

THE CORRELATION BETWEEN SELF-EFFICACY AND STUDENTS' ACADEMIC ANXIETY DURING SCIENCE LEARNING PRESENTATIONS

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Abstract

This study aims to determine the level of self-efficacy and the level of academic anxiety among students regarding presentations in science subjects, as well as to analyze the correlation between the two variables. The research method employed was a quantitative correlational design with a sample size of 36 students. Data collection was conducted using psychological scale questionnaires. The results of the descriptive data analysis showed that the mean score for self-efficacy was 69.3 (SD = 12.8) and the mean score for academic anxiety was 51.3 (SD = 12.1). The Shapiro-Wilk prerequisite test indicated that both variables were normally distributed, with a value of $p = 0.866$ for variable X and $p = 0.268$ for variable Y. The results of the hypothesis testing using Pearson Product-Moment correlation showed a significance value of $p < 0.001$, which means there is a significant correlation between the variables. The correlation coefficient value of -0.625 indicates a strong negative correlation. This implies that the higher the level of self-efficacy possessed by the students, the lower their level of academic anxiety when delivering presentations in science learning

Keywords: Self-Efficacy, Academic Anxiety, Science Presentation, Junior High School Students.

1 INTRODUCTION

Education is one of the most vital cornerstones for a nation, functioning to shape character and comprehensively develop students' abilities, both as individuals and as members of society (Hayati et al, 2025). In the 21st-century era, science education is required to focus on equipping students with specific skills to enable them to face global challenges and solve real-life problems (Aprina et al., 2024). One of the essential core components highly needed in modern Integrated Science learning is scientific communication skills, particularly oral communication abilities (Pramono, 2019). In science learning, this scientific communication capacity is developed through presentation techniques, which are defined as activities of delivering information, ideas, reasoning, concepts, and observation results systematically and logically in front of an audience (Diana et al, 2017). Oral communication skills through presentations become critical because the hallmark of science learning is not merely memorizing concepts and formulas, but also involving practical activities and problem-solving that demand active student engagement (Rahmawati et al, 2021). Therefore, oral presentation performance serves as a crucial indicator of students' success in conveying scientific ideas.

In reality, however, science presentation activities in schools frequently become the primary trigger for the emergence of academic anxiety among students. Based on empirical and theoretical literature reviews, anxiety is an internal negative feeling characterized by worries about making mistakes and a sense of inadequacy, which is further exacerbated by the initial assumption that the obtained results will be poor (Binoardi, 2022). The issue of academic anxiety during presentations is urgent because it visibly hinders students' active participation and engagement, especially in science subjects whose learning materials are often considered challenging, extensive, filled with formula calculations, and demanding critical thinking skills (Gea et al, 2023). Similar problems in various settings are generally resolved through affective approaches, one of which is by examining the aspect of self-efficacy or students' self-belief in their ability to perform academic tasks (Zahidah et al, 2020). This research is paramount because anxiety left without empirical interventions will paralyze students' scientific communication skills. This phenomenon occurs due to low student self-confidence regarding their own capability to manage presentation situations, whereas the problem can actually be reduced if internal psychological factors such as self-efficacy are identified and managed measurably.

Although several previous studies have examined the relationship between psychological aspects and student performance, a fundamental research gap still remains. Prior research by (Dewi et al, 2022) indicates a general relationship between the level of self-efficacy and academic anxiety, where low self-efficacy correlates with high communication anxiety. In line with this, a study by (Ester et al., 2023) found a significant detrimental link between self-belief and students' presentation anxiety levels. Nevertheless, the results of those studies have not comprehensively or explicitly explained how the dynamics of self-efficacy affect students' academic anxiety specifically within oral presentation activities in science subjects. The novelty of this research lies in its focus on the subjects and the learning context. This study specifically examines 7th-grade Junior High School (SMP) students, who, in terms of psychological development, are in the early adolescence phase—a crucial stage where they are still in the process of developing self-confidence and managing emotions (Semilarski et al, 2021). What remains empirically unknown is how the interaction of these two variables operates when students are required to verbally convey science observation data at the lower secondary education level.

The main purpose of this study is to discover and analyze in depth the relationship between self-efficacy and students' academic anxiety levels regarding presentation activities in science learning. Furthermore, this study aims to empirically test the existence of a relationship between self-efficacy and students' academic anxiety levels within those presentation activities. To achieve these goals with clear focus, the scope and limitations of this study are restricted to the self-efficacy variable, defined as the level of student self-confidence in performing scientific presentations, and the academic anxiety variable, which focuses on emotional responses in the form of nervousness and fear of making mistakes when speaking in front of the class. The subjects in this study are limited to 7th-grade students in the 2nd semester at Junior High School (SMP) for the 2025/2026 Academic Year. With this well-defined scope, the presentation assignment indicators in the science curriculum can be measured precisely. The comprehensive overview of this entire background serves as a theoretical foundation for the authors to formulate the research hypothesis regarding the existence of a significant negative relationship between the level of self-efficacy and students' academic anxiety.

2 METHODOLOGY

This study employs a quantitative approach with a correlational method to investigate the relationship between self-efficacy (independent variable) and students' academic anxiety (dependent variable) within presentation activities in the Integrated Science (IPA) subject. The research design applied is a cross-sectional survey, in which the data for both self-efficacy and academic anxiety are collected simultaneously at a single point in time to analyze the degree and direction of the relationship between the two variables. The quantitative correlational method was selected because it efficiently provides an objective and measurable mathematical visualization regarding the strength of the relationship between variables based on the analysis of the correlation coefficient value. The workflow of this analysis is reflected in the operational characteristics of the variables, which are designed to measure the types of students' abilities in science presentation activities.

Population and Sample

The target population in this study encompasses all seventh-grade students at SMP Negeri 1 Larangan during the even semester of the 2025/2026 Academic Year, with a grand total of 286 students distributed evenly across 8 parallel classes (Classes VII-A to VII-H). The general characteristic of the population is that they are in the early adolescence developmental phase, psychologically undergoing a transition period, which causes their self-confidence levels and emotional management when speaking in front of the class to experience dynamic fluctuations. Given the homogeneity of the class characteristics, marked by a student count ranging from 35 to 36 children per class, the sampling technique employed is simple random sampling. This technique provides an equal opportunity for every class unit within the population to be selected as a sample member without any subjective bias from the researcher. Through this random lottery procedure, one intact class consisting of 36 students (N=36) was selected to serve as a representative sample for the research data collection. This sample size is deemed adequate for parametric correlation analysis because all subjects share an equivalent background in Integrated Science learning experiences and oral presentation activities at the school.

Data Collection Instruments and Procedures

Primary data collection in this study relies on two main instruments: a structured closed-ended questionnaire and an unstructured observation sheet. The questionnaire instrument is designed using

a five-point Likert scale to measure the level of self-efficacy with 20 statement items and the level of students' academic anxiety during science presentations with 20 statement items. Prior to its application for actual data collection, the feasibility of both questionnaires was pre-tested to guarantee their psychometric aspects. Construct validity was analyzed using the Pearson Product-Moment correlation formula to assess the correlation between item scores and the total score, while content validity was evaluated through expert judgment. The internal consistency reliability of the instrument was tested using the Cronbach's Alpha formula with a minimum reliability criterion of 0.60 for the instrument to be declared feasible for use. The research procedure initiated with the preparation stage, consisting of obtaining research clearance and conducting preliminary observations during the Introduction to School Environment (PLP) activity to identify students' scientific communication barriers. Subsequently, during the implementation stage, the questionnaires were distributed directly to the 36 sample students immediately after they completed their group presentation tasks in 7th-grade Integrated Science learning. The obtained data were then systematically tabulated for further analysis in the final stage.

Data Analysis Methods

Data analysis commences with descriptive statistics to determine the mean, median, minimum-maximum values, and standard deviation (Sutisna, 2020). Once the data distribution is proven to be normally distributed through the Shapiro-Wilk prerequisite test ($p > 0,05$), hypothesis testing is performed using the Pearson Product-Moment parametric correlation analysis (Rahmatia Putri et al, 2025). The strength of the relationship between the two variables is interpreted based on the criteria by (Sugiyono, 20218) to determine whether the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted

3 RESULTS

3.1 RESPONDEN CHARACTERISTICS

A total of 35 seventh-grade students from SMP Negeri 1 Larangan participated in this study. All respondents were enrolled in Science classes. The purpose of this study was to examine the relationship between students' self-efficacy and academic anxiety during presentation activities in science learning. The respondents' characteristics were categorized according to class and gender.

Table 1. Respondent Characteristics

No.	Kelas	Jumlah	Presentase
1	VII A	35	100%
Total		35	100%

3.1.1 INSTRUMENT TESTING

Before conducting hypothesis testing, the research instruments were tested for validity and reliability to ensure that the questionnaire accurately measured students' self-efficacy and academic anxiety. The validity test results showed that all questionnaire items had corrected item-total correlation coefficients greater than the critical value ($r\text{-table} = 0.361$). Therefore, all items measuring self-efficacy and academic anxiety were declared valid and suitable for data collection.

Table 2. Validity Test Results

Variabel	Number of item	Valid Item	Conclusion
Self-Efficacy	20	20	Valid
Academic Anxiety	20	16	Valid

The reliability analysis also demonstrated that both variables had Cronbach's Alpha values greater than 0.70, indicating that the research instruments possessed satisfactory internal consistency and were reliable for use in this study.

Table 3. Reliability Test Results

Variabel	Cronbach's Alpha	Interpretation
Self-Efficacy	0.907	Reliable
Academic Anxiety	0.848	Reliable

3.1.2 NORMALITY TEST

Prior to hypothesis testing, the normality of the data was examined using the Shapiro–Wilk test.

Table 4. Reliability Test Results

Descriptives		
	Variable X	Variable Y
N	36	36
Shapiro-Wilk W	0.984	0.963
Shapiro-Wilk p	.866	.268

The results indicated that both variables had significance values greater than 0.05, suggesting that the data were normally distributed. Therefore, the Pearson Product-Moment correlation analysis could be applied.

3.1.3 PEARSON PRODUCT-MOMENT CORRELATION ANALYSIS

Table 5. Pearson Product-Moment Correlation Results

Variabel		Variable X	Variable Y
Self-Efficacy	Pearson's <i>r</i>	-	-0.625
	<i>p</i> -value	-	<.001
Academic Anxiety	Pearson's <i>r</i>	-0.625	-
	<i>p</i> -value	<.001	-

The Pearson Product-Moment correlation analysis produced a correlation coefficient of $r = -0.625$ with a significance value of $p < 0.001$. Since the significance value was lower than 0.05, H_0 was rejected and H_1 was accepted. Therefore, there was a statistically significant relationship between students' self-efficacy and academic anxiety during presentation activities in science learning. The negative value of the correlation coefficient indicates an inverse relationship between the two variables. This finding suggests that students with higher self-efficacy tend to experience lower levels of academic anxiety during presentations, whereas students with lower self-efficacy are more likely to experience higher levels of academic anxiety. Furthermore, the correlation coefficient of -0.625 falls within the interval of 0.60–0.799, indicating a strong correlation.

Based on hypothesis testing using Pearson Product Moment correlation analysis assisted by Jamovi software, a significant and strong negative relationship was found between self-efficacy and the level of academic anxiety among seventh-grade students at SMP Negeri 1 Larangan. The statistical analysis produced a correlation coefficient of $r = -0.625$ with a significance level of $p < 0.001$. The significance

value, which is far below the threshold ($0.001 < 0.05$), provides an absolute statistical decision to reject H_0 and accept H_1 . Rationally, the negative sign on the correlation coefficient indicates an inverse direction of relationship. This means that an increase in students' self-efficacy will be followed by a decrease in their level of academic anxiety in a linear and consistent manner. Conversely, students who harbor low self-belief will be more prone to experiencing an intense increase in academic anxiety during presentations. The coefficient of -0.625 , which falls within the interval of 0.60 to 0.799 , confirms that self-efficacy is a strong internal predictor in explaining the variation in the rise and fall of students' presentation anxiety in science subjects.

Theoretically, the strength of this relationship is supported by the conceptual framework of cognitive regulation proposed by (Mohamed et al., 2025). Self-efficacy functions as the primary cognitive filter that determines how individuals interpret challenging situations. Students with high self-efficacy will conceptualize science presentation tasks as a controllable challenge, rather than as a threat that damages self-esteem. This positive cognitive appraisal suppresses the activation of the sympathetic nervous system responsible for anxiety symptoms such as a racing heart or cold sweat. This strong negative correlation finding is consistent with research by (Mustafa, 2023), which demonstrated the crucial role of self-belief in reducing speaking anxiety. Although similar research on medical students in Sudan showed a relatively weaker negative correlation due to differing demographic characteristics (Mohamed et al., 2025) the results of this study nonetheless reinforce that, at the secondary school level, psychological interventions based on self-efficacy hold significant potential to substantially reduce academic anxiety (Yuni et al., 2025).

4 CONCLUSIONS

This study successfully proved the research hypothesis stating that there is a significant and strong negative relationship between self-efficacy and the level of academic anxiety among students in oral presentation activities in science subjects at SMP Negeri 1 Larangan. This finding addresses the research objective by confirming that the level of self-belief or self-efficacy and the level of academic anxiety among students generally fall within the moderate category. The significance of this research finding indicates that the high or low level of students' self-confidence serves as a strong internal predictor in determining the intensity of emotional anxiety they experience when having to communicate scientific concepts in front of the class. The practical implication of this finding emphasizes the importance for educators to not only focus on the transfer of academic conceptual understanding, but also to actively integrate mental reinforcement strategies, such as providing a supportive and appreciative classroom climate, in order to minimize students' cognitive distress.

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