

# Investigation of Psychological Behavior on the Academic Performance of High School Students in Karawang, West Java, Indonesia

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## Abstract

The purpose of this research is to investigate the extent to which psychological behavior influences academic performance in this case Creativity, Self Efficacy and Curiosity. Stratified random sampling procedure was used to get 386 respondents from first grade high school students out of 11.000 population. Academic performance is measured in mathematics and natural sciences tests developed from question banks in their respective fields of study. The results showed that the psychological dimension was a significant predictor of academic performance in mathematics and natural sciences. Subsequent findings, there are differences in the significant impact of psychological behavior of students based on the school form and school location.

**Keywords:** psychological behavior; academic performance; high school students..

## Introduction

Improving the quality of education is a priority of the Indonesian government in the period 2019-2024, expressed in the vision of human resource development so that Indonesia can compete globally (Dandy Bayu, 2019). Based on the 2012 TIMSS survey report students' achievements in mathematics and natural sciences lost the competition at the global level (Esther Lince Napitupulu, 2018). As a solution an effective learning practices are needed by considering students' psychological behavior. Several studies have shown students' psychological behavior (creativity, self-efficacy, curiosity) have an important role to improve effective learning practices and have a significant effect on academic performance (Hurlock, 1991; Baird and Northfield, 1992). Student achievement is influenced by several factors including; psychological factors, teacher competence, school culture, class density, learning motivation, socio-economic background, curriculum, teaching methods, building facilities, and school facilities (Mzokwana, 2008; Dorleku, 2013).

## Literature Reviews

### Psychological Behavior

There are 3 dimensions of psychological behavior in this study, namely: creativity, self-efficacy and curiosity. Creativity is each individual's self domain expressed through new discoveries and productivity (Michelle A. Morrell, 2015). In relation to the field of education, teachers must develop student creativity by presenting teaching materials that are challenging, innovative and provide students flexibility in adjusting to the environment. Otherwise, classroom situations that are not conducive to building creativity are characterized by conditions of teaching and learning characterized by strict adherence to the curriculum, a portion of dominant memorization, limited choices, and the pressure to adjust (Michelle A. Morrell, 2015). Literature studies state that there is an effect of student creativity on students' academic performance in mathematics with a contribution of 27, 6% (Rahmawati et al., 2017). The dimensions of creativity in this study include; fluency for the ability to build many ideas, Flexibility the ability to try various alternative approaches to

solve problems, Originality the ability to produce extraordinary ideas that are not common. Problem sensitivity is the ability to recognize the existence of a problem. Elaboration is the ability to cut, develop or affix an idea or product (Guilford, 1960).

Self-efficacy is defined as person's beliefs about him/herself (Seçil Bal Taştan, et. All., 2018). Such beliefs have an impact on the emotional state, choice, effort, endurance, ability and capacity of the individual to perform a task or cope with the demands of a challenging environment (Pajares, 1996). Self-efficacy is measured based on three dimensions namely; (1) The magnitude (or level) refers to how difficult someone finds it to adopt certain behaviors, (2) Strength reflects how a person can perform certain tasks, (3) Generalization refers to the extent to which beliefs are positively related in the domain of behavior, (Bandura, 1977). In this study self-efficacy measured by the General Self-Efficacy Scale (GSES) instrument was adapted and developed by Schwarzer and Jerusalem (1995), Bandura (1997), Teo & Kam (2014). Curiosity is defined as a multi-dimensional construction that includes the desire to know more deeply (Shelby Clark & Scott Seider, 2017).

Curiosity is the readiness and desire to consciously and openly carry out tasks that involve objects of knowledge, and motivation to reveal reality and facts (Lewis, 2012). Curiosity is very important for human survival and growth. When a person has Curiosity towards an object, he strives by: asking questions, manipulating interesting objects, taking risks to gain new experiences, persisting in challenging tasks, exploring, and immersing himself in situations of potential new information (Todd B Kashdan, et al., 2017). There are five dimensions of curiosity: Exciting exploration, deprivation sensitivity, stress tolerance, social curiosity, and sensation seeking (Todd B. Kashdan, et al., 2017).

### Academic performance

The intended academic performance is the performance of qualified students to make a difference at the local, regional, national and global levels. The quality of academic performance of students varies between one school and another school, this is influenced by culture, socio-economic structure and personal characteristics that color the psychological behavior of students such as creativity, curiosity and self-efficacy affect the quality of academic performance (MS

Farooq et.al., 2011 ; Jansen & Maartje EJ, Raijmakers, 2018). Based on Walberg's educational productivity theory, there are nine factors for the optimization of effective learning, namely: Aptitude (ability, development and motivation); instruction (number of students in the class and quality of learning); environment (home, classroom, peers and facilities) (Roberts, 2007). Academic performance is influenced by various levels including psychological behavior, interaction with parents, teachers, and the larger systems that surround it such as; school culture, socio-economic environment, government policies, these factors have been shown to have a positive impact on academic achievement and student development ( Cornelius-White & Harbaugh, 2010). Findings from the study stated academic performance in mathematics and natural sciences is predicted by students' psychological behavior in carrying out learning tasks. Students who perform well are active in carrying out assignments, while students who perform poorly are related to task avoidance (Hughes, Luo, Kwok, & Loyd, 2008).

## Objective

The main objective of this study is to investigate the psychological behavior of students influencing academic performance in mathematics and natural sciences. The assumption of this research is that academic performance is influenced by psychological behavior such as creativity, curiosity, and self-efficacy (Baird and Northfield's, 1992). Research question: Is there an influence of psychological behavior on academic performance in public and private high schools in the Karawang regency of Indonesia.

## Hypothesis

H1: There is a significant influence of psychological behavior on student achievement

H2: There are significant differences in the psychological behavior of students in public and private high schools in the Karawang regency of Indonesia.

## Method

### Population

The target population in this study are public and private high schools in the Karawang regency of Indonesia. The number of schools is 30 public high schools and 19 private high schools with 11,000 students (grade 10) and a total of 34,300 students.

### Samples and sampling procedures

Based on Louis C, Lawrence M and Keith M in Alejandra Navarro Sada & Antonio Maldonado (2007), sample sizes, confidence levels and confidence intervals for random samples, from an accessible population of 34,300 high school students. Multistage sampling technique is used in sample selection with initial stratification of areas into urban, suburban and rural areas. The purposive sampling technique was then used to select 11,000 first grade high school students from each school, while the proportional random sampling technique was used to select a sample size of 390 students, and 386 students could be analyzed.

### Instrument

The instruments used to measure psychological behavior and academic performance tests include three psychological tests and two academic performance tests as follows: (1) Creativity tests use a combination of figural and verbal tests covering aspects of fluency, flexibility, originality, elaboration, and sensitivity (Torrance 1966; Guilford, 1960) adapted 20 circle figural tests and 32 verbal test items with a Cronbach Alpha score of .82; (2) General Self-Efficacy Scale

(GSES) was adapted from Instrument developed by (Schwarzer and Jerusalem, 1995; Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005; Teo & Kam, 2014) with Cronbach's alpha values .75 Instrument. 10 items of the GSES test on a scale of 1-4 (strongly agree, agree, disagree, strongly disagree), (3) Curiosity and Exploration Inventory (CEI) adapted developed by Sheldon, Jose, Kashdan, & Jarden (2015) 10 items with a scale of five answer choice categories: Very Appropriate (VA), Appropriate (A), Less Conforming (LC), Unsuitable (U) and Very Unsuitable (VU) Cronbach's Alpha value of .87; (4) Test instruments mathematics is taken from a question bank developed by a mathematics teacher as many as 8 structured essay items with a total value of 100, with a Cronbach Alpha value of .80; (5) Natural sciences test instruments taken from a question bank developed by a natural sciences teacher as many as 10 items structured essays with a total score 100, with this by Alpha Cronbach .78.

## Research procedure

The first day of conditioning the classroom comfortably to avoid the tension of participants in carrying out the test. Next, students are given a 60-minute creativity test that includes 20 circle figural tests and 32 item verbal tests. The second day, there was a 30 minute self-efficacy test, students are given a General Self-Efficacy Scale (GSES) test covering 10 items magnitude, strength, and generality aspects. On the third day doing a 30 minute curiosity test, students were given a Curiosity and Exploration Inventory-II (CEI) test of 10 items from 5 dimensions of curiosity namely; explore, discover, adventurous, deprivation sensitivity and questioning. On the fourth day, students take a 60-minute Mathematics test. Students are given 8 items of structured essay mathematics test items with a total grade of 100. On the fifth Day, students take a 60 minute natural sciences test. They were given 10 items of structured natural sciences essay tests with a total score of 100. Data analysis was performed using the multivariate analysis of covariance (MANCOVA) method, the data were tested based on the normality of Kolmogorov Smirnov and Homogeneity Tests with the Levene's test. Hypotheses were tested using the multiple linear regression summary model, Wilk's lambda multivariate test and post hoc test with the help of SPSS version 23.

## Result

Table 1. shows that there is a significant correlation between the dimensions of psychological behavior and academic performance, namely: the correlation coefficient of creativity with mathematics ( $r = .600$ ;  $p < .000$ ), creativity with natural sciences ( $r = .577$ ;  $p < .00$ ); correlation coefficient of self-efficacy with mathematics ( $r = .564$ ;  $p < .00$ ); self-efficacy with natural sciences ( $r = .505$ ;  $p < .00$ ); the correlation coefficient curiosity with mathematics ( $r = .364$ ;  $p < .00$ ); curiosity with natural sciences ( $r = .278$ ;  $p < .00$ ). This is still in line with previous research that psychological behavior has a relationship with academic performance (Nori, 2002; Karimi, 2000; Pajares & Valiante, 1999).

Based on the summary model (first model from table 2.) multiple regression analysis shows that the dimensions of psychological behavior predict academic performance in mathematical tests, the model was significant ( $R = .638$ ,  $R^2 = .407$ , Adjusted  $R^2 = .403$ ,  $p < .001$ ). As indicated by the coefficient of determination ( $R^2$ ), the dimensions of psychological behavior simultaneously contribute 40.3% of the variance in mathematics performance.

Table 2. explains that the dimensions of psychological behavior predict significantly to academic performance in mathematics, as evidenced by the standardized coefficient of multiple regression analysis: creativity ( $\beta = .176$ ,  $p < .000$ ); self efficacy ( $\beta = .586$ ,  $p < .002$ ); and curiosity ( $\beta = .304$ ,  $p < .000$ ). The prediction standard equation

**Table 1.** Descriptive statistic and correlations among variables

	Score Range	M	SD	Skew	Kurt	1	2	3	4	5
1. Creativity	32-260	117.16	43.57	.590	.594	1				
2. Self-Efficacy	10-40	23.64	6.80	.792	.478	.780**	1			
3. Curiosity	10-50	26.56	10.88	.796	-.327	.324**	.351**	1		
4. Math	0-100	60.59	19.77	-.299	-.593	.600**	.564**	.364**	1	
5. Natural sciences	0-100	64.14	18.94	-.470	-.427	.577**	.505**	.278**	.839**	1

**Table 2.** Coefficients of Standard Linear Regression of Mathematics Scores on Psychological Dimension

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Beta	Std. Error	Beta			Tolerance	VIF
(Constant)	18.028	2.993		6.023	.000		
Creativity	.176	.029	.388	6.141	.000	.388	2.574
Self-Efficacy	.586	.185	.202	3.162	.002	.380	2.629
Curiosity	.304	.077	.167	3.963	.000	.870	1.149

a. Dependent Variable: Mathematics Scores

**Table 3.** Coefficients of Standard Linear Regression of Natural Sciences Scores on Psychological Dimension

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Beta	Std. Error	Beta			Tolerance	VIF
(Constant)	29.030	3.010		9.644	.000		
Creativity	.198	.029	.455	6.858	.000	.388	2.574
Self-Efficacy	.331	.186	.119	1.774	.077	.380	2.629
Curiosity	.155	.077	.089	2.013	.025	.870	1.149

a. Dependent Variable: Natural sciences Score

for mathematics performance as observed is as follows: Mathematics academic performance = 0.388 (Creativity) + 0.202 (Self-Efficacy) + 0.167 (Curiosity). This finding is still relevant to some research which shows that psychology is predicting academic performance in mathematics (Churcher, Asiedu-Owuba and Adjabui (2015). Like curiosity, students are very important for students' academic and intellectual development (Ostroff, 2012). As well as individual self-efficacy in the importance of mathematics in supporting other subjects.

The results of the multiple linear regression analysis in the summary model (the first model in table 3) show that the dimensions of psychological behavior predict significant performance in natural sciences tests (R = .589, R<sup>2</sup> = .347, Adjusted R<sup>2</sup> = .0342, p < .001). All dimensions of psychological behavior simultaneously contribute 34.2% of the variance in natural sciences performance.

Table 3. explains that there are two dimensions of psychological behavior predicting the performance of natural sciences tests significantly as evidenced by the standardized coefficient; creativity ( $\beta = .198$ , p < .000); and curiosity ( $\beta = .155$ , p < .025). Whereas self Efficacy predictor did not significantly affect natural sciences performance ( $\beta = .331$ , p < .077). The prediction standard equation for the observed academic performance of natural sciences is as follows: Natural sciences academic performance = 0.455 (Creativity) + 0.119 (Self-Efficacy) + .089 (Curiosity).

This finding is in accordance with research Vuong, et.al, (2010) states that the dimensions of creativity and curiosity are significant predictors of natural sciences performance, whereas self efficacy is not a significant predictor of natural sciences performance.

### Hypothesis test

H1: There is a significant influence of psychological behavior on student achievement. Multiple regression analysis and summary models show that: There is a significant influence of the psychological dimension on mathematics achievement (R square = .693; F = 287,884,

p = .000); significant influence on science achievement (R square = .721; F = 329,536, p = .000).

H2 : There is a significant difference between the psychological behavior of students from public schools and private schools in high schools in the Karawang Regency of Indonesia. Two-way multivariate analysis of variance was used to test whether there were statistically significant differences in psychological behavior among urban, suburban and rural high school students and also between public and private schools. Examination of the box covariance matrix test (Box's M) shows that the covariance matrix of psychological behavior is the same in all settings (Box's M = 423,277, p = 0,000).

Table 4. illustrates the results of a multivariate test that shows that there are significant main effects for public and private students (Form) wilk's lambda = 0.930, F (5,530) = 0.0039, p = 0,000) Partial Eta Square = .070. Thus, there are significant differences in the psychological behavior of students from public schools and private schools in the learning process. Based on multivariate test results showed there were significant differences in creativity for public schools (M = 121.51) and private schools (M = 110.217) (M diff = 31.36; F (32.205) = 0.05, p < .000, eta square = .016). Thus, students in public high schools show a higher level of creativity than students in private high schools. Further findings for self-efficacy in public schools (M = 24.20) and private school students (M = 22.13) (M diff = 3.6706; F (12.764) = 0.05, p < .000, eta square = .019). Thus, students in public high schools show higher levels of Self Efficacy compared to students in private high schools. Subsequent findings for Curiosity in public schools (M = 28.31) and private school students (M = 25.00) (M diff = 9.2282; F (16.997) = 0.05, p < .000, eta square = .019). Thus, students in public high schools show a higher level of curiosity than students in private high schools.

These findings indicate differences in the psychological behavior of students in the teaching and learning process due to the existence of school location arrangements and the form of public and private schools. The above findings are still in accordance with the results of

Hurlock's research (1991) which states that there are differences in student behavior in urban, sub-urban and rural areas. Students who live in urban areas are required to have a positive attitude and be creative in dealing with individualistic environmental conditions, full of competition and the demands of life (Hurlock, 1991). Other findings from this study indicate that gender did not have a significant effect on psychological dimensions: Creativity ( $F(1,812) = 0.039, p = .179$ , Partial Eta Square = 0.005); Self Efficacy [ $F(.962) = 0.039, p = 0.327$ , Partial Eta Square = 0.003]; Curiosity [ $F(2,470) = 0.039, p = 0.117$ , Partial Eta Square = 0.007].

## Discussion

This study investigates the psychological behavior of public and private high school students in urban, sub-urban and rural areas on academic performance in mathematics and natural sciences. Psychological behaviors investigated in this study are creativity, self-efficacy, and curiosity. The results showed that psychological behavior was a significant predictor of academic performance in mathematics and natural sciences. Further results show that there are differences in the significant effects of students' psychological behavior on the location settings and form of school in the process of learning mathematics and natural sciences. Likewise, the results of Tood B. Kashdan, et al., (2017) research stated that when a student has curiosity towards a subject matter, then he tries to make the object interesting, he will explore it to gain new experiences, carry out the task seriously and if there is something that has not been understood yet so he asked the teacher questions to obtain new information. In these situations the teacher must provide guidance in the process of finding their knowledge (Long, W, 2017). Furthermore, effective learning requires that teachers must be competent and able to apply pedagogic, that is, understand the characteristics of students in providing assistance for the achievement of students' academic performance.

Likewise the teacher must develop a self-efficacy attitude for students to be proactive when confronted with subject matter with full responsibility (Le, Casillas, Robbins, & Langley, 2005). In an effective learning effort the government, in this case the Ministry of Education, conducts regular monitoring and evaluation in gathering information about problems and gaps that occur related to improving the quality of education. As; lack of teachers, infrastructure and facilities. The results of this study found that there were significant differences in the psychological behavior of public and private students in urban, sub-urban and rural locations. This occurs the difference in facilities as observed. This finding is in accordance with Opoku-Asare and Siaw's (2015) research which confirms that differences in school facilities in urban, sub-urban, and rural broaden the gap in the quality of education. Academic performance of students in urban areas is higher than students in sub-urban and rural areas. This is because urban schools have good facilities, quality teachers and schools in urban areas perform better than schools in sub-urban and rural areas (Hurlock, 1991; Chambers & Schreiber, 2004).

## Conclusions & Recommendations

This study has analyzed three dimensions of psychological behavior in academic performance in public and private high schools in urban, sub-urban and rural areas. The findings of this study indicate that creativity, self efficacy, curiosity, are significant predictors of academic performance in mathematics and natural sciences. The next research finding is that there are significant differences in the psychological behavior of public and private high school students in urban, sub-urban and rural areas in academic performance. Based on observations in this study that teacher facilities and quality determine student behavior

in the classroom in the process of learning mathematics and natural sciences.

It is recommended that the government to reduce the gap in the number of teachers in urban areas compared to sub-urban and rural areas, as well as the low quality of teachers. Schools in the urban areas have good and complete facilities compared to rural areas that have poor facilities and less competent teachers. The next recommendation for teachers in achieving effective learning in class, teachers must consider psychological behavior, this is a concern for the teacher's strategy in developing the learning process in class by strengthening cognitive, metacognitive, logical, and reasoning behaviors. Teachers build and encourage students to be more active, creative, and innovative in the learning process.

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