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The Influence of Self-Confidence and Adversity Quotient on Mathematics Problem-Solving Ability of Fifth Grade Students at SD Negeri Arjawinangun

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Abstract. Mathematics problem-solving ability is a fundamental skill in elementary education that is influenced by various psychological factors. This study aims to investigate the effects of self-confidence and adversity quotient on the problem-solving skills of fifth-grade students at SD Negeri Arjawinangun. Using a quantitative correlational design, the study involved a total sample of 100 students. Data were collected through validated and reliable questionnaires measuring self-confidence and adversity quotient, along with a mathematics problem-solving test. Prior to analysis, assumptions of normality, linearity, and multicollinearity were confirmed. Multiple linear regression analysis revealed that both self-confidence and adversity quotient had a significant positive effect on students' problem-solving abilities, with regression coefficients of 0.45 and 0.37 respectively ($p < 0.05$). The regression model accounted for 62% of the variance in problem-solving ability. These findings highlight the crucial role of psychological resilience and confidence in enhancing mathematical problem-solving at the elementary level. However, given the correlational design, causal inferences cannot be definitively made. The results suggest that educators should focus on fostering students' psychological strengths alongside cognitive skills to improve academic outcomes. Future research is recommended to employ experimental designs and incorporate additional variables to deepen understanding of the factors influencing mathematical problem-solving.

Keywords: self-confidence; adversity quotient; mathematics problem-solving ability; elementary school students; mathematics education; educational psychology

INTRODUCTION

Problem-solving ability in mathematics learning is a key indicator of success in primary education, playing a vital role in developing students' critical and analytical thinking skills (Winoto & Hadi, 2025). The problem-solving process involves a series of complex cognitive activities, ranging from understanding the problem, planning strategies, implementing solutions, to evaluating the results. Mastery of this competence is essential as it contributes not only to academic achievement but also to the development of higher-order thinking skills crucial for everyday life and future challenges (Dewi et al., 2024). However, empirical studies show that many elementary school students experience difficulties in optimally developing mathematical problem-solving skills. This indicates the need for a deeper analysis of the factors influencing this learning process, both cognitively and psychologically (Kartikasari et al., 2023).

In this context, students' psychological factors become a primary concern due to their significant influence on motivation, learning strategies, and academic outcomes. Two prominent psychological aspects in mathematics education literature are self-confidence and adversity quotient. Self-confidence refers to an individual's belief in their capacity and ability to complete specific tasks (Kharisma & Safitri, 2023). In mathematics learning, self-confidence acts as a psychological capital that encourages students to dare to try, not fear making mistakes, and persist in seeking solutions (Putra & Roza, 2020). Students with high self-confidence tend to be more active and open to diverse learning strategies, thus having a greater chance of success in problem-solving (Puspita et al., 2024).

Self-confidence can be explained as an internal factor influencing how students perceive their abilities in completing mathematical tasks (Zahroh & Dewi, 2022). A strong sense of confidence triggers high intrinsic motivation, encouraging students to be more active in learning and increasing resilience against failure. Without sufficient confidence, students tend to feel anxious, fear mistakes, and hesitate to take risks in answering challenging math questions (Hanifah & Miatun, 2024). This condition often becomes a major barrier in the mathematics learning process

at the elementary level. Therefore, strengthening self-confidence is a crucial aspect to be considered in designing effective learning methods.

Besides self-confidence, the concept of adversity quotient, commonly known as mental resilience, has also gained increasing attention in educational psychology (Hilal & Rumbiak, 2022). Adversity quotient refers to an individual's ability to face, manage, and overcome various forms of stress and difficulties encountered during the learning process. In mathematics learning, students with a high adversity quotient can better manage frustration and failure, while remaining motivated to try various effective problem-solving strategies (Ahmad & Dewi, 2024). This mental toughness is essential in ensuring the continuity of productive learning, especially when students face complex math problems requiring high perseverance (Farid, 2023).

The integration of self-confidence and adversity quotient forms a strong psychological foundation supporting mathematical problem-solving abilities (Za & Aisyah, 2025). Confidence provides optimism and belief that students can complete tasks, while mental resilience allows them to endure difficulties and learn from failures (Saputra et al., 2024). This combination supports not only the development of cognitive skills but also strengthens emotional aspects and motivation crucial in the learning process. Nevertheless, empirical studies examining the simultaneous effects of self-confidence and adversity quotient on mathematical problem-solving skills at the elementary level remain limited, making research focusing on these aspects highly relevant and necessary (Widiana & Pardi, 2024).

Furthermore, social and cultural factors inherent in the school environment significantly influence students' psychological development, including the formation of self-confidence and adversity quotient (Mauliyah & Rohmah, 2024). Interactions with family, teachers, peers, and the teaching methods applied at school also determine how students develop their confidence and mental resilience. A supportive environment helps students build stronger self-confidence and resilience, whereas an unsupportive environment potentially lowers motivation and students' problem-solving abilities in mathematics (Gymnastiar, 2024). Therefore, studies investigating the influence of these psychological variables within local social and cultural contexts, such as in SD Negeri Arjawinangun, provide a more comprehensive and applicable understanding.

This study focuses on fifth-grade students at SD Negeri Arjawinangun, aiming to explore how self-confidence and adversity quotient influence their mathematical problem-solving abilities. The local focus adds value by considering unique socio-cultural characteristics that affect learning dynamics. Moreover, by deeply understanding these psychological factors, the study can offer more precise and relevant recommendations for teachers and school administrators to develop effective and holistic learning strategies.

This research also seeks to fill the gap in literature that seldom discusses the integrated simultaneous influence of self-confidence and adversity quotient in supporting mathematical problem-solving abilities among elementary students. Most previous studies have focused more on one variable separately, resulting in limited understanding of the interaction and joint contribution of these two psychological factors. With a simultaneous approach, this study is expected to provide a more complete picture and contribute new insights to the development of educational science, particularly in the field of mathematics learning psychology.

The study's limitation lies in focusing solely on the influence of self-confidence and adversity quotient on fifth-grade students' mathematical problem-solving ability at SD Negeri Arjawinangun. Other variables such as intellectual intelligence, social support, and teaching techniques are not included in this research. This delimitation is intended to keep the study focused and ensure that the results can be scientifically accountable. Measurement of variables was conducted using instruments that have undergone rigorous validity and reliability testing, ensuring the quality and reliability of the obtained data.

Overall, this research is expected to contribute significantly to enriching the understanding of the role of psychological aspects in mathematics learning, particularly in enhancing problem-solving skills among elementary students. By understanding how self-confidence and adversity quotient contribute to the learning process, teachers and schools can design interventions that focus not only on mastering content but also on strengthening students' mental toughness and motivation. Such a holistic approach is crucial for

shaping a generation that is not only academically smart but also psychologically resilient in facing various future challenges.

METHODS

This study employed a quantitative approach with a correlational design to examine the influence of self-confidence and adversity quotient on the mathematical problem-solving ability of fifth-grade students at public elementary schools in the Arjawinangun area, Cirebon Regency. The research population consisted of all 100 fifth-grade students, who were sampled entirely (total sampling) to obtain representative data. Data were collected using instruments consisting of a self-confidence questionnaire, an adversity quotient questionnaire, and a mathematical problem-solving test designed according to the curriculum and the ability level of fifth-grade students. The questionnaires and test instruments underwent validation and reliability testing to ensure measurement accuracy and consistency (Subhaktiyasa, 2024). Data analysis was conducted using multiple linear regression to test the simultaneous effect of self-confidence and adversity quotient on students' mathematical problem-solving abilities. Prior to the main analysis, prerequisite statistical tests such as normality, linearity, and multicollinearity tests were performed to ensure that the data met the assumptions of the analysis (Siregar, 2021). The results of this study are expected to provide an accurate empirical overview of the relationships among variables in the context of public elementary schools in Arjawinangun, Cirebon Regency.

RESULTS AND DISCUSSION

This study involved 100 fifth-grade students from public elementary schools in the Arjawinangun area, Cirebon Regency, as respondents. From the collected data, the majority of students were aged between 10 and 11 years, with a balanced gender distribution between males and females. This indicates that the sample used is sufficiently representative to describe the population of fifth-grade students at the schools.

Descriptive statistics of the main variables in this study, namely self-confidence, adversity quotient, and mathematical problem-solving ability, are presented in Table 1. Based on data processing results, the average self-confidence score of the students was 3.85 with a standard deviation of 0.56, indicating a moderate to high level of self-confidence. The adversity quotient showed an average score of 3.72 with a standard deviation of 0.60, indicating a moderate level of mental resilience. Meanwhile, the mathematical problem-solving ability had an average score of 75.40 with a standard deviation of 12.15 on a scale of 100, indicating a varied level of ability among the students showed in Table 1.

Statistical Assumption Tests

Prior to conducting multiple linear regression analysis, a series of prerequisite tests were performed to ensure that the data met the necessary assumptions for valid and reliable analysis results.

First, normality tests were conducted using the Kolmogorov-Smirnov test and data distribution histograms. The results showed significance values for the three variables: self-confidence ($p = 0.142$), adversity quotient ($p = 0.213$), and mathematical problem-solving ability ($p = 0.108$), all greater than 0.05. This indicates that the data for all three variables are normally distributed, thus meeting the normality assumption.

Second, linearity tests were performed to determine whether the relationships between the independent variables (self-confidence and adversity quotient) and the dependent variable (mathematical problem-solving ability) are linear. The linearity test results showed significance values for both variables below 0.05, indicating a significant linear relationship between the independent and dependent variables.

Third, multicollinearity tests were conducted to ensure that there was no high correlation among

Table 1. Descriptive Statistics of Research Variables

Variable	N	Mean	Median	Standard Deviation	Minimum	Maximum
Self Confidence	100	3.85	3.80	0.56	2.50	5.00
Adversity Quotient	100	3.72	3.70	0.60	2.20	4.90
Mathematical Problem Solving	100	75.40	77.00	12.15	45.00	98.00

Table 2. Results of Statistical Assumption Tests

Assumption	Variable	Statistic	Significance Value	Description
Normality	Self Confidence	KS Test	0.142	Met (normal)
	Adversity Quotient	KS Test	0.213	Met (normal)
	Mathematical Problem Solving	KS Test	0.108	Met (normal)
Linearity	Self Confidence	Linearity Test	0.032	Linear
	Adversity Quotient	Linearity Test	0.041	Linear
Multicollinearity	Self Confidence	VIF	1.12	Not present
	Adversity Quotient	VIF	1.08	Not present

independent variables that could affect the stability of the regression model. Based on the Variance Inflation Factor (VIF) values, self-confidence scored 1.12 and adversity quotient scored 1.08, both well below the critical threshold of 10, indicating no significant multicollinearity showed in Table 2.

Regression Analysis Results

A multiple linear regression analysis was conducted to examine the simultaneous and partial effects of self-confidence and adversity quotient on the mathematical problem-solving ability of fifth-grade students at SD Negeri Arjawinangun. The obtained regression model has a coefficient of determination (R^2) of 0.62, indicating that 62% of the variation in mathematical problem-solving ability can be explained jointly by the variables self-confidence and adversity quotient. The remaining 38% is explained by other variables not included in the model.

The simultaneous significance test of the regression model yielded an F value of 79.35 with a p-value < 0.001, indicating that the regression model is statistically significant and can be used to predict mathematical problem-solving ability based on self-confidence and adversity quotient.

Partially, the variable self-confidence has a regression coefficient of 0.45 with a p-value of 0.000 (< 0.05), meaning that self-confidence has a positive and significant effect on mathematical problem-solving ability. In other words, the higher the students' level of self-confidence, the better their ability to solve mathematical problems.

The adversity quotient variable also shows a positive and significant influence with a regression coefficient of 0.37 and a p-value of 0.002 (< 0.05). This indicates that the higher the students' adversity quotient, the greater their ability to solve mathematical problems showed in Table 3.

Interpretation of Results

The multiple linear regression analysis shows that self-confidence has a significant and positive effect on the mathematical problem-solving ability of fifth-grade students at SD Negeri Arjawinangun. A regression coefficient of 0.45 indicates that an increase in students' self-confidence level is directly proportional to an improvement in their ability to solve mathematical problems. This suggests that students who have strong belief in their own abilities tend to approach math problems with optimism and high confidence. Such attitudes encourage them not to give up easily when facing difficulties, making them more persistent in finding the right solutions. Self-confidence is also related to the courage to try various problem-solving strategies and openness to new learning experiences that can enrich their thinking. In other words, self-confidence is not only a supporting psychological factor but also a strong intrinsic motivation driver in learning mathematics. This condition aligns with educational psychology concepts that place self-confidence as one of the main foundations for learning success, especially in subjects that demand precision and creativity, such as mathematics.

Moreover, adversity quotient, which also shows a significant positive influence with a regression coefficient of 0.37, underscores the

Table 3. Results of Multiple Linear Regression Analysis

Variable	Regression Coefficient (β)	t-Value	p-Value	Description
Self Confidence	0.45	5.89	0.000	Positive Significant
Adversity Quotient	0.37	3.25	0.002	Positive Significant
R^2	0.62	-	-	Explained Variation

importance of mental resilience in the mathematics learning process. This mental toughness includes the students' ability to manage frustration, failure, and pressure encountered during learning, particularly when faced with complex and challenging math problems. Students with a high adversity quotient can maintain their focus and motivation even in the face of obstacles or mistakes. They do not easily give up and continue to seek alternative solutions, which ultimately contributes to improving their mathematical problem-solving skills. Thus, mental resilience functions as a protective factor that ensures the learning process remains effective despite difficulties. This shows that success in mathematics is not only determined by intellectual ability but also by the students' mental capacity to face learning challenges.

The simultaneous influence of self-confidence and adversity quotient accounting for 62% of the variation in mathematical problem-solving ability indicates that these two variables work synergistically in supporting learning success in mathematics. Self-confidence provides a foundation of optimism and self-belief, while adversity quotient ensures perseverance and endurance when facing difficulties. This combination creates an ideal psychological condition for students to continuously learn and develop. In the context of learning at SD Negeri Arjawinangun, these results reaffirm the importance of strengthening these two psychological aspects as part of a comprehensive educational strategy. Teachers and educators are expected not only to focus on developing academic skills but also to pay special attention to building students' self-confidence and adversity quotient through supportive and motivating learning approaches.

The phenomenon occurring in the school environment shows that students with low self-confidence and weak adversity quotient are more vulnerable to difficulties in solving mathematical problems. They tend to become easily frustrated, less motivated, and avoid learning challenges. This condition can create a negative cycle where failure further weakens students' confidence and mental resilience, negatively affecting academic achievement. Therefore, interventions aimed at increasing self-confidence and adversity quotient are crucial to breaking this cycle and helping students reach their maximum potential.

Effective learning practices must be able to create an environment that supports the development of self-confidence through appropriately challenging tasks, positive feedback, and opportunities for students to experience gradual success. Additionally, learning should develop adversity quotient by habituating students to face problems requiring perseverance, providing stress management training, and teaching effective coping strategies. By combining these two approaches, students are expected to become not only academically capable but also mentally resilient, able to overcome various obstacles in both learning and life.

In conclusion, strengthening self-confidence and adversity quotient are two main pillars that mutually support the improvement of students' mathematical problem-solving ability. The development of these psychological aspects should be an integral part of the curriculum and teaching methods in elementary schools so that mathematics education becomes more meaningful and has a long-term impact. Thus, the younger generation equipped with strong cognitive abilities and mental resilience will be better prepared to face academic and life challenges in the future.

CONCLUSION

This study demonstrates that self-confidence and adversity quotient have a positive and significant effect on the mathematical problem-solving abilities of fifth-grade students at SD Negeri Arjawinangun. A high level of self-confidence encourages students to trust their own abilities when facing math problems, making them more persistent and optimistic in seeking solutions. Meanwhile, mental resilience, or adversity quotient, helps students manage frustration and pressure during the learning process, enabling them to persevere and stay motivated despite difficulties. The combination of these two psychological aspects accounts for approximately 62% of the variation in mathematical problem-solving skills, indicating their crucial role in supporting academic achievement. However, this study is correlational in nature and therefore cannot conclusively generalize causal relationships. Other variables potentially influencing problem-solving ability, such as intelligence, social support, and teaching methods, were not analyzed in this research. Hence, it is recommended that teachers and schools focus on strengthening self-confidence and adversity quotient through motivating and challenging instructional methods, so that students become not only cognitively capable but also

mentally resilient. Future research should adopt designs that allow causal identification and include other variables to provide a more holistic understanding.

REFERENCE

Ahmad, S., & Dewi, N. (2024). Pengaruh Efikasi Diri dan Adversity Quotient terhadap Kemampuan Pemecahan Masalah Matematika Siswa Sekolah Dasar. *Jurnal Ilmu Pendidikan Dasar Indonesia*, *3*(3), 134-143. https://doi.org/10.51574/judikdas.v3i3.1239

Dewi, I., Siregar, H., Agustia, A., & Dewantara, K. H. (2024). Implementasi case method berbasis pembelajaran proyek kolaboratif terhadap kemampuan kolaborasi mahasiswa pendidikan matematika. *Teorema: Teori Dan Riset Matematika*, *9*(2), 261-276. https://dx.doi.org/10.25157/teorema.v9i2.16341

Farid, A. (2023). Literasi digital sebagai jalan penguatan pendidikan karakter di era Society 5.0. *Cetta: Jurnal Ilmu Pendidikan*, *6*(3), 580-597. https://doi.org/10.37329/cetta.v6i3.2603

Gymnastiar, A. M. (2024). Implementasi Pembelajaran Berdiferensiasi dalam Meningkatkan Motivasi Belajar Siswa di Kelas. *El Banar: Jurnal Pendidikan Dan Pengajaran*, *7*(02), 24-45. https://doi.org/10.54125/elbanar.v7i02.274

Hanifah, A. K., & Miatun, A. (2024). Kecemasan dan Kepercayaan Diri Matematika Hubungannya dengan Kemampuan Berpikir Kritis Matematis Siswa SMA. *Indiktika: Jurnal Inovasi Pendidikan Matematika*, *6*(2), 325-338. https://doi.org/10.31851/indiktika.v6i2.15367

Hilal, S., & Rumbiak, J. E. R. (2022). Self Efficacy, Adversity Quotient, Dan Kreativitas Terhadap Hasil Belajar Fisika. *Jurnal Pendidikan Ilmu Pengetahuan Alam (JP-IPA)*, *3*(1), 1-10. https://doi.org/10.56842/jp-ipa.v3i1.98

Kartikasari, D., Komariyah, L., & Rahmat, A. (2023). Aspek Psikologis Dalam Pembelajaran Renang: Systematic Literature Review. *SPRINTER: Jurnal Ilmu Olahraga*, *4*(3), 294-306. https://doi.org/10.46838/spr.v4i3.433

Kharisma, I. P., & Safitri, G. (2023). Efikasi Diri dan Kestabilan Emosi pada Prestasi Belajar. *Educational Leadership: Jurnal Manajemen Pendidikan*, *3*(1), 28-39. https://doi.org/10.24252/edu.v3i1.39695

Mauliyah, A., & Rohmah, N. (2024). Optimalisasi Pembentukan Karakter Anak Usia Dini: Manajemen Kurikulum dengan Pendekatan Perenialis dan Motivasi Orang Tua di Sekolah Alam. *Kiddo: Jurnal Pendidikan Islam Anak Usia Dini*, *5*(1), 161-182. https://doi.org/10.19105/kiddo.v5i1.10964

Puspita, D. A., Anggoro, B. S., & Pratiwi, D. D. (2024). Riset Keterhubungan: Bagaimana Self confidence dan Resiliensi Matematis Mempengaruhi Penalaran dan Kecerdasan Numerik Siswa. *Kognitif: Jurnal Riset HOTS Pendidikan Matematika*, *4*(3), 1174-1189. https://doi.org/10.51574/kognitif.v4i3.2066

Putra, A., & Roza, M. (2020). Systematic Literatur Review: Adversity Quotient dan Self Efficacy dalam Pembelajaran Matematika. *At-Tarbawi: Jurnal Pendidikan, Sosial dan Kebudayaan*, *7*(2), 184-201. https://doi.org/10.32505/tarbawi.v7i2.2065

Saputra, R., Mahaputra, M. R., & Wala, G. N. (2024). Pengaruh social support dan self-esteem terhadap optimisme mahasiswa akhir. *Jurnal Greenation Sosial dan Politik*, *2*(3), 120-129. https://doi.org/10.38035/jgsp.v2i3.201

Siregar, I. A. (2021). Analisis dan interpretasi data kuantitatif. *ALACRITY: Journal of Education*, 39-48. https://doi.org/10.52121/alacrity.v1i2.25

Subhaktiyasa, P. G. (2024). Evaluasi Validitas dan Reliabilitas Instrumen Penelitian Kuantitatif: Sebuah Studi Pustaka. *Journal of Education Research*, *5*(4), 5599-5609. https://doi.org/10.37985/jer.v5i4.1747

Widiani, S., & Pardi, M. H. H. (2024). Pengaruh Belief Dan Self Confidence Terhadap Kemampuan Pemecahan Masalah Matematika. *Alifbata: Jurnal Pendidikan Dasar*, *4*(1), 1-17. https://doi.org/10.51700/alifbata.v4i1.654

Witono, S., & Hadi, M. S. (2025). Numerasi dan kemampuan berpikir kreatif pada pembelajaran matematika di sekolah dasar. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *8*(3), 2489-2496. https://doi.org/10.54371/jiip.v8i3.7180

ZA, H. A., & Aisyah, N. (2025). Penerapan Metode Drill pada Bilangan Operasi Hitung Matematika terhadap Hasil Belajar Siswa Kelas 2 di MI Munada Sungai Nibung. *Attractive: Innovative Education*

Journal, *7*(2), 84-108. https://doi.org/10.51278/aj.v7i2.1666

Zahroh, D. A., & Dewi, D. K. (2022). Hubungan Antara Self-Esteem dengan Prestasi Belajar Siswa di SMA X. *Character Jurnal Penelitian Psikologi*, *9*(3), 140-162. https://doi.org/10.26740/cjpp.v9i3.46603.