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Anxiety, psychology and learning motivation in elementary school science learning: A correlational study

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ABSTRACT

This study examines the relationship between anxiety, psychological factors and the motivation to learn science among elementary school students. The research employs a quantitative approach with a correlational design. Purposive sampling was used to select the sample which consisted of 438 elementary school students from Jakarta, Indonesia. Data were gathered through a questionnaire focused on the variables of interest. The data analysis was conducted using Structural Equation Modeling (SEM) with the SMART-PLS 3.0 software. The findings reveal a significant value of 0.000 ($p < 0.05$) indicating a positive and significant relationship between anxiety, psychological conditions, and students' motivation to learn science. Anxiety and psychological factors are critical elements influencing students' motivation to learn. Teachers can better monitor students' learning progress by identifying and addressing these three factors. Properly managed anxiety and favorable psychological conditions can lead to enhanced motivation and support from teachers in fostering a conducive environment. Understanding students' psychological needs plays a crucial role in helping students achieve better academic outcomes in science.

Contribution/Originality: This study shows that anxiety and psychological factors in elementary schools significantly and positively impact science learning motivation. Well-managed anxiety and adequate psychological support can improve students' motivation emphasizing the importance of a holistic approach to improving learning outcomes.

1. INTRODUCTION

The elementary school curriculum includes the teaching of natural science. The *Merdeka* curriculum applied in Indonesia incorporates integrated science learning (Kurdiati, 2023). The *Merdeka* curriculum incorporates integrative learning using a scientific methodology that involves the processes of observation, inquiry, experimentation, logical thinking, and communication (Leasa, Corebima, & Batlolona, 2020; Subali, Kumaidi, Aminah, & Sumintono, 2019). The goals of scientific education in elementary schools are categorized into three dimensions: outcome, methodology, and mindset. Regarding items, students are anticipated to possess the ability to comprehend scientific concepts and their correlation with daily existence (Bezci & Sungur, 2023). Regarding the

process, students must have the capacity to acquire knowledge, employ principles, and resolve issues encountered in daily existence. Students must demonstrate a curiosity towards examining objects in their surroundings (Atmojo, Ardiansyah, Saputri, & Adi, 2021).

Comprehending scientific concepts during the learning process necessitates the presence of learning motivation for students to grasp the content effectively. Motivation is the inclination that emerges because of internal or external stimulation, prompting an individual to improve their behavior or engage in specific activities to surpass their prior circumstances (Tsai, Ho, & Nisar, 2021). Learning motivation is a crucial element in the learning process as it catalyzes progress. Students who possess a strong inclination towards learning will readily embrace and comprehend the instructional content presented by the teacher. One can successfully attain their learning objectives by cultivating a solid drive to acquire knowledge (Budiastra, Wicaksono, & Sanjaya, 2020).

Motivation to learn science is an essential factor that influences the extent to which students can understand and master natural science material (Petruţa, 2015). This motivation includes internal and external drives that encourage students to be actively involved in the learning process, seek new knowledge, and overcome various academic challenges (Maryani, Fitriani, & Sulisworo, 2019). Students with high motivation to learn science tend to be more interested in the topics being taught, participate more in class activities, and are more persistent in completing assignments and scientific experiments. Students may find it challenging to follow lessons which can ultimately hinder the achievement of desired learning goals without adequate learning motivation (Fortus & Touitou, 2021; Frank, Honzík, Pěchoučková, & Šiková, 2020).

Natural sciences are a subject that has a crucial role in building students' comprehensive understanding of the universe and its environment. This understanding not only produces essential knowledge but also enriches students' abilities to explore the world around them (Taupik & Fitria, 2023). However, failure to understand science can cause students to feel anxious. Humans cannot avoid anxiety which is one manifestation of psychological pressure. Anxiety is one of the characteristic features of various psychological disorders (Yang, Gu, & Hong, 2021). Primary anxiety can appear in children when they feel helpless in dealing with specific situations. Emotional intelligence and a sense of security provided by parents or trusted figures can reduce children's anxiety (Fernández-Batanero, Román-Graván, Reyes-Rebollo, & Montenegro-Rueda, 2021; Zulkiflee & Nimehchisalem, 2022).

Joint disorders such as generalized anxiety disorder often cause persistent states of distress and difficulty (Gabriel, Buckley, & Barthakur, 2020). This disorder can sometimes also cause serious medical problems such as fatigue, difficulty breathing, insomnia, increased sweating, and feelings of nervousness as well as other physical symptoms such as chest pain, dizziness and cold sweats (Fawaz & Samaha, 2021). The anxiety that often arises in elementary school students when studying natural sciences is often caused by difficulty with abstraction in the subject matter. Science concepts often involve understanding complex and abstract natural phenomena such as chemical processes, ecosystem interactions and fundamental physical concepts (Hopcan, Türkmen, & Polat, 2024). This high level of abstraction can make students find it challenging to connect these concepts with their actual experiences, giving rise to anxiety and a sense of lack of confidence in understanding the subject matter.

The anxiety experienced by elementary school students during the science learning process significantly impacts their psychological well-being leading to reduced concentration, motivation, and confidence in engaging with the subject matter (Hilliard, Kear, Donelan, & Heaney, 2020). Students' psychology is critical to regulate their emotional responses to academic challenges. When students feel anxious or unconfident, they tend to find it difficult to focus on the lesson which can hinder their ability to understand and master the science concepts being taught (Tasan, Mede, & Sadeghi, 2021). Thus, emotional management and confidence building are crucial in supporting students' academic achievement in science learning.

Lee et al. (2023) underlined the importance of understanding the relationship between anxiety and students' learning motivation in science subjects. According to research conducted by Lee et al. (2023) students' psychological conditions are crucial in influencing how much they can maintain motivation during the science

learning process. Meanwhile, Bedel, Ercan, and Şahan (2020) added that students' psychological conditions have a significant impact on learning motivation especially in the context of science teaching in elementary schools. Furthermore, Alamer and Almulhim (2021) confirmed that anxiety not only impacts students' psychological conditions but also has the potential to drive their learning motivation. Enhancing psychological well-being and managing anxiety effectively may be essential to motivating students to overcome obstacles in the classroom (Li, Cho, Cosso, & Maeda, 2021; Van Rooij & Baggio, 2021).

This study opens opportunities to deepen understanding of the interactions between anxiety, psychological conditions, and science learning motivation in elementary education. Exploring the complex interactions between these factors can provide valuable insights into creating a more supportive and stable learning environment for elementary school students, enabling them to achieve academic success more effectively. This study aims to explore the complex relationship between anxiety, psychological state and motivation to learn science in primary school students. This research aims to identify effective strategies to improve the quality of science learning by understanding how these factors interact with each other. In addition, this research also aims to help students overcome problems related to their anxiety and psychological state which could potentially affect their overall learning motivation.

The purpose of this study is to investigate the intricate relationship between anxiety, psychological disorders, and primary school students' enthusiasm for learning science. This study aims to understand how these factors interact to identify effective strategies for improving the quality of science education. The study's hypotheses are as follows: (1) Anxiety has a positive and significant correlation with learning motivation suggesting that controlled anxiety levels can enhance learning motivation. (2) Anxiety has a positive and significant relationship with psychological conditions suggesting that higher anxiety may affect students' mental states. (3) Psychological conditions have a positive and significant relationship with learning motivation suggesting that good psychological support can enhance student motivation. (4) Anxiety and psychological conditions interact directly or jointly to affect learning motivation suggesting that combined these two factors can have a more significant impact on students' learning motivation. It is anticipated that this study will offer insightful advice on creating the best learning settings that foster students' intellectual and emotional growth.

2. LITERATURE REVIEW

2.1. Science Learning in Elementary Schools

The main objective of science education in elementary schools is to foster students' fundamental understanding of scientific principles and the workings of the natural world (Deltania & Rosyid, 2023). The learning method is deliberately designed to incite children's inherent curiosity and inspire them to actively participate in exploring their environment. The learning design process encompasses various activities such as engaging in direct observation, doing small-scale experiments and actively participating in class discussions (Pramudiyanti et al., 2023). Engaging in these activities is essential for nurturing the growth of students' critical observational and analytical abilities. Science education in primary schools has a dual impact: it not only improves academic achievement but also has a significant influence on children's psychological well-being (Graham, Kiuhara, & MacKay, 2020; Russell & Martin, 2023). Increasing student involvement and motivation in the learning process can reduce anxiety and provide a more enjoyable and productive educational experience (Acesta, Sumantri, & Fahrurrozi, 2020).

2.2. Anxiety

Anxiety is an emotional reaction marked by both emotions of tension and worry and physical changes including a higher heart rate and sweating. Fear, an immediate response to a perceived threat, is not the same as anxiety (Downing, Cooper, Cala, Gin, & Brownell, 2020; Li, Li, Wu, & Zhen, 2022). Students suffer learning

anxiety which is defined as worry, tension, or anxiety faced with a task or situation related to their education. This emotion is not limited to dread about academic outcomes; it may also include concerns about the learning process, such as the difficulty of absorbing new information, participating in class discussions or taking tests (Hasina, Noventi, Livana, & Hartono, 2021; Wang & Wang, 2022). Learning anxiety can have a wide range of effects on students' performance, including a decrease in their ability to think critically, concentrate and retain material (Van Tongeren, Raad, McIntosh, & Pae, 2013).

2.3. Psychological

The psychological aspect includes all elements related to the human mind and behavior including cognitive processes, emotions and the dynamics of social interactions (Fokkema, Iliescu, Greiff, & Ziegler, 2022; Rosen, 2022). This term generally refers to internal phenomena that influence individual actions. Psychology in learning science in elementary schools has a vital role in influencing how students receive, process and apply scientific knowledge (Siddiqui, Soomro, & Thomas, 2020). Teachers can design more personalized and effective learning strategies, thereby significantly increasing the effectiveness of learning and student learning outcomes in science subjects by identifying and supporting these psychological conditions (Lyon, Brewer, & Areán, 2020; Savitri, 2019).

2.4. Learning Motivation

Learning motivation is an important component that influences students' academic progress. Motivation can come from within the students such as a desire to understand the universe or a resolve to achieve personal goals, or it can come from outside sources such as praise from teachers, parents or positive outcomes (Bryan, Glynn, & Kittleson, 2011; Lim & Yeo, 2021). Strong motivation keeps students engaged and enthusiastic during the learning process especially when faced with hurdles or complex subject matter (Puspitarini & Hanif, 2019; Suwarni, Lubna, Aimang, Cakranegara, & Pratama, 2023). Motivation has an impact on elementary school science learning because this topic typically incorporates complex concepts and natural occurrences that are difficult to observe or comprehend (Nasir, Arifin, & Damopolii, 2023).

Teachers who can cultivate intrinsic motivation in their students have the power to transform the notion of learning from a mere obligation to a thrilling and engaging journey (Fadli et al., 2022; Solichin, Muchlis, & Ferdiant, 2021). To accomplish this, individuals can employ a range of approaches, including hands-on experiments, collaborative assignments, or on-site investigations (Hidayati, Boleng, & Candra, 2020; Rachmavita, 2020). These strategies not only enhance student involvement but also enhance their comprehension of the subject matter, resulting in a more dynamic and memorable learning experience.

3. METHOD

3.1. Research Design

This research employs a quantitative method with a correlational design to investigate variables that can predict outcomes using a structural equation model (SEM) (Balnaves & Caputi, 2018; Memon et al., 2021). In this approach, psychological circumstances are viewed as mediators explaining the relationship between external variables (anxiety) and endogenous variables (learning motivation). Students' psychology serves as an intermediary that helps in understanding how anxiety affects their level of learning motivation. This study aims to identify and measure the direct and indirect effects of anxiety on learning motivation as well as strengthen the understanding of the complex interactions between psychological factors in the context of science learning in elementary school students using SEM.

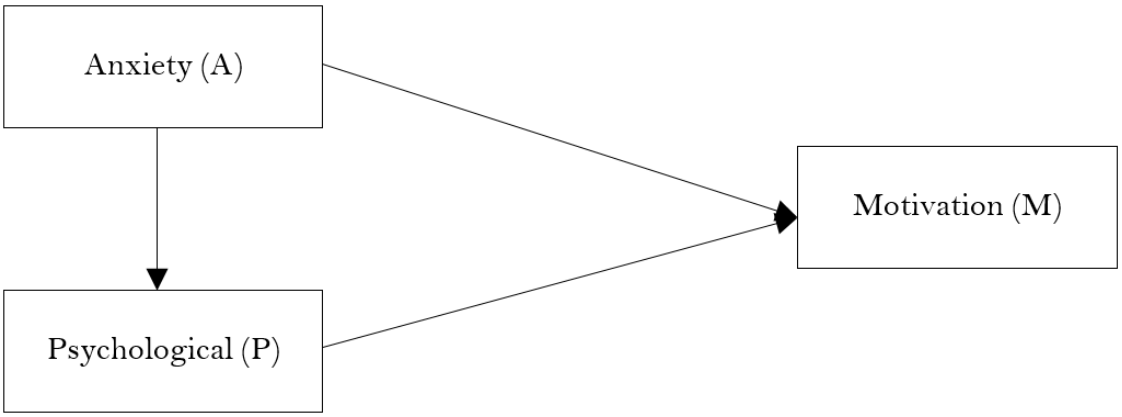

Figure 1. Research model framework.

Figure 1 shows the relationship model between anxiety, psychology, and motivation in the context of science learning in elementary schools. Anxiety directly influences psychological variables which in turn affect student motivation. In addition, anxiety also has a direct path that affects motivation independently of psychological factors.

3.2. Population and Sample Determination

The majority of the study's participants were elementary school students from Jakarta, Indonesia. The sample size was 438 students chosen by a survey approach using purposive sampling techniques. The individual characteristics of the respondents were chosen in accordance with the study's goals to provide comprehensive replies to the specified research topics. Data collection was carried out using questionnaires distributed to respondents representatively. The population and sample of elementary school students in grades 4-6 were chosen as research subjects because of the importance of understanding and monitoring students' anxiety and psychological conditions in the context of science learning which can directly affect their learning motivation. Further details regarding the samples used can be seen in Table 1.

Table 1. Total students participating.

School names	Gender		N
	Male	Female	
SDN WK 02 Pg	38	58	96
SDN TDS 01 Pg	41	51	92
SDN JP 05 Pg	39	47	86
SDN TM 03 Pg	33	59	92
SDN DK 16 Pg	26	46	72
Total	177	261	438

***Note:** SDN (State elementary school), SDN WK 02 Pg (Wijaya Kusuma 02 Pagi), SDN TDS 01 Pg (Tanjung Duren Selatan 01 Pagi), SDN JP 05 Pg (Jatipulo 05 Pagi), SDN TM 03 Pg (Tamansari 03 Pagi), and SDN DK 16 Pg (Duri Kepa 16 Pagi).

3.3. Instruments and Data Collection Tools

The data in this research was collected through instruments and indicators related to anxiety (A), psychological (P), and motivation (M) in learning science in elementary school students. Data collection used an instrument in the form of a five-point Likert scale questionnaire adopted from previous research. The process of developing this questionnaire was based on prior research that consisted of three separate questionnaires, namely the anxiety (A) (Li, Zhang, Duan, & Yu, 2024) psychological (P) (Bernacki, Crompton, & Greene, 2020) and learning motivation (M) (Syofyan & Ratih, 2022) questionnaires. Indicators of anxiety are worry, discomfort, restlessness and difficulty concentrating. Psychological indicators are intelligence, emotions, social, personality and morals. The indicators of motivation to learn science include the desire for success, the drive and need for learning,

hopes and aspirations for the future, appreciation for learning, engaging activities during lessons, and a supportive learning environment.

The instrument consists of 20 statement questions that elementary school children easily understand in grades 4, 5, and 6. Each statement uses language and information adapted to the level of understanding and age of children in grades 4, 5, and 6 so that they can answer the questions correctly. Instruments are designed to produce data that genuinely reflect the conditions, abilities, or perceptions of the research target children without distortion or misinterpretation. The validity of this instrument is based on Piaget's theory which shows that the cognitive abilities of children in grades 4, 5, and 6 have developed well and sufficient reasoning abilities to understand the information presented in this instrument. This questionnaire was given to students online through Google Forms to make it easier to fill out the questionnaire with the help of parents, facilitators or peers who already understand the content of the statements, thereby ensuring that the results are more accurate and representative.

The instrument used in this research statement consists of a five-choice Likert scale where respondents can indicate their level of agreement with the statement submitted. The Likert scale in the study consists of five answer options: "strongly agree" with a value of 5, "agree" with a value of 4, " somewhat agree" with a value of 3, "disagree" with a value of 2 and "strongly disagree" with a value of 1. This instrument is used with the aim of gaining a deeper understanding of anxiety (A), psychology (P) and motivation (M) in learning science for elementary school students.

3.4. Research Data Analysis and Processing

This research employs the Partial Least Square (PLS) method from Structural Equation Models (SEM) to analyze relationships between variable constructs, including exogenous and endogenous variables while accounting for measurement error. Data analysis was conducted using SmartPLS 3.0 software designed to test research hypotheses. PLS-SEM is useful for understanding the relationships between variables by considering latent variables (constructs) and their indicators (Hair et al., 2021).

The model produces path parameter estimates that explain endogenous variables through exogenous variables using a structural model. The outer model (measurement model) in PLS-SEM assesses latent variables represented by measured indicators. This study gained deeper insights into the relationships between variables in the research context while ensuring accurate measurement through this approach. Outer model testing was conducted to assess the validity and reliability of the questionnaire indicators and to measure the constructs appropriately. The loading factor parameters should exceed 0.7 for reliable results and the Average Variance Extracted (AVE) must also meet this threshold.

In this study, hypothesis testing is carried out using the p-value criterion. The hypothesis is accepted if the p-value is less than 0.05 and rejected if it exceeds 0.05. Hypothesis testing is carried out in an inner model where the relationships between variables are analyzed in more depth. This research can make an essential contribution to deepening understanding of the dynamics of relationships between variables in relevant contexts by using this approach.

4. RESULTS

4.1. Results of the Research Validity and Reliability Tests

The purpose of conducting validity and reliability tests on the questionnaire for each variable is to assess the dependability and accuracy of the study data. The analysis results demonstrate that the model satisfies convergent and discriminant validity and reliability standards requirements. The tests for validity and reliability of the questionnaires on anxiety (A), psychology (P), and motivation (M) about studying science in primary school students were carried out using PLS-SEM with a focus on the outer model. Confirmatory Factor Analysis (CFA) was applied to calculate Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE), all

of which met the necessary criteria (Bajpai & Bajpai, 2014). The loading value for each latent variable factor in the outer model is more significant than 0.7 indicating that the research instruments have high validity and reliability (Heale & Twycross, 2015). Table 2 shows the results of all the tests that examine accuracy and consistency.

Table 2. Results of reliability and validity.

Variables	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Anxiety (A)	0.858	0.906	0.708
Motivation (M)	0.880	0.909	0.625
Psychological (P)	0.861	0.905	0.705

The results of the analysis in Table 2 indicate that the Composite Reliability (CR) value for each variable construction ranges from 0.905 to 0.909 while Cronbach's alpha values range from 0.858 to 0.880. These statistics indicate that the Cronbach's alpha and CR values are suitable and acceptable with strong internal consistency and outstanding dependability across all formative constructs (Mohamad, Sulaiman, Sern, & Salleh, 2015). Indicator P1 (for intellect) must be eliminated because its outer loading is less than 0.6. A Composite Reliability (CR) value greater than 0.7 (Al-Emran, Mezhuyev, & Kamaludin, 2019) implies that all constructs in the model are reliable which answers the study question about overall construct reliability. Figure 2 shows the recapitulation outcomes for this research construction route model.

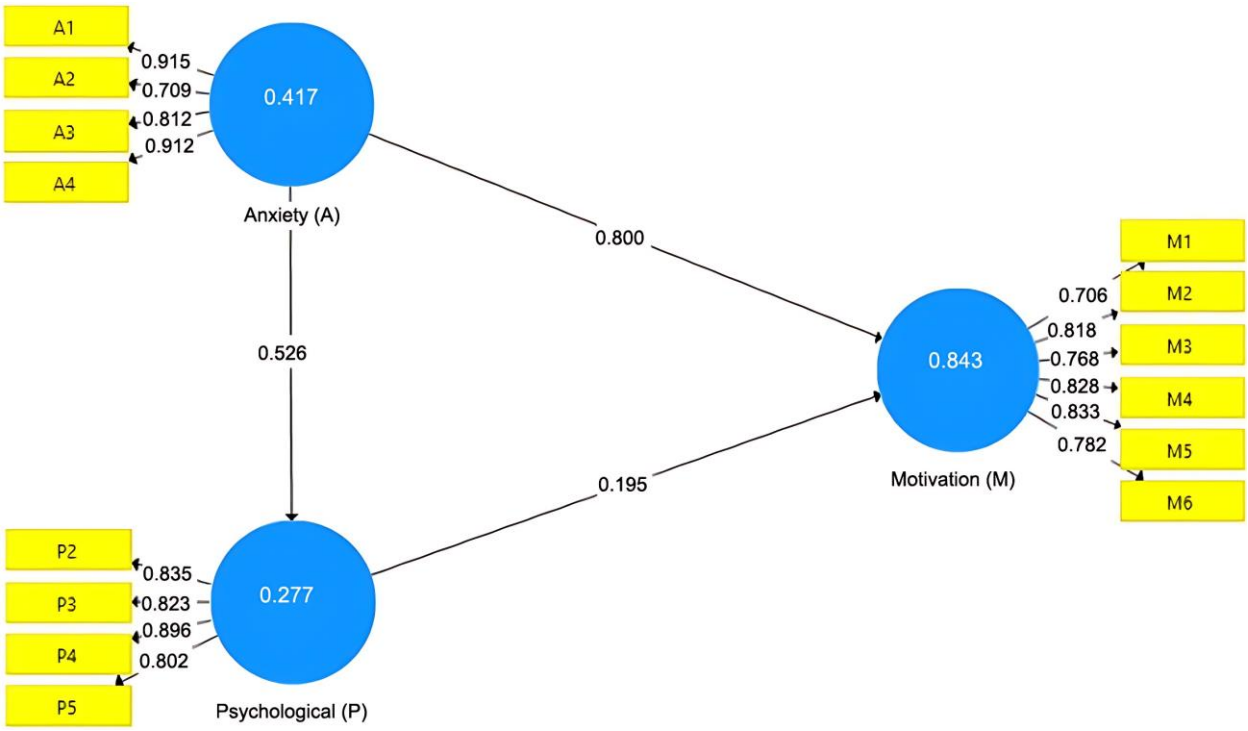

Figure 2. Validity and reliability path diagram.

Figure 2 demonstrates the validity and reliability of each variable. The obtained values for each variable are sufficient. This result signifies that the measurement tools employed in this study exhibit a notable degree of coherence and precision aligning with established norms in statistical analysis. Therefore, the outcomes derived from these factors can be trusted to substantiate research findings and suggestions.

4.2. Analysis of Hypotheses Results using Structural Equation Modeling (SEM)

This study employs a path coefficient test to analyze the hypothesis. It is crucial to assess the suitability of the research data model using a goodness-of-fit test before proceeding to the hypothesis testing phase. The model's fit is evaluated by examining the normed fit index (NFI) and standardized root mean square residual (SRMR) values which are obtained through the SMARTPLS-SEM program. A model is deemed to have a good fit if the NFI value exceeds 0.8 and the SRMR value is below 0.10. Table 3 provides the details of the fit test results.

Table 3. HTMT value.

Variables	Anxiety (A)	Motivation (M)	Psychological (P)
Anxiety (A)	0.841		
Motivation (M)	0.903	0.790	
Psychological (P)	0.526	0.616	0.840

The analysis results from Table 3 explain that the HTMT (Heterotrait-Monotrait ratio of correlations) value is used to measure discriminant validity. According to Table 3, the HTMT value must be <0.85 to indicate adequate discriminant validity. The results of the HTMT value show that all values are below 0.85 confirming that there is no problem related to discriminant validity. This research's model fit test results show that the variable model used is suitable with a Normed Fit Index (NFI) of 0.809 and a Standardized Root Mean Square Residual (SRMR) of 0.094 (Leguina, 2015; Wong, 2019). We looked at the research hypothesis using SMARTPLS 3.0's bootstrapping test procedure. This approach may assess hypotheses and generate estimates of population parameters using existing samples. Additionally, it determines the statistical significance of each hypothesis. Table 4 presents the results of the hypothesis analysis conducted using the bootstrapping test method.

Table 4. Hypothesis analysis test results using SEM.

Variables	Original sample (O)	T-statistics	P-values
Anxiety (A) -> Motivation (M)	0.803	109.774	0.000
Anxiety (A) -> Psychological (P)	0.526	11.679	0.000
Psychological (P) -> Motivation (M)	0.195	7.031	0.000
Anxiety (A) -> Psychological (P) -> Motivation (M)	0.091	5.665	0.003
Anxiety (A) -> Psychological (P) -> Motivation (M)	0.309	3.162	0.000

Table 4 shows a direct relationship between anxiety (A) and motivation (M) for learning with a parameter coefficient of 0.803 and a p-value of 0.000<0.05 indicating an 80.3% positive relationship. 2) The parameter coefficient value for anxiety (A) on psychological conditions (P) is 0.526 while the p-value is 0.000<0.05 which means that anxiety has a positive relationship with psychological conditions of 52.6%. 3. The parameter coefficient for psychological condition (P) on learning motivation (M) is 0.195 while the p-value value is 0.000<0.05 which means that psychological condition has a positive relationship with student learning motivation of 19.5%.

The indirect influence of the research can be seen from the total indirect effect analysis which explains that the parameter coefficient value obtained from all variables is 0.091 and the p-value obtained is 0.003<0.05, which means that the higher the anxiety and psychological values, the more the learning motivation value will increase—amounting to 09.1%. The overall direct influence of this research can be seen from the total effect which explains that the R-square coefficient value obtained from anxiety (A) and psychological (P) to students' motivation (M) to learn science is 0.432 and the p-value is 0.000 which means that together the same (simultaneous) anxiety (A) and psychology (P) have a positive and significant relationship to students' learning motivation (M) in science learning in elementary schools with an increase of 43.2% so that the Ha hypothesis is accepted.

The results of this hypothesis test study demonstrate statistical significance as it confirms a positive and significant correlation between students' anxiety and psychological circumstances and their learning desire. There is a positive correlation between the level of worry and the student's psychological condition, and their motivation to learn increases accordingly. Teacher monitoring is crucial in reducing excessive anxiety and establishing a conducive psychological environment for students throughout science education.

5. DISCUSSION

Education is a critical component of the development of children particularly at the elementary education level. Natural sciences are one of the subjects of significant importance. Nevertheless, the science learning process must be linked to a variety of factors that can affect the learning outcomes of students (Huang, Chiu, Huang, Zhong, & Lai, 2020). Anxiety, psychological conditions and learning motivation are among the most significant factors. Anxiety is an emotional reaction to situations that are perceived as menacing or difficult (Dökme, Açıksöz, & Koyunlu Ünlü, 2022). Students who experience academic pressure or feel incapable of comprehending the material may develop anxiety during the learning process. High levels of anxiety can impede concentration, hinder the capacity to process information and negatively impact academic performance (Salikha, Sholihin, & Winarno, 2021). Anxiety in the context of science is frequently expressed through specific attitudes, including restlessness, concern, discomfort and difficulty concentrating (Mohammed et al., 2021). Science subjects frequently necessitate comprehension of intricate concepts and the execution of practical investigations which frequently results in the development of these attitudes. This can result in anxiety which is a substantial impediment to the teaching and learning process (Hsu & Goldsmith, 2021).

The psychological conditions of students, including intelligence, emotions, social interactions, personality, and morals will be associated with anxiety in the context of science education in primary schools. In general, students who possess a high level of intelligence possess cognitive abilities that facilitate their ability to concentrate and demonstrate a strong interest in learning (Budiman, Lestari, & Yuliatun, 2021; Rozgonjuk, Kraav, Mikkor, Orav-Puurand, & Täht, 2020). Students can more effectively comprehend intricate concepts and complete complex tasks when they possess a high level of intelligence. Students' emotional states are exceedingly susceptible to educational challenges (Safranj, Volarov, & Oljaca, 2020). The learning process can be disrupted, and academic performance can be diminished by negative emotions such as anxiety, tension or fear (Wang, Zhao, & Zhang, 2020). Consequently, it is crucial to establish a supportive learning environment and offer the emotional support that students require. The capacity of students to acquire scientific knowledge is also significantly influenced by their social circumstances. Students' motivation and mood can be enhanced through positive social interactions and support from teachers and peers (Priya, Garg, & Tigga, 2020).

Conversely, social problems such as bullying or isolation can increase anxiety and hinder learning. Students' personalities and morals greatly influence the way they learn. Students with adaptable personalities and good morals tend to have a positive attitude towards learning. They can better face academic challenges confidently, stay motivated, and not give up easily when faced with difficulties. Good character helps students stay motivated and learn optimally despite difficulties (Perchtold-Stefan et al., 2024; Wang & Wang, 2022).

Teachers and parents need to understand the relationship between anxiety and psychological conditions so they can take appropriate steps to create a supportive learning environment. A supportive environment can help students overcome their anxiety so that they can learn science more effectively and maximally as well as create good motivation to learn science (Cataudella et al., 2021; Kring & Johnson, 2022). Learning motivation is an internal drive that makes students want to learn and achieve academic goals. This motivation can be intrinsic (coming from within such as curiosity and personal satisfaction) or extrinsic (coming from outside such as appreciation or recognition) (Feuer, 2021; Hullman, Kapoor, Nanayakkara, Gelman, & Narayanan, 2022). Anxiety

and negative psychological conditions can reduce students' intrinsic motivation. When students feel anxious or depressed, they tend to avoid challenging subjects such as science which leads to decreased academic performance.

The desire to succeed is one factor that might affect elementary school students' motivation to learn. Children who strive for achievement are inclined to work hard and diligently in their studies (El-Adl & Alkharusi, 2020; Zhou, Chiu, & Dong, 2024). Students who have the drive and need to learn will have a thirst for knowledge and a deep understanding of the subject matter which can encourage students to continue learning and seek further information. Students might be strongly motivated to pursue their studies when they have clear goals and objectives for the future and realise that education is essential to realizing those desires (Camacho, Correia, Zaccoletti, & Daniel, 2021). Students' motivation to learn more and do well may be raised by rewarding them with praise from classmates, parents, and teachers. Students can be more excited and motivated to learn science if engaging learning activities are used such as experiments, educational games, and group discussions (Ismail, Rahul, Patra, & Rezvani, 2022). A learning environment that is comfortable, safe, and free from distractions can help students focus and enjoy the learning process. Teachers and parents can help increase students' learning motivation so that they can learn science more effectively, overcome anxiety, and achieve better academic achievement by paying attention to these factors (Usher et al., 2024; Xiang, 2024).

The research conducted by Süren and Kandemir (2020) elucidates that there is a substantial correlation between anxiety and psychiatric disorders which significantly impacts the learning environment of students. These elements have the potential to alter students' inclination and drive to acquire knowledge. Su (2016b) stated that there is a strong correlation between psychological conditions and students' willingness to learn science. Creating a comfortable, safe, and suitable environment can enhance students' ability to concentrate. Additional studies indicate a strong relationship between anxiety and the drive to learn science particularly in terms of motivating students to attain high academic objectives (Orbach, Herzog, & Fritz, 2019; Su, 2016a). This research elucidates the interconnectedness of anxiety, psychological circumstances, and willingness to learn science in fostering the ability of elementary school students to focus and excel in science classes.

The data demonstrates a strong correlation between anxiety, psychological disorders, and learning motivation indicating that high levels of anxiety are frequently linked to low levels of learning motivation. Conversely, a favourable learning environment and adequate psychological support have the potential to enhance students' motivation to learn (Maghfiroh, Setiawan, Saputra, Afifah, & Darmayanti, 2023; Pollack et al., 2021). Thus, teachers and caregivers must establish a nurturing educational setting, offer psychological assistance, and foster students' self-assurance in the pursuit of scientific knowledge. Therefore, students' can conquer their anxiety, enhance their psychological well-being, and eventually boost their drive to learn (Amrulloh & Galushasti, 2022; Suendarti & Virgana, 2022). The subject matter at hand necessitates comprehension of intricate concepts and execution of actual experiments which might give rise to heightened levels of anxiety (Tran & Dong Le, 2024). Students experiencing anxiety may exhibit feelings of uncertainty over their capabilities, fear of committing errors or concern around evaluation from both educators and peers. These factors can diminish their motivation to actively engage in the learning process (Henschel, 2021).

Teachers and parents are essential in the creation of an optimal learning environment for elementary school students (De la Fuente, López-García, Mariano-Vera, Martínez-Vicente, & Zapata, 2017; Schwarzer, 2020). Students must prioritize the establishment of a nurturing and conducive environment in both the classroom and at home to foster the intellectual and emotional development of children. A classroom environment that is low-stress and amicable also substantially contributes to the reduction of student anxiety (Mao, Yang, Bonaiuto, Ma, & Harmat, 2020). The establishment of conditions that facilitate effective learning is facilitated by a setting that offers support and approval from both teachers and peers (Ahmetovic, Becirovic, & Dubravac, 2020). Primary school students who are susceptible to emotional fluctuations and feelings of insecurity require a supportive and pleasurable learning environment to ensure optimal learning outcomes. Teachers and parents not only assuage

children's apprehension but also increase their motivation to engage in diligent academic pursuits by creating a constructive and encouraging educational environment.

6. CONCLUSION

The motivation of students to learn science, psychology, and anxiety are all positively and significantly correlated. Students' motivation to learn can be adversely affected by high levels of stress which can impede their ability to concentrate and overcome academic obstacles in the field of natural science. Meanwhile, students' psychological states such as IQ, emotions, relationships, personality, and morals also have significant effects on how motivated they are to study science. Teachers and parents must comprehend and effectively manage the apprehension of students to preserve their psychological well-being, thereby contributing to the establishment of a supportive learning environment. This supportive environment not only alleviates students' anxiety but also enhances their motivation to learn science more effectively and optimally. It is possible to improve students' learning motivation and their academic performance in scientific studies by placing in place suitable intervention strategies against anxiety and offering assistance for their psychological needs.

7. IMPLICATIONS AND SUGGESTIONS

The findings of this research offer valuable insights into the significance of closely monitoring and attentively observing students' circumstances within the realm of science education. Teachers and parents can offer suitable assistance by comprehending the correlation between anxieties, psychological problems, and learning motivation to enhance student accomplishment and learning outcomes. It is crucial to prioritize the establishment of a supportive learning environment to ensure that students feel secure and at ease while tackling academic obstacles in the field of science. Implementing comprehensive monitoring and support systems for students will significantly enhance their academic success in science education. Possible avenues for future research pertaining to anxiety, psychology, and learning motivation in elementary school science learning: a correlational study involve broadening the scope of the research domain. This research should encompass other regions in Indonesia as the current study is limited to only one area, specifically Jakarta. The findings will encompass a broader population leading to a more thorough comprehension of the correlation between anxiety, psychology, and learning motivation in elementary school science lectures across different geographical contexts in Indonesia by broadening the scope of the study.

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