Research Design

This study was implemented at SMP N 2 Lasem during the even semester of the 2024/2025 academic year, with the study population consisting of all eighth-grade students, totaling 152 students. The technique for sampling selected in this study was simple random sampling. To determine the sample size, the researcher applied the Slovin formula as follows:

$$n = \frac{N}{1 + N.e^2}$$

description:
n = sample size
N = population size
e = margin of error due to sampling inaccuracies, which is tolerable or acceptable (set at 5% with a 95% confidence level).

$$n = \frac{N}{1 + N.e^2} = \frac{152}{1 + 152.(0{,}05)^2} = \frac{152}{1{,}38}$$

$$= 110{,}145 \approx 111 \text{ responden}$$

The data collection instruments used in this study included the academic stress questionnaire, academic resilience questionnaire, learning motivation questionnaire, and mathematical problem-solving test.

For the academic stress instrument, the researchers adapted the instrument from Mudita, et al. (2023) with indicators of academic stress according to Gadzella & Masten (2005), namely physical, emotional, cognitive, and behavioural aspects. From the validity test results, there are 38 statements deemed valid, and the reliability test yielded a score of 0.987, which falls into the very high category (reliable).

For the academic resilience instrument, the researcher adapted the instrument from Cassidy (2016) with the indicators of academic resilience according to Cassidy (2016), which are perseverance, reflection and seeking adaptive help, and negative affect and emotional response. From the results of the validity test, there are 30 statements that are considered valid, and the reliability test yielded a score of 0.83, which falls into the very high category (reliable).

For the learning motivation instrument, it is adopted from Salam (2024) with the learning motivation indicators from Salam (2024) consisting of 1) drive to achieve something, 2) commitment to learning, 3) initiative in learning, 4) always optimistic, 5) rewards in learning, and 6) punishment. From the results of the validity test, there are 30 statements that are considered valid, and the reliability test yielded a score of 0.819, which falls into the very high category (reliable).

Mathematical problem-solving ability was measured through a test using an instrument developed by the researcher based on Polya's (1978) problem-solving indicators: understanding the problem, making a plan, executing the plan, and reviewing it. A total of seven questions were tested and validated. However, due to time constraints in completing the test, the researcher selected only five questions. The test used was in the form of an essay-based assessment on the topic of a system of two-variable linear equations (SPLDV).

Then, the data was analyzed using SEM (Structural Equation Model) PLS with the assistance of SmartPLS version 4. SEM is used to test direct and indirect relationships between latent variables. The data to be analyzed includes the results of the academic stress questionnaire, the academic resilience questionnaire, the learning motivation questionnaire, and the scores from the math problem-solving test. The stages of the analysis are as follows:

a. Outer Model Testing

This test was conducted to verify that the measurement model was valid and reliable. The outer model testing includes the following assessments:

1) Convergent Validity

Convergent validity gauges the degree of correlation between constructs and latent variables (variables that are not directly measurable). The standardized loading factor values evaluate convergent validity through individual item reliability. The standardized loading factor represents the degree of correlation between each measurement item (indicator) and its construct. A loading factor value of ≥ 0.7 is considered ideal, indicating that the indicator is valid in measuring the construct it represents. Therefore, we should drop a loading factor value of < 0.7 from the model. The squared value of the loading factor is referred to as communalities, which indicates the proportion of the construct that explains the variation present in the indicator.

2) Discriminant Validity

Discriminant validity determines whether a test designed to measure a specific construct does not correlate with tests measuring different constructs. According to Fornell and Larcker's criteria, discriminant validity is established if the square root of the AVE for a particular construct is > the correlation value with other constructs.

3) Average Variance Extracted (AVE)

The Average Variance Extracted (AVE) value can also yield the results of discriminant validity testing. A measurement model is considered effective if the latent construct has an AVE value is > 0.5, and vice versa.

4) Composite Reliability

Composite reliability assesses how well the underlying variables a construct are represented in structural equation modeling. If the composite reliability value > 0.7 and Cronbach's alpha > 0.7, then the results demonstrate good reliability, and vice versa.

b. Structural Model Measurement (Inner Model)

Testing of the structural model (inner model) is conducted by analyzing the R-square (R^2) value, which serves as a goodness-of-fit test for the model. The R^2 value is used to measure the extent to which specific independent latent variables (exogenous variables) influence the dependent latent variables (endogenous variables). According to Chin (1998), the R^2 criteria are classified into three levels: 0.67 (strong), 0.33 (moderate), and 0.19 (weak).

The second test involves evaluating the significance by examining the parameter coefficient and significance value in the Bootstrapping Algorithm Report—Path Coefficients. The hypothesis is accepted if the value > the value, with a significance level of 5% (= 1.65845).

3. Results and Discussion

3.1 Results

Outer Model Analysis

The results of data processing and SEM PLS analysis using SmartPLS 4 are presented in Figure 2.

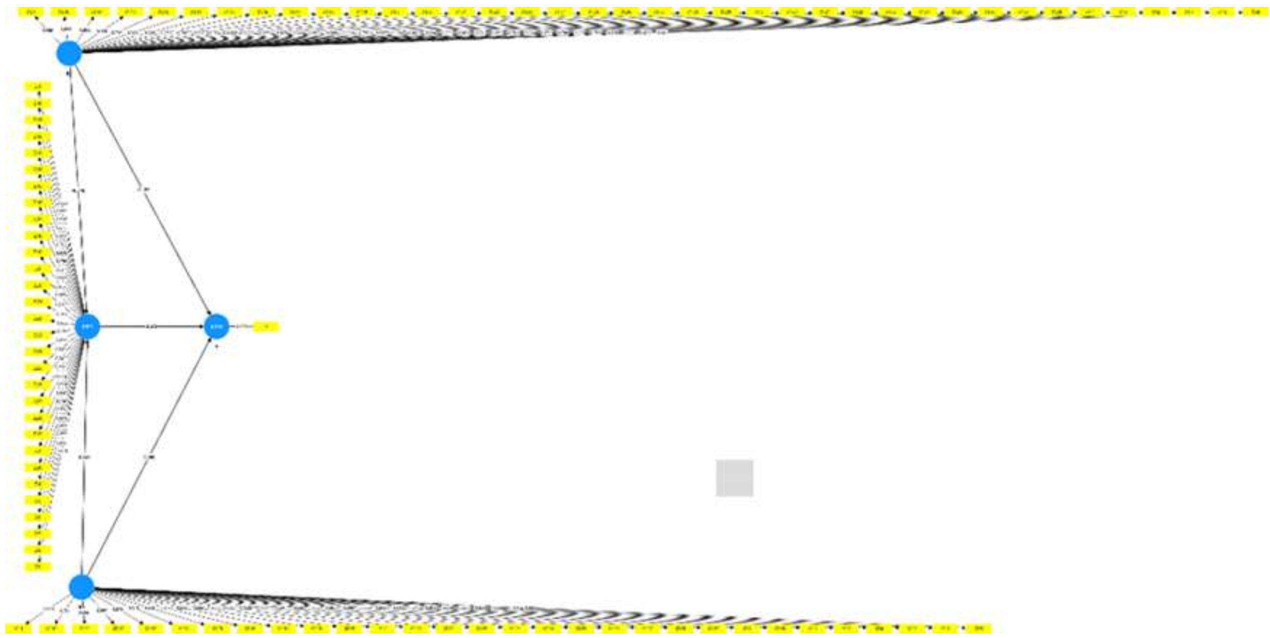

Figure 2. Outer Loading Results from SEM-PLS SmartPLS 4

Table 1. Outer Loading Results from SEM-PLS SmartPLS 4 After Eliminated

	X1	X2	Y	Z		X1	X2	Y	Z		X1	X2	Y	Z
X1.1	0.865				**X1.38**	0.788				**X2.7**		0.895		
X1.10	0.841				**X1.4**	0.835				**X2.8**		0.775		
X1.11	0.808				**X1.5**	0.791				**X2.9**		0.875		
X1.12	0.909				**X1.6**	0.878				**Y**			1.000	
X1.13	0.753				**X1.7**	0.828				**Z.1**				0.852
X1.14	0.803				**X1.8**	0.823				**Z.10**				0.865
X1.15	0.800				**X1.9**	0.881				**Z.11**				0.819
X1.16	0.859				**X2.1**		0.835			**Z.13**				0.822
X1.17	0.799				**X2.10**		0.726			**Z.14**				0.793
X1.18	0.837				**X2.11**		0.858			**Z.15**				0.838
X1.19	0.784				**X2.12**		0.862			**Z.16**				0.787
X1.2	0.828				**X2.13**		0.821			**Z.17**				0.889
X1.20	0.823				**X2.14**		0.807			**Z.18**				0.892
X1.21	0.855				**X2.16**		0.889			**Z.19**				0.860
X1.22	0.823				**X2.18**		0.848			**Z.2**				0.871
X1.23	0.747				**X2.19**		0.734			**Z.20**				0.801
X1.24	0.897				**X2.2**		0.868			**Z.23**				0.775
X1.25	0.826				**X2.20**		0.894			**Z.24**				0.882
X1.26	0.820				**X2.21**		0.909			**Z.25**				0.859
X1.27	0.750				**X2.22**		0.851			**Z.26**				0.854
X1.28	0.907				**X2.24**		0.866			**Z.27**				0.764
X1.29	0.864				**X2.25**		0.912			**Z.28**				0.777
X1.3	0.882				**X2.26**		0.911			**Z.29**				0.743
X1.30	0.864				**X2.27**		0.877			**Z.3**				0.847
X1.31	0.833				**X2.28**		0.844			**Z.30**				0.759
X1.32	0.861				**X2.29**		0.809			**Z.5**				0.848
X1.33	0.791				**X2.3**		0.864			**Z.6**				0.899
X1.34	0.862				**X2.30**		0.819			**Z.7**				0.879
X1.35	0.781				**X2.4**		0.865			**Z.8**				0.917
X1.36	0.884				**X2.5**		0.817			**Z.9**				0.843
X1.37	0.872				**X2.6**		0.831							

The outer loading value of any statement that is < 0.7 is then eliminated. And the results of the statements that have been eliminated are as shown in Figure 2. Very latent variable (X1, X2, Z, and Y) achieved an outer loading value above 0.7, with the highest values for each variable being 0.909 for X1, 0.912 for X2, and 0.917 for Z. It can be concluded that the indicators used in this study passed the convergent validity test, as they accurately reflect the relevant variables (Haryono, 2016).

The next step is the discriminant validity test, which is assessed by analyzing the cross-loading values as follows:

Table 2. Discriminant Validity Fornell Larcker

	(Y)	(Z)	(X2)	(X1)
Mathematical Problem-Solving Ability (Y)	**1.000**			
Learning Motivation (Z)	0.739	**0.837**		
Academic Resilience (X2)	0.746	0.664	**0.848**	
Academic Stress (X1)	-0.693	-0.658	-0.775	**0.834**

Based on Table 2, it can be observed that the square root of the AVE for each variable is greater than the correlation between other constructs. Therefore, it can be concluded that all variables meet the criteria for discriminant validity (Savitri et al., 2021).

Table 3. Composite Reliability Results and Cronbach's Alpha

	Cronbach's alpha	Composite Reliability	AVE
Learning Motivation (Z)	0.983	0.984	0.701
Academic Resilience (X2)	0.985	0.986	0.719
Academic Stress (X1)	0.988	0.989	0.695

Based on Table 3, the results indicate that the main model has met the requirements. With a Cronbach's Alpha value for all latent variables > 0.7, a composite reliability value > 0.7, and an AVE > 0.5 (Hussein, 2015).

Inner Model Analysis

The output for the R^2 value was obtained using the SmartPLS 4.0 software:

Table 4. R-square

	R-square	*Adjusted R-square*
Mathematical Problem-Solving Ability (Y)	0.670	0.661
Learning Motivation (Z)	0.493	0.483

Based on Table 4, the adjusted R-square (R^2 Adjusted) value for the mathematical problem-solving ability (Y) variable is 0.661. This indicates that the influence of academic stress, academic resilience, and learning motivation on mathematical problem-solving ability reaches 66.1%, while the remaining 33.9% is impacted by other factors not included in this model. Meanwhile, the adjusted R-square (R^2 adjusted) value for the learning motivation (Z) variable is 0.483, meaning that academic stress and academic resilience account for 48.3% of the variation in learning motivation, with the remaining 51.7% influenced by other external factors. Thus, it can be concluded that the developed model is well-fitted and effectively explains the relationships between the variables.

Table 5. F-square

	Mathematical Problem-Solving Ability (Y)	Learning Motivation (Z)
Learning Motivation (Z)	0.244	
Academic Resilience (X2)	0.149	0.118
Academic Stress (X1)	0.022	0.101

Based on the data presented in Table 5, several results were obtained as follows:

a. The influence of learning motivation on mathematical problem-solving ability is 0.244 (moderate).

b. The influence of academic resilience on mathematical problem-solving ability is 0.149 (moderate).

c. The influence of academic stress on mathematical problem-solving ability is 0.022 (weak).

d. The influence of academic resilience on learning motivation is 0.118 (moderate).

e. The influence of academic stress on learning motivation is 0.101 (moderate).

Goodness Of Fit (GOF)

Table 6. GOF (Goodness Of Fit) value

	AVE	*R-Square*
Academic Stress (X1)	0,48264	
Academic Resilience (X2)	0,49931	
Learning Motivation (Z)	0,48681	0,342361
Mathematical Problem-Solving Ability (Y)		0,465278
Average	0,489583	0,403819

GOF value = $\sqrt{(\text{AVE average} \times R^2 \text{ average})}$

GOF value = $\sqrt{(0{,}489583 \times 0{,}403819)}$

GOF value = 0,444638

Based on Table 6, the GOF value is 0.444638, which indicates that the aggregate achievement of the outer model (measurement model) and inner model (structural model) falls into the high GOF category (Haryono, 2016). This presents that the model has a strong overall fit and is suitable for hypothesis testing.

Hypothesis Testing

The hypothesis test in the SEM model using PLS aims to determine the influence of exogenous variables on endogenous variables. Hypothesis testing using the SEM PLS method is conducted through the bootstrapping process. Before performing the hypothesis test, the T_{table} value for a 95% confidence level (α = 5%) and degrees of freedom (df) = n-1 = 114 – 1 = 113 is 1.65845. A hypothesis is accepted or rejected by considering the significance value between constructs, the $T_{statistic}$, and the p-value as follows.

Table 7. Direct Hypothesis Test

Variable	Original Sample	T statistik	*P - values*
Academic Stress (X1) -> Learning Motivation (Z)	-0.358	2.831	0.005
Academic Resilience (X2) -> Learning Motivation (Z)	0.387	3.198	0.001
Academic Stress (X1) -> Mathematical Problem-Solving Ability (Y)	-0.143	1.595	0.111
Academic Resilience (X2) -> Mathematical Problem-Solving Ability (Y)	0.371	4.285	0.000
Learning Motivation (Z) -> Mathematical Problem-Solving Ability (Y)	0.398	5.702	0.000

Based on Table 7, the results of hypothesis testing for the direct effects between latent variables are as follows: 1) Academic stress significantly affects learning motivation. The $T_{statistic}$ is 2.831 > the T_{table} (1.65845), the p-value is 0.005 < 0.05, and H_1 is accepted. 2) Academic resilience significantly affects learning motivation. The $T_{statistic}$ is 3.198 > the T_{table} (1.65845), the p-value is 0.001 < 0.05, and H_2 is accepted. 3) Academic stress does not significantly affect mathematical problem-solving ability. The $T_{statistic}$ is 1.595 < the T_{table} (1.65845), the p-value is 0.111 > 0.05, and H_3 is rejected. 4) Academic resilience significantly affects mathematical problem-solving ability. The $T_{statistic}$ is 4.285 > the T_{table} (1.65845), the p-value is 0.000 < 0.05, and H_4 is accepted. 5) Learning motivation significantly affects mathematical problem-solving ability. The $T_{statistic}$ is 5.702 > the T_{table} (1.65845), the p-value is 0.000 < 0.05, and H_5 is accepted.

Table 8. Indirect Hypothesis Test

Variable	Original Sample	T statistik	P values
Academic Stress (X1) -> Learning Motivation (Z) -> Mathematical Problem-Solving Ability (Y)	-0.143	2.462	0.014
Academic Resilience (X2) -> Learning Motivation (Z) -> Mathematical Problem-Solving Ability (Y)	0.154	2.722	0.007

Based on the data in Table 8, the hypothesis testing for each indirect relationship between latent variables is as follows: 1) There is an effect of academic stress on mathematical problem-solving ability through learning motivation, with a $T_{statistic}$ of 2.462 > the T_{table} value (1.65845). The p-value is 0.014, which is less than 0.05, so H_6 is accepted. 2) There is an effect of academic resilience on mathematical problem-solving ability through learning motivation, with a $T_{statistic}$ of 2.722 > the T_{table} value (1.65845). The p-value is 0.007, which is less than 0.05, so H_7 is accepted.

3.2 Discussion

The Influence of Academic Stress on Learning Motivation

The research results show that academic stress has a significant negative impact on learning motivation. This means that the less academic stress students experience, the higher their learning motivation, and the higher their academic stress, the lower their learning motivation.

This findings align with Puspitasari et al. (2024), who stated that if students' academic stress increases, their learning motivation will decrease. This theory is also supported by Ramadan & Yushita (2022), who found that academic stress can reduce students' learning motivation, especially in online learning conditions that require greater adaptation. If students lack adequate coping strategies to manage academic tasks, they are probable to encounter higher levels of stress, which ultimately affects their learning motivation (Pratama & Prihatiningsih, 2014).

Thus, academic stress partially influences learning motivation. The lower the demands of academic tasks and achievement expectations, the higher students' motivation to learn. This may be due to the coping strategies that students have in dealing with academic pressure. Students who are accustomed to pressure tend to be able to complete tasks without losing their critical thinking skills.

The Influence of Academic Resilience on Learning Motivation

This study further discovered positively affects learning motivation. In other words, the higher a student's level of academic resilience, the higher their learning motivation, and vice versa.

These conclusions are corroborated by study from Yaman et al. (2023), which highlights the significant role of academic resilience in increasing students' learning motivation. Additionally, Septianmar et al. (2022) found a positive relationship between academic resilience and learning motivation. Academic resilience enables students to persevere and adapt to academic challenges. Students exhibiting great academic resilience tend to possess superior qualities coping strategies in dealing with academic stress, ultimately helping them stay motivated in their studies.

The Influence of Academic Stress on Mathematical Problem-Solving Ability

The findings of this study reveal that academic stress does not significantly impact mathematical problem-solving skills. This result contrasts with the theory of Charles and Lester (1984), which states that academic stress is one of the factors affecting mathematical problem-solving ability. However, this finding aligns with Pradiri et al. (2021), who stated that although academic stress can increase anxiety, its impact on academic performance is not always significant. The effect depends on students' adaptability to the pressure they face.

Several studies also show that certain groups of students are more vulnerable to stress, while others have better resilience to stress (Siagian et al., 2025). Therefore, in the context of this study, it is likely that students possess effective coping strategies, enabling them to manage academic stress without significantly affecting their aptitude at solving mathematical issues.

The Influence of Academic Resilience on Mathematical Problem-Solving Ability

This study found that academic resilience positively affects mathematical problem-solving ability. This confirms the greater the students academic resilience, the better their ability to solve mathematical problems, and vice versa.

These findings align with the theory of Charles and Lester (1984), which states that academic resilience is one of the key factors influencing mathematical problem-solving ability. Similarly, Khotimah et al. (2022) found that students with high academic resilience tend to have better problem-solving skills, as they can face academic challenges with a positive attitude and persistence. Academic resilience helps students stay focused on finding creative solutions to mathematical problems, even when facing obstacles. This finding is also supported by La'ia & Harefa (2021), who stated that students with strong critical thinking skills and high perseverance are more capable of solving mathematical problems effectively.

The Influence of Learning Motivation on Mathematical Problem-Solving Ability

This study also found that learning motivation has a significant positive effect on students' mathematical problem-solving abilities. This means that the higher a student's learning motivation, the better their problem-solving skills in mathematics, and vice versa. This finding is supported by examinations carried out by Afrilia et al. (2023), which states that students with higher learning motivation tend to perform better in solving mathematical problems.

Furthermore, a study by Lestari et al. (2022) highlights that learning motivation plays a essential function in augmenting students cognitive skills, particularly in understanding and applying problem-solving strategies in mathematics. High motivation encourages students to be more proactive in seeking solutions and prevents them from giving up easily when faced with complex problems.

The Influence of Academic Stress on Mathematical Problem-Solving Ability Through Learning Motivation

This study found that academic stress indirectly affects mathematical problem-solving ability through learning motivation. In other words, academic stress can decrease students' learning motivation, which then impacts their ability to solve mathematical problems. This finding aligns with Robbani & Sumartini (2023), who emphasized that learning motivation is a key factor in enhancement students mathematical problem-solving ability.

This theory is beyond supported by Puspitasari et al. (2024), who found that high academic stress can hinder students' cognitive development, leading to decreased motivation, which in turn affects their problem-solving ability in mathematics.

The Influence of Academic Resilience on Mathematical Problem-Solving Ability Through Learning Motivation

The study outcome also show that academic resilience indirectly affects mathematical problem-solving ability through learning motivation. This means that students with high academic resilience tend to have higher learning motivation, which ultimately helps them perform better in solving mathematical problems.

Nisrina (2020) asserted a favorable relationship was also indentiied between academic resilience, learning motivation, and mathematical problem-solving ability. Additionally, research by Sari Nst et al. (2023) stated that factors such as critical thinking skills, literacy, and motivation significantly influence students' problem-solving ability.

4. Conclusions

Based on research data conducted on eighth-grade students at SMP N 2 Lasem during the 2024/2025 academic year, the following conclusions were drawn: Academic stress has a significant effect on learning motivation; academic resilience has a significant effect on learning motivation; academic stress does not have a significant effect on mathematical problem-solving ability, while academic resilience does have a significant effect on mathematical problem-solving ability. Additionally, learning motivation significantly influences mathematical problem-solving ability. Furthermore, academic stress indirectly affects mathematical problem-solving ability through learning motivation, and academic resilience also indirectly influences mathematical problem-solving ability through learning motivation. Therefore, it is essential to enhance academic resilience and learning motivation while minimizing academic stress to optimize students' problem-solving abilities.

The researchers acknowledge that this study has the following limitations:

a. This research was conducted with a sample of only 114 students. This limits the generalization of findings to other schools, especially those with different social, academic, or geographical conditions.

b. In the data collection process, the information provided by respondents through questionnaires sometimes does not reflect their actual opinions. This occurs due to differences in thinking, assumptions, and understanding among respondents, as well as other factors such as honesty in filling out the questionnaire.

c. This research only examines the influence of several factors, such as academic stress, academic resilience, and learning motivation, on mathematical problem-solving ability, so further research is needed to investigate the impact of other factors that have not yet been studied on mathematical problem-solving ability.

d. The limitation of students' time in solving mathematical problem-solving tasks

References

Afrilia, D., Mustalifah, M., & Ramadanniya, D. N. (2023). Pengaruh Motivasi Belajar Terhadap Kemampuan Pemecahan Masalah Matematis Mahasiswa Tadris Matematika Uin Fatmawati Sukarno Bengkulu. Numeracy, 10(2), 120–133. https://doi.org/10.46244/numeracy.v10i2.2237

Annikmah, I., Priyo Darminto, B., & Budi Darmono, P. (2020). Pengaruh Kepercayaan Diri dan Adversity Quotient terhadap Kemampuan Pemecahan Masalah Matematika Siswa. PYTHAGORAS: Jurnal Program Studi Pendidikan Matematika, 9(2), 112.

Cassidy, S. (2016). The Academic Resilience Scale (ARS-30): A new multidimensional construct measure. Frontiers in Psychology, 7(NOV), 1–11. https://doi.org/10.3389/fpsyg.2016.01787

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. Modern methods for business research. Statistical Strategies for Small Sample Research, January 1998, 295-336. http://books.google.com.sg/books?hl=en&lr=&id=EDZ5AgAAQBAJ&oi=fnd&pg=PA295&dq=chin+1998+PLS&ots=47qB7ro0np&sig=rihQBibvT6S-Lsj1H9txe9dX6Zk#v=onepage&q&f=false

Gadzella, B. M., & Masten, W. G. (2005). An Analysis of The Categories in the Student Life Stress Inventory. American Journal of Psychological Research, 1(1), 1–10.

Handayani, K. (2017). Analisis faktor – faktor yang mempengaruhi kemampuan pemecahan masalah soal cerita matematika. Seminar Nasional Matematika: Peran Alumni

MatematikadalamMembangunJejaring, 325–330. http://digilib.unimed.ac.id/id/eprint/26892

Haryono, S. (2016). Metode SEM Untuk Penelitian Manajemen dengan AMOS LISREL Smart PLS. In Jakarta : PT Intermedia Personalia Utama. of Physics A: Mathematical and Theoretical.

Hussein, A. S. (2015). Penelitian Bisnis dan Manajemen Menggunakan Partial Least Squares dengan SmartPLS 3.0. Universitas Brawijaya, 1, 1–19. https://doi.org/10.1023/A:1023202519395

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. Journal of psychiatric research, 47(3), 391-400. https://doi.org/10.1016/j.jpsychires.2012.11.015

Jubaedah, A. S. (2022). PENGARUH MODEL PEMBELAJARAN PROBLEM BASED LEARNING TERHADAP KEMAMPUAN PEMECAHAN MASALAH (Studi Kuasi Eksperimen pada Peserta Didik Kelas XI IPS SMA Negeri 2 Singaparna Tahun Ajaran 2021/2022).

Khotimah, K., Budiono, A. N., & Wahyuni. (2022). Hubungan Motivasi Belajar dengan Resiliensi Akademik Siswa. Jurnal Consulenza : Jurnal Bimbingan Konseling Dan Psikologi, 5(2), 180–189. https://doi.org/10.56013/jcbkp.v5i2.1613

Kudsiyah, S. M., Novarina, E., & Lukman, H. S. (2017). Faktor - Faktor yang Mempengaruhi Kemampuan Pemecahan Masalah Matematika Kelas X di SMA Negeri 2 Kota Sukabumi. Seminar Nasional Pendidikan, 110–117.

Kurniawati, A. D., & Siswono, T. Y. E. (2014). Pengaruh kecemasan dan self. MATHEdunesa, 3(2), 36–41.

La'ia, H. T., & Harefa, D. (2021). Hubungan Kemampuan Pemecahan Masalah Matematis dengan Kemampuan Komunikasi Matematik Siswa. Aksara: Jurnal Ilmu Pendidikan Nonformal, 7(2), 463. https://doi.org/10.37905/aksara.7.2.463-474.2021

Lestari, D. E., Amrullah, A., Kurniati, N., & Azmi, S. (2022). Pengaruh Motivasi Belajar Siswa terhadap Kemampuan Pemecahan Masalah Matematika Pada Materi Barisan dan Deret. Jurnal Ilmiah Profesi Pendidikan, 7(3), 1078–1085. https://doi.org/10.29303/jipp.v7i3.719

Mudita, I. K., Santyasa, I. W., & Tegeh, I. M. (2023). Peran Self Efficacy Dalam Memediasi Pengaruh Pembelajaran Daring Terhadap Stres Akademik Mahasiswa. Jurnal Teknologi Pembelajaran Indonesia, 13, 69–79. https://doi.org/10.23887/jurnal_tp.v13i1.2155

Murniati, R. (2022). Pengaruh Stres Akademik Dan Kemampuan Numerik Terhadap Hasil Belajar Siswa Kelas X SMK Negeri Kebonagung. Jurnal Ilmu Pendidikan, 7(2), 809–820.

Nisrina, N. (2020). Pengaruh Minat dan Motivasi Belajar terhadap Kemampuan Pemecahan Masalah Matematik. ALFARISI: Jurnal Pendidikan MIPA, 1(3), 294–303. https://journal.lppmunindra.ac.id/index.php/alfarisi/article/view/8249

Polya, G. (1978). How to Solve It a New Aspect of Mathematical Method Princeton University Press 2004. https://archive.org/details/g.-polya-how-to-solve-it.-a-new-aspect-of-mathematical-method/G. Polya - How to solve it. A new aspect of mathematical method/page/n9/mode/2up

Pradiri, A. P., Hendriani, W., & Surjaningrum, E. R. (2021). Studi Kualitatif dalam Kajian Stres Akademik. INSAN Jurnal Psikologi Dan Kesehatan Mental, 6(2), 79. https://doi.org/10.20473/jpkm.v6i22021.79-89

Pratama, M. R., & Prihatiningsih, D. (2014). Hubungan motivasi akademi dengan tingkat Stres akademi mahasiswa keperawatan semester VI Stikes'Aisyiyah Yogyakarta. Naskah Publikasi STIKES 'Aisyiyah Yogyakarta, 1–16. https://digilib.unisayogya.ac.id/384/

Puspitasari, E. I., Widyastuti, & Affandi, G. R. (2024). Pengaruh Stres Akademik dan Cognitive Load Terhadap Motivasi Belajar Siswa. 11(September), 374–388.

Rahmawati, D., Fahrudin, A., & Abdillah, R. (2021). Hubungan Kontrol Diri dengan Stres Akademik Akibat Pembelajaran Hybrid dalam Masa Pandemi COVID-19 di SMK X Kota Bekasi. KHIDMAT SOSIAL: Journal of Social Work and Social Services, 2(2), 135–153. https://jurnal.umj.ac.id/index.php/khidmatsosial/article/view/14124

Ramadan, M., & Yushita, A. N. (2022). Pengaruh Stres Akademik, Fasilitas Belajar, Dan Lingkungan Belajar Terhadap Motivasi Belajar Daring Mahasiswa. Jurnal Pendidikan Akuntansi Indonesia, 20(1), 52–66. https://doi.org/10.21831/jpai.v20i1.48530

Robbani, I. A., & Sumartini, T. S. (2023). Kemampuan pemecahan masalah matematis ditinjau dari motivasi belajar siswa sekolah dasar. Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu, 2(2), 185–192. https://doi.org/10.31980/powermathedu.v2i2.3049

Salam, M. N. (2024). Korelasi Motivasi Belajar, Kecerdasan Emosional Dan Peranan Orang Tua Dengan Hasil Belajar Mata Pelajaran Pjok Peserta Didik Kelas Viii Sekolah Menengah Pertama Negeri Se-Kecamatan Sawangan Kabupaten Magelang. 1–203.

Sari Nst, H. M., Syahputra, E., & Mulyono. (2023). Pengaruh Kemampuan Berpikir Kritis, Literasi, Spasial dan Komunikasi Matematis Terhadap Kemampuan Pemecahan Masalah Matematika Siswa SMP Kelas VIII di Medan. Jurnal Cendekia : Jurnal Pendidikan Matematika, 7(1), 820–830. https://doi.org/10.31004/cendekia.v7i1.2234

Sari, P. K. P., & Indrawati, E. S. (2016). Hubungan Antara Dukungan Sosial Teman Sebaya Dengan Resiliensi Akademik Pada Mahasiswa Tingkat Akhir Jurusan X Fakultas Teknik Univesitas

Diponegoro. Jurnal Empati, 5(2), 177–182. https://ejournal3.undip.ac.id/index.php/empati/article/view/14979/14478

Savitri, C., Faddila, S. P., Iswari, H. R., Anam, C., Syah, S., Mulyani, S. R., & Sihombig, P. (2021). Statistik Multivariat Dalam Riset. In Widina (Issue 15018).

Septianmar, P., Esterlita P, S., & Afiati, N. S. (2022). Hubungan Antara Dukungan Sosial Keluarga Dan Motivasi Belajar Dengan Resiliensi Akademik Pada Siswa Sma Di Masa Pandemi Covid-19. PSIKOSAINS (Jurnal Penelitian Dan Pemikiran Psikologi), 17(2), 159. https://doi.org/10.30587/psikosains.v17i2.4595

Siagian, I. O., Linda, S., & Melia, S. (2025). Hubungan Tingkat Stres Dengan Prestasi Akademik Mahasiswa Ira. Jurnal Keperawatan Muhammadiyah, 10(1), 114–119.

Sugiyono, P. D., & Lestari, D. P. (2021). Metode Penelitian Komunikasi (Kuantitatif, Kualitatif, Analisis Teks, Cara Menulis Artikel Untuk Jurnal Nasional dan Internasional). In P. D. Sunarto (Ed.), Penerbit Alfabeta Bandung (Vol. 1, Issue 3). Alfabeta,cv.

Utami, R. W., & Wutsqa, D. U. (2017). Analisis Kemampuan Pemecahan Masalah Matematika dan Self-Efficacy Siswa SMP Negeri di Kabupaten Ciamis. Jurnal Riset Pendidikan Matematika, 4(2), 167. https://doi.org/10.25273/jta.v5i1.4642

Wulandari, & Kumalasari, D. (2022). Resiliensi Akademik Pada Mahasiswa: Bagaimana Kaitannya Dengan Dukungan Dosen? Jurnal Psikologi Malahayati, 4(1), 19–30. https://doi.org/10.33024/jpm.v4i1.5058

Yaman, S. W., Daud, M., & Jalal, N. M. (2023). Hubungan Antara Resiliensi Akademik Dan Motivasi Belajar Selama Pembelajaran Daring Pada Siswa SMPN 1 Pinrang. PESHUM : Jurnal Pendidikan, Sosial Dan Humaniora, 2(4), 700–711. https://doi.org/10.56799/peshum.v2i4.1813