



RELATIONSHIP BETWEEN EDUCATIONAL DECISION MAKING ABILITY IN BIOLOGICAL AND PERSONALITY (*BIG FIVE PERSONALITY*) WITH COGNITIVE ABILITY

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Abstract

This study aims to analyze the relationship between decision making abilities and cognitive abilities, personality (*big five personality*) with cognitive ability, and decision making ability and personality (*big five personality*) together with cognitive abilities. This research was conducted in the State High School of Pandeglang Regency, Banten Province with a sample of 45 educators. This study uses a quantitative approach, descriptive method with correlational techniques. The results of this study are based on research data analysis using a regression model with a significance level ($\alpha = 0.05$) and a correlation coefficient test with the Pearson Product Moment test ($\alpha = 0.05$). The results of the analysis show that there is a positive relationship between decision making ability and cognitive abilities, there is a positive relationship between personality (*big five personality*) and cognitive ability and there is a positive relationship between decision making ability and big five personality together with the ability cognitive.

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INTRODUCTION

The quality of educators in providing teaching will be strongly influenced by persistence and the abundance of teaching experience in class (Goldhaber & Player, 2011), in line with (Kim & Klassen, 2018) also found that the level of experience of educators also determines the cognitive abilities of educators while teaching learning material. (Hattie, 2009) found in his research that the quality of the quality of education is low due to the presence of educators with low cognitive abilities have been found in many previous studies and have a detrimental effect on student academic achievement results, in this case according to (Susiaty et al., 2018) reading comprehension ability is the basis and center for realizing scientific literacy. Science about science can be obtained through understanding reading activities. A high school Biology educator must have good reading comprehension skills, in order to obtain scientific literacy skills. The ability to read a good understanding of a Biology Educator will support these educators in understanding the context of science, science competence, science content and being able to have a good scientific attitude. therefore according to (Tait (2008) competency in teaching experience is not enough to keep up with the changing times, the level of competence and professionalism of educators must also be improved. and practice in accordance with their fields, in order to create professional educators with high competence, which will eventually bring students to achieve the best academic achievement.

Other perspectives see that the success of educators in teaching material is also determined by the educator's decision-making ability itself, in determining learning models, learning strategies and delivery of learning material. In the study (Supriyatin, Miarsyah, & Melia 2017) states educators with a good transactional leadership style will explore the perceptions, desires and expectations of students towards the subjects given at the beginning of learning. After conducting an exploration, educators clearly define and communicate it to students about the purpose of the learning being carried out. In line with that according to (Ristea, 2014) decision making is an important process of school educators who represent each field, whose core function is to regulate the education system as planned by stakeholders for the best goals. Whereas according to (Eishenfuhr, 2011)

also states that decision making is a decision-making process from a number of alternatives to achieve the best results desired, in this case decision making is very important in predicting the success of future learning, as research conducted (Gulkan, 2008) decision making is considered to be the most important process among the education management process, because it includes the most basic things that will be done by educators, namely planning the course of learning choices.

In addition to cognitive factors that must be owned by educators, (Ciorbea & Pasarica, 2013) concluded that non-cognitive factors have a very strong role in the process of one's cognitive abilities in achieving academic achievement, also stated (Leson, 2008) also stated research the latest shows that there are also non cognitive factors that are responsible for high academic performance such as motivation, emotional intelligence, creativity, and positive thinking. Along with this, personality is now an important factor studied and related to cognitive abilities (Jumagalieva & Aitjanova, 2014) stating personality training in efforts to develop communication and cognitive abilities of educators is very important in modern education, given the conditions of developing psychological and cognitive development of students rapidly.

Based on data from the Ministry of Education and Culture the achievement of 2015 Teacher Competency Test (UKG) results from districts / cities in Banten Province, namely: South Tangerang City (61.94), Tangerang City (59.11), Cilegon City (59.03), Serang City (57.32), Kab. Tangerang (55.64), Kab. Serang (53.44), Kab. Lebak (52.61), and Kab. Pandeglang (51.56). So, only 4 cities (South Tangerang, Tangerang, Cilegon, and Serang) in Banten Province achieved UKG above the national average UKG achievement (56.69). The value of achieving the Teacher Competency Test (UKG) for Pandeglang and Lebak Districts has not yet reached the value of the National Assessment.

The many problems that exist in the world of education that are related to the ability of decision-making educators in determining educational instructional, and personalities that play a role in the cognitive abilities of educators, making the authors conduct correlational studies

of research on the relationship of educator's decision-making abilities in instructional Biology and personality (*big five personality*) with the cognitive abilities of Biology educators in Pandeglang District, Banten Province who have a value index that has not yet achieved National provisions.

METHODS

Design of the Study

This study uses a quantitative approach, descriptive method with correlational techniques, namely to see whether there is a relationship between independent variables and dependent variables. The variables in this study are three variables, namely, decision making ability (X1), personality (*big five personality*) (X2) and cognitive ability (Y). This research was conducted in Banten Province, Pandeglang Regency, in the State High School. The time of this study starts from April to November 2018.

Participant

The target population in this study included all Biology educators in Banten Province. Based on data from the Central Bureau of Statistics (BPS) there are 4,487 educators the total number includes all high school educators in all subjects. While the affordable population in this study only used a sample of Biology educators in the Pandeglang District High School as many as 45 educators.

Instrument

The instruments in this study used test questions for cognitive abilities as many as 70 questions which referred to Benjamin Bloom (Eshun & Mensah, 2013), and non-test questions using questionnaires for decision-making abilities as many as 35 statements developed by (Parker, 2007), and personality (*big five personality*) as many as 60 statements developed by (McCrae & Costa, 1987).

Data Analysis

Data analysis in this study uses the first two tests of prerequisite testing using the *Kolmogorov Smirnov* normality test and the two homogeneity tests using the *Bartlett* test, both using a significance level $\alpha = 0.05$. In this research hypothesis test is divided into the first three regression test models used to determine the significance and linearity of the regression model using the F-Test at $\alpha = 0.05$, both the correlation coefficient test aims to determine the

strength of the relationship. Correlation test is done by calculating the correlation coefficient (r_{xy}) with the *Pearson Product Moment* formula, and the third test the coefficient of determination and contribution which aims to see the numbers or indices used to determine the amount of donations as variables or more (independent variables) on other variables (dependent variable). To find out it is calculated by the formula = $r_{xy}^2 \times 100\%$.

RESULTS AND DISCUSSION

Description of Research Results

Results of Decision Making Ability Research Data (X1)

The data of decision making ability conducted in Pandeglang District High School to 45 Biology Educators, obtained the highest score of 98 and the lowest score of 65. From the score the highest number of scores was obtained, namely in the range 76.5-82.5 with the number of frequencies absolute 16 and the relative frequency of 35.56%, while for the lowest range of scores obtained in the range 64.5-70.5 with the number of absolute frequencies 6 and the relative frequency of 13.33%. Read more to see the distribution of the distribution frequency of decision making ability can be seen in (Figure 1) as follows.

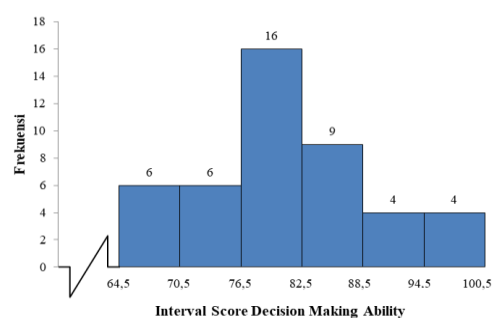


Figure 1. Frequency Distribution of Decision Making Ability Score

Results of the Personality (*Big Five Personality*) (X2)

The data of personality research (*big five personality*) conducted at Pandeglang District Senior High School to 45 Biology Educators, obtained the highest score of 95 and the lowest score of 65. From the score, there were two

ranges of scores with the same highest number of 76.5-82, 5 with an absolute frequency of 15 and a relative frequency of 33.33%, and in a score range of 82.5-88.5 with an absolute frequency of 15 and a relative frequency of 33.33%, while the lowest score was obtained in a score range of 64.5- 70.5 with absolute frequency 6 and relative frequency 13.3%. Learn more to see the distribution of the frequency distribution of personality scores (*big five personality*) can be seen in (figure 2) as follows.

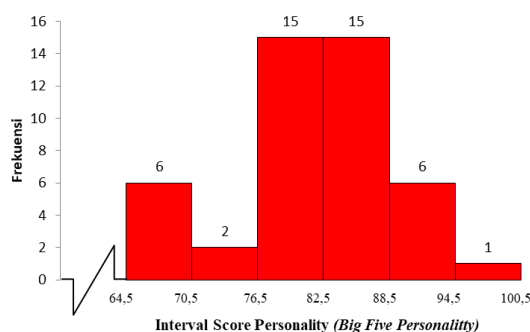


Figure 2. Distribution of Frequency of Personality Scores (*Big Five Personality*)

Cognitive Ability Research Data Results (Y)

Cognitive ability research data carried out at Pandeglang District High School to 45 Biology Educators, obtained the highest score of 99 and the lowest score of 60. From the score the highest number of scores was 82.5–89.5 with absolute frequency 17 and the relative frequency is 37.78%, while the lowest score is obtained in the range of scores 59.5-66.5 with the number of absolute frequencies 3 and the relative frequency of 6.67%. Read more to see the distribution of frequency distribution scores of cognitive abilities can be seen in (figure 3) as follows.

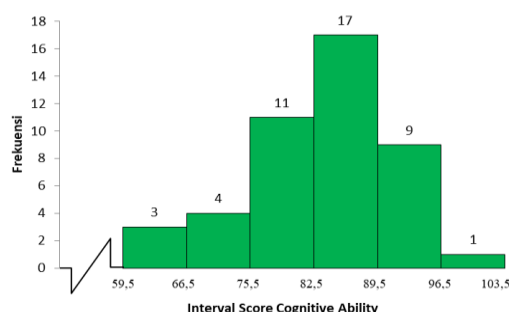


Figure 3. Frequency distribution of cognitive ability scores

Testing Requirements Analysis

Normality Test (*Kolmogorov-Smirnov Test*)

The normality test is carried out by using the *Kolmogorov-Smirnov* test at $\alpha = 0.05$ using the *SPSS 20* software program. The results obtained are significant values (p) decision making ability (X1) is 0.885, significance value (p) for personality (big five personality) (X2) is 0.503 and the significance value (p) for cognitive ability (Y) is 0.450. Significance value (p) of the three variables greater than (α) = 0.05, this shows that when groups of data are normally distributed.

Homogeneity Test (*Bartlett Test*)

Homogeneity test at significance level (α) = 0.05 by using *SPSS 20 software program*. Based on the data obtained significance value (p) decision making ability (X1) with cognitive ability (Y) is 0.207.

Table 1. Data on Homogeneity of Decision Making Ability

Test of Homogeneity of Variances

Cognitive Ability

Levene Statistic	df1	df2	Sig.
1.482	12	21	.207

And then for the significance value (p) for personality (big five personality) (X2) with cognitive ability (Y) is 0.292.

Table 2. Data on Personality Homogeneity Test Results (*Big Five Personality*)

Test of Homogeneity of Variances

Cognitive Ability

Levene Statistic	df1	df2	Sig.
1.283	11	24	.292

And the significance value (p) for decision-making ability (X1) and personality (*big five personality*) (X2) with Cognitive Ability (Y) is 0.223. Based on the Bartlett test the significance value (p) of the three groups of data is greater than (α) = 0.05. This shows that the three group data are homogeneous. Following is the table of the test results.

Table 3. Data on Homogeneity Test Results Decision Capability (X1) and Personality (*Big Five Personality*) (X2) with Cognitive Ability (Y) by using (*Bartlett Test*)

Test Results

F	Box's M	3.034
	Approx.	1.502
	df1	2
	df2	39204.000
	Sig.	.223

Hypothesis testing**Regression Model Test****Linearity Test Simple Regression Model and Significance between Decision Making Capabilities (X1) and Cognitive Ability (Y)**

The linearity test of the regression model used is a simple linear regression test. Based on the data obtained the significance value must be smaller than the value of α , which is $0.002 < 0.05$. See in table 4.

Table 4. Simple Linearity Test Regression Model between Decision Making Ability (X1) and Cognitive Ability (Y).

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	46.657	11.237		4.152	.000
1 Decision Making Ability	.451	.139	.443	3.237	.002

Furthermore, referring to the provisions after a simple linear regression test is obtained the value of $\hat{Y} = 46.657 + 0.451X_1$. Figure 4. Based on these equations, it can be interpreted if there is an increase in 1 decision making ability score (X1) then it will be followed by an increase in cognitive ability (Y) of 0.451 in the constant 46.657 through the regression model \hat{Y} .

Based on the results of the linearity test obtained a significance value smaller than α , which is $0.002 < 0.05$. Based on these data it is known that the model of the relationship between decision-making abilities and cognitive abilities is linear.

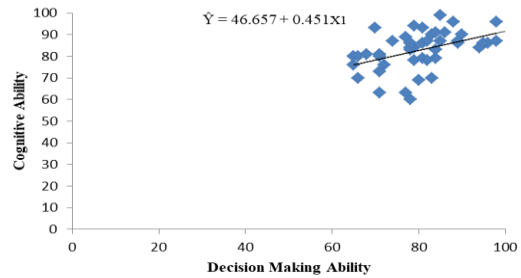


Figure 4. Simple Linear Regression Model between Decision Making Ability (X1) and Cognitive Ability

Linearity Test Simple Regression Model and Significance between Personality (Big Five Personality) (X2) and Cognitive Ability (Y)

The linearity test of the regression model used is a simple linear regression test. Based on the data obtained the significance value must be smaller than the value of α , which is $0.000 < 0.05$. Listed in table 5.

Table 5. Linearity Test Simple Regression Model between Personality (Big Five Personality) (X2) with Cognitive Ability (Y).

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	26.556	13.472		1.971	.055
1 Personality	.687	.164	.539	4.191	.000

Furthermore, referring to the provisions after a simple linear regression test is obtained the value of $\hat{Y} = 26.556 + 0.687X_2$. Figure 5. Based on these equations, it can be interpreted if there is an increase in 1 score of personality (big five personality) (X2) then it will be followed by an increase in cognitive ability (Y) of 0.687 on the constant 26.556 through the regression model \hat{Y} .

Based on the results of the linearity test obtained a significance value smaller than α , which is $0.000 < 0.05$. Based on these data it is known that the model of the relationship between personality (big five personality) and cognitive ability is linear.

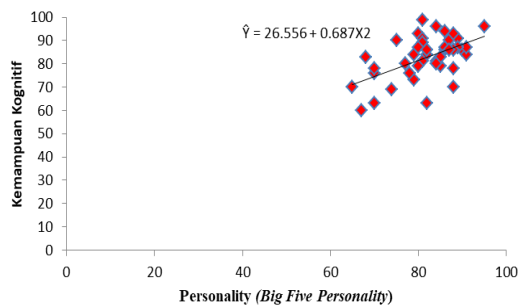


Figure 5. Simple Linear Regression Model between Personality (*Big Five Personality*) (X2) and Cognitive Ability

Linearity Test of Double Regression Models and Significance between Decision Making (X1) Personality (*Big Five Personality*) (X2) and Cognitive Ability (Y)

The linearity test of the regression model used is a multiple linear regression test. Based on the data obtained the significance value must be smaller than the value of α , which is $0.000 < 0.05$.

Table 6. Linearity Test of Double Regression Models and Significance between Decision Making (X1) Personality (*Big Five Personality*) (X2) and Cognitive Ability (Y)

Model	Unstandardize d Coefficients		Stand ardize d Coeffi cients	t	Sig.
	B	Std. Error	Beta		
(Consta nt)	8.072	14.398		.561	.578
1 Decision Making Ability	.336	.126	.330	2.660	.011
Personality	.583	.158	.457	3.685	.001

Referring to the provisions after multiple linear regression tests obtained the value of $\hat{Y} = 8.072 + 0.336X_1 + 0.583X_2$. Based on these equations, it can be interpreted if an increase in 1 decision-making ability score (X1) and personality (*big five personality*) (X2) will be followed by an increase in cognitive abilities (Y) of 0.336 and 0.583 in the 8072 constant through the regression model \hat{Y} . In the table

Based on the results of the linearity test obtained a significance value smaller than α , which is $0,000 < 0,05$. Based on these data the model of the relationship between decision making and personality (*big five personality*) together with cognitive abilities is linear.

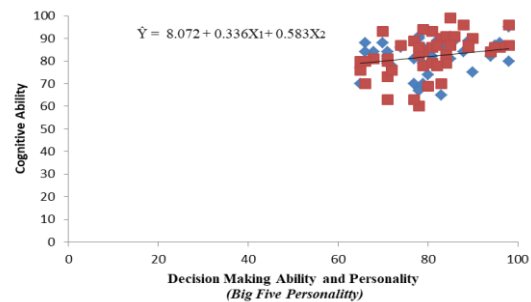


Figure 6. Double Linear Regression Model between Decision Making Ability (X1) Personality (*Big Five Personality*) (X2) and Cognitive Ability

Correlation Coefficient Test with Pearson Product Moment Test

The results of the correlation test coefficient can be seen in table 9 below.

Table 7. Test of Correlation between Decision Making Ability and Cognitive Ability, Personality (*Big Five Personality*) with Cognitive Ability.

		Decisi on Makin g Ability	Person ality	Cogn itive Abili ty
Decision Making Ability	Pearson Correlation	1	.246	.443*
	Sig. (2-tailed)		.103	.002
	N	45	45	45
Personality	Pearson Correlation	.246	1	.539*
	Sig. (2-tailed)	.103		.000
	N	45	45	45
Cognitive Ability	Pearson Correlation	.443**	.539**	1
	Sig. (2-tailed)	.002	.000	
	N	45	45	45

Based on the table above, it can be described that the correlation coefficient (r_{x1y}) between decision-making ability (X1) and cognitive ability (Y) is 0.443. The value of $r_{x1y} = 0.443$ shows that there is a positive correlation. And also obtained

a significance value that is smaller than α , that is, $0,000 < 0,05$. Based on these data there is a significant relationship between decision making ability (X1) with cognitive abilities (Y).

The correlation coefficient (rx_{2y}) between personality (*big five personality*) (X2) with cognitive ability (Y) is 0.539. The value of $rx_{2y} = 0.539$ shows that there is a positive correlation. And also obtained a significance value that is smaller than α , which is $0,000 < 0,05$. Based on these data there is a significant relationship between personality (*big five personality*) (X2) with cognitive abilities (Y).

Table 8. Joint Correlation Tests with Personality (*Big Five Personality*) with Cognitive Ability.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.626 ^a	.392	.363	7.106	.392	13.563	2	42	.000

a. Predictors: (Constant), Personality, Decision Making Ability

b. Dependent Variable: Cognitive Ability

Based on the multiple correlation test obtained a multiple correlation coefficient of rx_{1x2y} between decision making (X1) and personality (*big five personality*) (X2) together with cognitive ability (Y) is 0.626 which means there is a positive correlation. Also obtained a significance value that is smaller than α , which is $0,000 < 0,05$. Based on these data there is a significant relationship between decision making ability (X1) and personality (*big five personality*) (X2) together with cognitive abilities (Y).

Coefficient of Determination and Contribution

Results of Calculation of Coefficient of Determination and Contribution of Decision Making Ability (X1) to Cognitive Ability (Y).

Based on these data, the value of rx_{1y} is 0.443, and the coefficient of determination (rx_{1y}^2) is 0.196. On the contribution of decision making ability = $rx_{1y}^2 \times 100\% = (0.443)^2 \times 100\% = 19.7\%$. These

results show the decision making ability variable (X1) contributes to cognitive ability (Y) of 19.7% while 80.3% is given by other factors. This research has been strengthened by (Bruin, Dombrowski, Parker, & Szanto, 2015) who stated in his research findings that cognitive abilities, affective abilities and experience provide great support for the decision-making competency process. (Michal, 2012) found in the results of his research that the results of high cognitive abilities have the potential to compile information in decision making and have high self-esteem. (Davis, Patte, Tweed, & Curtis, 2007) also found substantial evidence that one's personality and performance can also influence decision making. In research (Parker, 2007) found that decision-making avoids mistakes that will occur in the future, for that it is necessary to predict the cognitive ability of a person in making choices in decision making so that the risk of selection errors can be minimized. As well (Gonzales, Thomas and Vanyukov, 2005) decision-making abilities with cognitive abilities have attachments that cannot be separated because the results of decision making are the processing of cognitive abilities.

Results of Calculation of the Determination Coefficient and Personality Contribution (*Big Five Personality*) (X2) to Cognitive Ability (Y).

Based on these data the value of rx_{2y} is 0.539, and the coefficient of determination (rx_{2y}^2) is 0.290. On personality contribution (*big five personality*) ($rx_{2y}^2 \times 100\% = (0.539)^2 \times 100\% = 29.0\%$). these results show the variable (X2) contributes to cognitive ability (Y) of 29.0% while 71.0% is given by other factors. The results of this study are also reinforced by previous studies by (Beaujean et al., 2011) in their study concluding that the relationship between personality and cognitive abilities in predicting one's academic performance shows interrelationship with positive results that personality has an influence on determine one's cognitive abilities and academic achievements. the path to that found by (Sori, Penezi, & Buri, 2017) also found that personality characteristics (*big five personality*) have a relationship with one's academic performance. One of the results of the research and conclusions in the study (Miasyah M., Made, P., I, & Wulandari, M., 2016) concluded

that the statistical hypothesis test results showed that there was a positive relationship between (*conscientiousness*) and learning outcomes biology (Hejazi & Lavasani, 2011) states that personality results (*big five personality*) are significantly related to academic achievement.

Results of Calculation of the Coefficient of Determination and Contribution of Decision Making Ability (X1) and Personality (*Big Five Personality*) (X2) to Cognitive Ability (Y).

Based on this power, the value of rx_1x_2y is 0.626 and the coefficient of determination $(rx_1x_2y)^2$ is 0.329. On the contribution of decision-making ability (X1) and personality (*big five personality*) (X2) = $(rx_1x_2y)^2 \times 100\% = (0.626)^2 \times 100\% = 39.2\%$. these results show the variable decision making ability (X1) and personality (*big five personality*) (X2) together contribute to cognitive ability (Y) of 39.2% while 60.8 is given by other factors. The results of this study are also reinforced by previous studies such as those conducted by (According to Dewberry, Juanchich, & Narendran, 2013) in the conclusion of his research stating that decision making ability is influenced by someone carrying out information processing on cognitive abilities in his mind, and involving his personality such as intuition, emotional, and self-confidence. In addition, it was also concluded in the study (Lauriola, Russo, Lucidi, Violani, & Levin, 2005) stated in conclusion the results of his research that personality also influences the aspects of decision making. The results of the study (Fallon et al., 2014) that a person's personality in making decisions affects a person's cognitive abilities.

CONCLUSION

Based on the results of research data and discussion, it can be concluded that, there is a positive relationship with the level of the relationship that is strong enough between decision-making abilities and cognitive abilities of Biology educators with a contribution of cognitive abilities of 19.7%. There is a positive relationship with a fairly strong level of relationship between personality (*big five personality*) and cognitive abilities of Biology educators with a contribution of cognitive abilities of 29.0%. And there is a positive relationship with a strong level of relationship between decision-making ability and personality (*big five personality*) together with the

cognitive abilities of Biology educators with a contribution of cognitive abilities of 39.2%.

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