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The Relationship Between Anxiety Level and Mathematics Learning Achievement on the Area of Rectangles and Squares in Class IV Students

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Abstract

This study aims to determine the relationship between anxiety levels and mathematics learning achievement regarding the area of rectangles and squares in class IV students at SDN 21 Pekanbaru. This type of research is quantitative with a correlation model. Data collection techniques used anxiety scales and written tests. The population in this study were all students at SDN 21 Pekanbaru and the sample used was class IV C students at SDN 21 Pekanbaru. Prerequisite tests use normality, linearity and heteroscedasticity tests. The data analysis technique used is Pearson product moment with the help of SPSS 25. The normality test results for the anxiety scale and learning achievement are 0.749 and 0.074, the value is greater than 0.05, so the data is normal, the linearity result is 0.511, which is greater than 0.05, so the data stated to be linear, and the heteroscedasticity test of 0.205 is greater than 0.05, it is concluded that there is no heteroscedasticity in the data. The Pearson product moment test result is 0.007 where the value is <0.05. There is a significant relationship between the anxiety variable and mathematics learning achievement, with the direction of the relationship being negative because the correlation coefficient results have a negative sign (-) which means, the higher the students' anxiety regarding mathematics learning, the lower the students' learning achievement results will be. .

Keywords: *Anxiety, learning achievement, mathematics*

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A. Introduction

Mathematics anxiety is rampant among student groups and determines how students view mathematics in the future. According to Ellis (in Wicaksono, 2013) explains that student anxiety is due to differences in students' levels of intelligence. Mathematics anxiety is a student's emotional response when studying, paying attention to the teacher, solving problems, and discussing mathematics (Qausarina, 2016). The assumption that mathematics is a very scary subject, which is why fear causes feelings of anxiety and worry when studying mathematics. According to Bararah (in Qausarina, 2016) explains that the real fear is that students are afraid when the answer they get is wrong, because that can be interpreted as failure, which means that children must always be able to get the right answer. When anxiety about studying mathematics has taken over students' minds, it will be difficult to think and concentrate, so students do not want to study mathematics and tend to stay away from it. This causes low student learning outcomes. The higher the level of mathematics anxiety, the worse the student's achievement and learning outcomes.

Learning achievement is expressed in the form of numbers, letters, symbols and sentences that describe the results of student achievements in a specific period and it is said that learning achievement is the result of educational activities accompanied by changes achieved by students (Rosyid, et al, 2019). According to Slameto (in Mukholil, 2018) states that student learning achievement in school is divided into 2, namely internal factors and external factors. Internal factors are factors within the student such as mental, physical readiness, anxiety, attitude, study habits, motivation, health, age. Meanwhile, external factors are factors outside the student, such as teacher characteristics, teaching and learning situations, learning environment and facilities.

Class IV C SDN 21 Pekanbaru experienced low student scores, this was because out of 25 students, 60% of students found difficulty in understanding the material, such as understanding formulas and story problems, so that class IV mathematics learning was less than satisfactory. From the results of the data obtained by examiners, it was found that a high percentage had not yet reached the KKM in UTS mathematics semester 1 of the 2022/2023 academic year, this was influenced by the lack of student motivation in learning mathematics, making students feel relaxed about learning mathematics but when faced with exams, students start to feel anxious, afraid, worried, cold sweat and unable to answer questions. Most students are not interested, so their learning achievement decreases.

Worry

Understanding Anxiety

Anxiety is an experience of painful and unpleasant feelings. It arises from a tension response caused by a push from within or outside and is understood by the autonomic nervous system (Hayat, 2014). Anxiety is the function of the ego to warn individuals about the possibility of impending danger so that appropriate adaptive reactions can be prepared (Kumbara, et al, 2018).

Anxiety Indicator

According to Whitbourne & Krauss (in Desiningrum, 2016) explain that anxiety indicators are divided into two aspects: psychological anxiety symptoms and physiological symptoms.

Psychological symptoms, symptoms related to the mental and emotional state of anxious people, such as worry, uncontrollable anxiety, feeling depressed, worrying that something bad will happen, prolonged complaints about fear of the future, believing that scary things will happen for no definite reason , threatening situations that occur are usually ignored, fear of losing control, fear of not being able to overcome problems, repetitive thoughts, wanting to run away, confusion, difficulty concentrating.

Physiological symptoms are symptoms related to the condition of a person's body or body who experiences anxiety, restlessness, especially symptoms related to the function of the nervous system such as tremors, paleness, nail biting, difficulty sleeping, stomach ache, excessive sweating, difficulty speaking, shortness of breath, heart pounding fast and hands feel cold.

Types of Anxiety Disorders

There are various types of anxiety, namely objective anxiety, such as being aware of the danger that is threatening you, invisible, and in accordance with your conscience, such as morals, feeling guilty and guilty (Mukholil, 2018). According to King (in Fap, 2018) explains that anxiety disorders are psychological disorders that include motor tension. Some anxiety disorders are as follows. Generalized anxiety disorder, This disorder occurs due to feeling anxious almost all the time. By experiencing anxiety that occurs continuously, and not being able to explain the cause of this anxiety. Panic disorder, this disorder occurs continuously and appears suddenly or suddenly. This disorder appears suddenly, causing a very fast heart rate, shortness of breath, tremors, cold sweats, dizziness and a feeling of helplessness.

Phobic disorders, this disorder occurs due to anxiety accompanied by excessive fear of a certain object or situation. Obsessive-compulsive disorder, this disorder occurs if you have thoughts that cause anxiety and the urge to carry out repetitive behavior, namely behavior to produce a situation or prevent the same one in the future.

Anxiety Levels

Qausarina (2016) states that there are 4 levels of anxiety, namely mild anxiety, moderate anxiety, severe anxiety and panic. Mild anxiety, this fear makes people more alert and expands their range of perception. Mild anxiety motivates learning and leads to growth and creativity. Moderate anxiety, with this anxiety, a person can focus on important things and ignore other things. This anxiety narrows the person's range of perception, so that the person receives selective attention but is able to carry out things in a targeted way. Severe anxiety, this anxiety limits a person's range of assumptions. People with severe anxiety focus on details and cannot think about anything else. All actions are aimed at eliminating tension. Panic,

panic is associated with confusion, fear, and loss of control. Someone who feels panic finds it difficult to carry out anything, even if there are instructions.

Factors Influencing Anxiety

According to Tujillo and Hadfield (in Atmojo, 2021) explain that there are 3 factors that influence anxiety, namely personality factors, intelligence factors and environmental factors. According to Ramaiah (in Zayani, 2019) explains the factors that indicate an anxiety reaction, namely: The environment will influence a person's way of thinking about individuals and groups, Holding back emotions and not being able to express your emotions or frustration for too long can cause high blood pressure and cause anxiety and frustration. Physical causes, mind and body interact. with each other and can cause anxiety.

How to Overcome Anxiety

Ramaiah (in Fap, 2018) explains several ways to overcome student anxiety, teachers can overcome it by: 1) self-control, 2) not applying pressure, 3) providing support. According to Rudiansyah, et al (2016) explain that efforts are needed to prevent and reduce student anxiety, namely by: Create a pleasant learning atmosphere. Learning will be fun when it starts from students' interests, potential and needs.Learning must be student-centered, allowing students to express and play an active role in learning activities. In the learning process, teachers must be able to instill a "sense of humor" for themselves and their students. However, jokes or "jokes" made must be based on ethics and not corner students. Carrying out

activities in addition to "games" or "ice breaks", for example when the classroom atmosphere is not conducive, the teacher's ability to make the class conducive is really needed. Inviting students to occasionally carry out the learning process outside the classroom so that students get a new atmosphere that makes them less anxious and worried, students will be freer and more flexible so they won't feel any pressure.

Learning achievement

Understanding Learning Achievement

Learning achievement is a learning process achieved by students after participating in a particular teaching unit (Harahap, et al, 2019). According to Mukholil (2018), learning achievement is the result achieved or obtained from efforts that show a person's level of achievement in the academic process, and is considered successful if the student's achievement meets the established standards for the degree of learning completeness.

Factors that Influence Learning Achievement

Learning effort and success can be influenced by several factors. According to Slameto (in Mukholil, 2018) states that student learning achievement in school is divided into 2, namely internal factors and external factors. Internal factors are factors within the student such as mental, physical readiness, anxiety, attitude, study habits, motivation, health, age. Meanwhile, external factors are factors outside the student, such as teacher characteristics, teaching and learning situations, learning environment and facilities.

Mathematics

Understanding Mathematics

Mathematics is a subject that develops ways of thinking, expressing opinions, participating in solving problems of daily life, work, supporting the development of science and technology (Susanto, 2013). Mathematics in schools consists of mathematics selected to grow abilities and shape individuals in the development of science and technology, so that mathematics in schools always has a mathematical identity such as abstract objects and a deductive mindset that does not change (Prasetyawan, 2016). Mathematical material for the area of rectangles and squares

Area of a Rectangle

A rectangle is a 2-dimensional flat shape that has 2 pairs of parallel sides of the same length and has 4 right angles. The longer side is said to be "p", while the

shorter side is said to be "l". There are 4 corners of a rectangle, namely corners A, B, C, and D. The rectangular shape can be called ABCD. There are 4 sides of the rectangle, namely AB, BC, CD, and DA which have two diagonals, namely AC and BD. Some examples of rectangular flat shapes are agricultural fields, floors, buildings, blackboards, doors, photo frames, table surfaces, and many more.

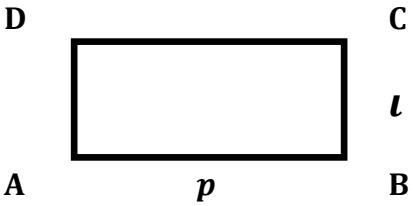


Figure 1.1 Rectangle

Square Area

A square is a flat building formed from four sides of the same length. The characteristic of a square is that all its sides are perpendicular to each other, a square has 4 right angles of equal measure, namely 90 degrees. Some examples of objects that have a square shape are white bread, origami paper, and even a chess board.

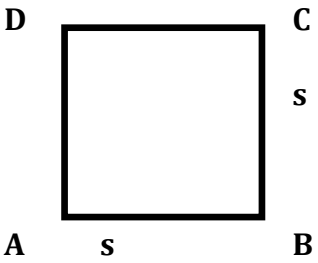
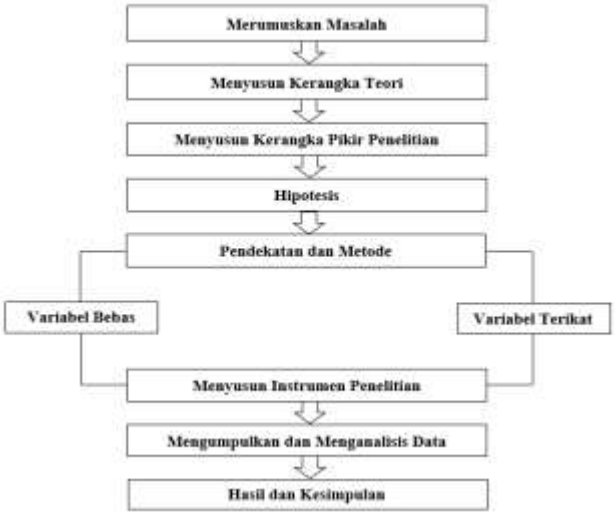


Figure 1.2 Rectangle

B. Method

Quantitative research with a descriptive approach. Quantitative research is the process of searching for data using information in the form of numbers as a tool for analyzing data about what you want to know. This quantitative research method has numeric nuances in the method of collecting field information and is processed through statistical methods (Djollong, 2014). This research is correlation research. According to Nurrahmi (2019), correlation research is research whose aim is to identify whether there is a relationship between the 2 variables used, anxiety as the independent variable (X) and mathematics learning outcomes as the dependent variable (Y).



Picture 1. Research Procedure

The population in this study were all students at SDN 21 Pekanbaru and the sample used was class IV C students at SDN 21 Pekanbaru. Data collection techniques used anxiety scales and written tests. The research variables are the independent variable and the dependent variable. Independent variables are variables that influence, cause changes or the emergence of dependent variables (Anggara, 2015). In this research, the independent variable is anxiety. The dependent variable is a variable that is influenced or is the result of the presence of an independent variable (Anggara, 2015). In this study the dependent variable is mathematics learning achievement. The data collection techniques for this research are an anxiety scale (30 statements) and a written test (10 multiple choice questions and 5 essay questions). The data analysis techniques for this research include: a. Prerequisite tests include: 1) normality test, which aims to see if the sample data is from a normally distributed population. Normality test using the SPSS 25 for Windows program with the Kolmogorov-Smirnov test (Latipah, 2014). 2) Linearity test, functions to see whether two variables have a significant linear relationship or not. Good data must have a linear relationship between the independent variable (X) and the dependent variable (Y) (Latipah, 2014). 3) heteroscedasticity test, aims to test whether the residual variance around the regression equation is not the same for all variable values (Lind et al., 2014). b. Hypothesis testing, among others: 1) correlation test, using Pearson product moment which functions to identify whether there is a relationship between 2 or more variables, if there is a relationship, then where is the relationship and how big is the relationship (Taniredja, 2011). 2) t test,

to test the influence of each independent variable on the dependent variable (Lind et al., 2014). 3) coefficient of determination, to determine the percentage change in the dependent variable (Y) caused by the independent variable (X) (Wardani & Permatasari, 2022). According to Sinambela, et al (2014) explain that the coefficient of determination (R2) is an indicator used to describe how much variation is explained in the model. The calculations and statistical tests used SPSS 25 for Windows with the significance value used in this research being 0.05.

C. Results and Discussion

Validity test

Validity is the quality that shows the suitability of the measuring instrument to the purpose being measured (Maolani, 2015). Experiment with 25 respondents using SPSS 25 for Windows analysis techniques. Provided that if rcount > rtable then the question is valid, if rcount < rtable then the question is invalid. The results of the validity test in this research are as follows.

Table 1. Validity Test Results

Variable	Items	Calculated t value	Table t values	Information
Anxiety Level (X)	X1	0.457	0.396	Valid
	X2	0.667	0.396	Valid
	X3	0.519	0.396	Valid
	X4	0.639	0.396	Valid
	X5	0.407	0.396	Valid
	X6	0.519	0.396	Valid
	X7	0.512	0.396	Valid
	X8	0.484	0.396	Valid
	X9	0.457	0.396	Valid
	X10	0.481	0.396	Valid
	X11	0.448	0.396	Valid
	X12	0.494	0.396	Valid
	X13	0.424	0.396	Valid
	X14	0.439	0.396	Valid
	X15	0.460	0.396	Valid
	X16	0.463	0.396	Valid

Variable	Items	Calculated t value	Table t values	Information
	X17	0.508	0.396	Valid
	X18	0.423	0.396	Valid
	X19	0.428	0.396	Valid
	X20	0.788	0.396	Valid
	X21	0.465	0.396	Valid
	X22	0.556	0.396	Valid
	X23	0.444	0.396	Valid
	X24	0.557	0.396	Valid
	X25	0.540	0.396	Valid
	X26	0.549	0.396	Valid
	X27	0.444	0.396	Valid
	X28	0.452	0.396	Valid
	X29	0.457	0.396	Valid
	X30	0.405	0.396	Valid
Learning Achievement (Y)	Y1 (PG)	0.576	0.396	Valid
	Y2 (PG)	0.686	0.396	Valid
	Y2 (PG)	0.483	0.396	Valid
	Y4 (PG)	0.495	0.396	Valid
	Y5 (PG)	0.616	0.396	Valid
	Y6 (PG)	0.529	0.396	Valid
	Y7 (PG)	0.463	0.396	Valid
	Y8 (PG)	0.459	0.396	Valid
	Y9 (PG)	0.427	0.396	Valid
	Y10 (PG)	0.456	0.396	Valid
	Y11 (Essay)	0.834	0.396	Valid
	Y12 (Essay)	0.796	0.396	Valid
	Y13 (Essay)	0.796	0.396	Valid

Variable	Items	Calculated t value	Table t values	Information
	Y14 (Essay)	0.834	0.396	Valid
	Y15 (Essay)	0.517	0.396	Valid

Based on the validity calculations in the table above, it can be seen that all anxiety level items and learning achievement items meet valid criteria. So that all these items can be tested again on research respondents.

Reliability Test

Reliability is a quality that shows the consistency of the equivalence of the measurements carried out (Setyosari, 2019). The reliability test is multiple choice mathematics questions and descriptions. The formula used is Cronbach's Alpha. The results of the reliability test can be seen in the table below.

Table 2. Reliability Test Results

Variable	**Reliability Statistics**		**Information**
	Cronbach's Alpha	N of Items	
Anxiety Level	,893	30	Reliable
Learning Achievement (PG)	,702	10	Reliable
Learning Achievement (Essay)	,777	5	Reliable

Based on the instrument that was tested, the results of the reliability test using Cronbach's Alpha on the anxiety level variable obtained a value of 0.893; variable learning achievement with multiple choice tests of 0.702; and the learning achievement variable with the essay test obtained a value of 0.777. All these values have a value of > 0.60, so it can be concluded that all variable instruments are reliable.

Normality test

This test aims to see if the sample data is from a normally distributed population. Normality test using the SPSS 25 for Windows program with the Shapiro-Wilk test. According to Statistician (2013), the Shapiro Wilk test is a method or formula for calculating the distribution of data created by Shapiro and Wilk. The Shapiro Wilk method is an effective and valid normality test method used for small samples. The Normality Test aims to test whether the data from the independent variable and the dependent variable both have a normal distribution or not. One way to test the normality of the data is to use the Normal PP Plot Graph by looking at the distribution of the data.The results of the normality test in this study are as follows.

Table 3. Normality Test Results

	Tests of Normality		
	Shapiro-Wilk		
	Statistics	Df	Sig.
Anxiety Level	,974	25	,749
Learning achievement	,927	25	,074

Based on the table above, the Shapiro Wilk test shows that the sig value for the student anxiety level variable is 0.749 and the learning achievement variable is 0.074. Based on the output results, it shows that the Shapiro Wilk significant value is greater than 0.05. Thus it can be concluded that both data are normally distributed.

Linearity Test

The Linearity Test functions to see whether two variables have a significant linear relationship or not. Good data must have a linear relationship between the independent variable (X) and the dependent variable (Y) (Latipah, 2014).The linearity test in this research is as follows.

Table 4. Linearity Test Results

ANOVA Table						
		Sum of Squares	Df	Mean Square	F	Sig.
Learning Achieveme	(Combined)	4875.583	13	375,045	1,580	,227

nt * Anxiety Level	Between Groups	Linearity	2058.625	1	2058.625	8,675	.013
		Deviation from Linearity	2816.959	12	234,747	,989	,511
	Within Groups		2610.417	11	237,311		
	Total		7486,000	24			

Based on the table above, the results of the linearity test can be seen that the significance value (P Value Sig.) in the Deviation from Linearity line is 0.511. Because the significance value is greater than 0.05, it can be concluded that between the variables anxiety (X) and learning achievement (Y) there is a linear relationship.

Heteroscedasticity Test

Heteroscedasticity is a test that aims to test whether the residual variance around the regression equation is not the same for all variable values (Lind et al., 2014). According to Marisa Exsa (2015) explains that detecting the presence or absence of heteroscedasticity can be done by looking at the presence or absence of scatterplots. So the heteroscedasticity test aims to test whether there is an inequality of variance from the residuals of one observation to another observation in the regression model.The heteroscedasticity results in this research are as follows.

Table 5. Heteroscedasticity Test Results

Coefficientsa					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	2,537	7.133		,356	,725
Anxiety Level	,152	.117	,262	1,304	,205
a. Dependent Variable: RES2					

Based on the table above, information is obtained that the Sig value of the heteroscedacity test is 0.205. This shows that the Sig value of the heteroscedasticity test is greater than 0.05, so it can be concluded that there is no heteroscedasticity in the data.

Hypothesis testing

The hypothesis used is the associative hypothesis. An associative hypothesis is a temporary answer to a problem formulation by asking about the relationship between 2 or more variables (Sugiyono, 2022). The analysis used in the research is Pearson Product Moment due to interval data. Pearson product moment correlation analysis functions to identify whether there is a relationship between 2 or more variables, if there is a relationship, then where is the relationship and how big is the relationship (Taniredja, 2011). The correlation test used in this research is the product moment test with a significance level of 5%. In this research, the hypothesis is: Ho, there is no relationship between anxiety levels and mathematics learning achievement regarding the area of rectangles and squares in class IV students at SDN 21 Pekanbaru. And Ha, there is a relationship between anxiety levels and mathematics learning achievement regarding the area of rectangles and squares in class IV students at SDN 21 Pekanbaru.The results of the correlation test in this research are as follows.

Table 6. Correlation Test Results

Correlations			
		Anxiety Level	Learning achievement
Anxiety Level	Pearson Correlation	1	-.524**
	Sig. (2-tailed)		,007
	N	25	25
Learning achievement	Pearson Correlation	-.524**	1
	Sig. (2-tailed)	,007	
	N	25	25
**. Correlation is significant at the 0.01 level (2-tailed).			

Based on the results of the analysis above, it is known that the significance value between the anxiety variable (X) and learning achievement (Y) is 0.007, where this value is <0.05. Thus it can be concluded that$H0$ is rejected and Ha is accepted, meaning that there is a significant relationship between the anxiety variable and mathematics learning achievement, with the direction of the relationship being negative because the correlation coefficient results have a negative sign (-). This

means that the higher the student's anxiety regarding mathematics learning, the lower the student achievement results will be.

T test

The t test is used to determine the effect of the independent variable on the dependent variable individually by measuring the relationship between the independent variable and the dependent variable (Lind et al., 2014). The results of the t test in this research are as follows.

Table 7. Partial Test Results (t)

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	85,425	11,857		7,205	,000
	Anxiety Level	-.574	,194	-.524	-2,954	,007
a. Dependent Variable: Learning Achievement						

Based on the table above, information is obtained that the significance value is 0.007 <0.05, meaning that the level of anxiety (X) has a significant effect on learning achievement (Y).

Coefficient of Determination

The Determination Coefficient (R2) is used to determine the percentage change in the dependent variable (Y) caused by the independent variable (X) (Wardani & Permatasari, 2022). According to Sinambela, et al (2014) explain that the coefficient of determination (R2) is an indicator used to describe how much variation is explained in the model. The calculations and statistical tests use SPSS 25 for Windows. The coefficient of determination shows the extent to which the contribution of the independent variable in the regression model is able to explain variations in the dependent variable. The results of the coefficient of determination in this research are as follows.

Table 8. Test resultsCoefficient of Determination

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.524a	,275	,243	15.36141
a. Predictors: (Constant), Anxiety Level				

From the test results, the coefficient of determination (R Square) was 0.275 (27.5%). This value shows that the contribution of anxiety level (X) to learning achievement (Y) is 27.5% while the remaining 72.5% is generated by other factors that influence learning achievement which are not discussed in this research.

D. Conclusion

Based on research conducted by researchers at SDN 21 Pekanbaru, it can be concluded that there is a relationship between anxiety and mathematics learning achievement regarding the area of rectangles and squares in class IV students at SDN 21 Pekanbaru. Based on calculations using Pearson product moment correlation analysis with the help of SPSS 25 for Windows, the significance value between the anxiety variable (X) and learning achievement (Y) was 0.007, where the value was <0.05. Thus it can be concluded that*H*0 is rejected and Ha is accepted, meaning that there is a significant relationship between the anxiety variable and mathematics learning achievement, with the direction of the relationship being negative because the correlation coefficient results have a negative sign (-). This means that the higher the student's anxiety regarding mathematics learning, the lower the student achievement results will be.

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