

Relationship Analysis Between Mathematics Problem Solving Skill and Student's Mathematics Anxiety Level

Fatya Azizah^{1, a)} and Hartono^{1, b)}

¹*Yogyakarta State University*

a)fatyaazizah9@gmail.com
b) hartono@uny.ac.id

Abstract. Mathematics problem solving skill is very important for our everyday life as we know that mathematics problem solving process is a thinking process that leads to a new and useful results at the situation. Behind the importance of mathematical problem solving skills, there are certainly some unavoidable difficulties for student to have that skill. One of the factors that caused the difficulties is mathematics anxiety. This problem is relevant for some people and still in doubt for other people because they found out that mathematics anxiety leads to lower mathematics problem solving skill. Solution of a problem depends on how the problem occurs. If mathematics anxiety problem leads to lower mathematical problem solving skill of students, then the solution must be some certain steps. However, if what happens is the opposite (mathematics anxiety problem caused by the low math ability of students), then the solution given of course also different. This study is aimed to explore deeper fact about the relationship of these two variables and which one gives stronger effect to the other so that the exact solution of the problem can be taken. This study is a survey research with 366 of 8 grader students of 17 junior high schools. Data collecting methods in this study are test and questionnaire. Data will be analyzed with simple correlation and regression analysis. The study result shows that mathematics problem solving skill had a weak relation to mathematics anxiety and mathematics anxiety gives stronger to mathematics problem solving while the affect given by problem solving skill to mathematical anxiety is as much as the affect given by anxiety mastematics to the mathematics problem solving skill.

INTRODUCTION

The main purpose of mathematics learning according to [1] is that students can solve problems in everyday life. [2] also stated that mathematics problem solving skill is the center of mathematics educational program. The steps in solving the mathematical problems described by [3] are understanding the problem, devising a plan, carrying out the plan, and look back.

Behind the importance of mathematical problem-solving skills, there are certainly some unavoidable difficulties. Related to the difficulty in learning mathematics, [4] argued that the anxiety of mathematics becomes higher when the ability of students in learning mathematics is lower. [5] quotes Richardson and Suinn (1972) that mathematical anxiety is a tense and anxious feeling that interferes with the activity of numerical manipulation and mathematics problem solving activity in real life and learning situation.

Based on data from the [6] some countries with students whose math skills are above average have below average mathematical anxiety, for example Liechtenstein. On the other hand, there are some countries whose under-average mathematical ability has an above-average mathematical anxiety, for example Argentina. These examples give a pattern that mathematical ability is inversely related to mathematical anxiety. On the contrary, there are also some countries whose mathematical abilities are above average but also have mathematical anxiety above average for example Japan, Korea and Singapore. On the other hand, there are also countries whose math

skills are below average and have mathematical anxiety also below average, for example Sweden and the United States. These examples show the opposite pattern compared to the previously formed pattern of mathematical ability which is directly proportional to the students' mathematical anxiety.

Solution of a problem depends on how the problem occurs. If mathematics anxiety problem leads to lower mathematical problem solving skill of students, then the solution given by Hambree (1990) in [7] is that parents and teachers have to participate to handle student's mathematics anxiety, understand the mechanisms of how anxiety affects student's mathematics skills. This can be very helpful in reducing student's mathematics anxiety, which will also give some impact on mathematical ability. However, if what happens is the opposite (mathematics anxiety problem caused by the low math ability of students), then the solution given of course also different.

Based on the description about mathematics skills problem, especially the mathematics problem solving skill and mathematics anxiety problem above and for finding the best solution, it is necessary to conduct a research to analyze the relationship between problem solving ability and mathematical anxiety of students which includes the description of the relationship between the two variables and which variable give influence bigger one another.

RESEARCH METHOD

Research type

Based on the research purpose, the type of this research is survey research. Survey research is a research conducted with large population and sample to generalize the results of research.

Place and time

This research is planned to be implemented in Banjarbaru City at VIII grade of Junior High School students. This research is implemented on February 2018.

Population and sample

Population

The population of this research are VIII grade students of Junior High Schools in Banjarbaru City. There are 36 Junior High Schools in Kota Banjarbaru with total number of students are 4294. A accredited Junior High School Banjarbaru City are 22 schools, B accredited Junior High School is six schools, while C accredited Junior High School were not found and schools with not-accredited status totaled eight schools.

Sample

Based on calculations from the Slovin formula with a precision level of 5%, obtained a sample of at least 366 students. The researcher assumes the mean number of students of each class is 25 students, so that would be selected at least about 15 of 36 schools in Banjarbaru City for the sample in this study. Proportional sampling is used to determine the sample proportionately for each stratum.

From the calculation results with certain formula, the number of schools as a sample of each strata were obtained. Nine schools with accreditation A, three schools with accreditation B, and three schools that are not accredited.

Data collection technique and instruments

Data collection techniques conducted in this study are test and questionnaire given once and also observation and interview. Data collection to measure problem solving ability was obtained by using 5 essay problems with first semester material in grade VIII. Measurement of students' mathematical anxiety will be done by giving questionnaires with the scale of 1-5, 30 items of positive and negative statements. While to classify and describe the characteristics of the school conducted interviews and observations at the school with interview guides and observation guidelines.

Instrument validation

Testing the validity of the problem solving test using content validity. Questionnaire of mathematics anxiety using content validity and construct validity with factor analysis.

Data analyse technique

Analyzing the relationship between mathematics problem solving skills and student's mathematics anxiety, using simple correlation analysis test of Pearson or product moment Pearson method. Then analyze the influence of both variables on each other using simple regression analysis.

Assumptions

The students were expected to answer the questionnaire honestly, the measuring tools used were required to be measured accurately and the work is a successful representative stated as the researches assumption.

Limitations

The study was administered between 2017-2018 academic year in Banjarbaru City of 15 different junior high schools which consists of 376 students.

FINDINGS

The discussions related to the findings will be stated in this section. The findings are stated as below.

1.1. Correlation

TABLE 1. The relationship between student's mathematics anxiety and mathematical problem solving skills points

		MPS	MA
KPM	Pearson Correlation	1	-.317**
	Sig. (2-tailed)		.000
	N	376	376
KM	Pearson Correlation	-.317**	1
	Sig. (2-tailed)	.000	
	N	376	376

The data in table shows the points between mathematic anxiety and mathematical problem solving skills points of correlation coefficient $r = -0,317$ and significant level as $p < 0.001$. Here student's mathematic anxiety points and mathematical problem solving skill points indicate significance and are negative, though it shows a low level of relationship.

1.2. Regression

TABLE 2. The number of mathematical problem solving skills affect to mathematics anxiety

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317 ^a	.101	.098	5.142

a. Predictors: (Constant), MPS

Based on the table below, we can see the R square is 10,1% that means mathematical problem solving skill gives 10,1% affect to student's mathematics anxiety and the rest 89,9% are given by other factors.

TABLE 3. The number of mathematics anxiety affect to mathematical problem solving skills

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317 ^a	.101	.098	5.867

a. Predictors: (Constant), MA

Based on the table below, we can see the R square is 10,1% that means student's mathematics anxiety also gives 10,1% affect to mathematical problem solving skill and the rest 89,9% are given by other factors.

DISCUSSION

As a result of the study, the test made to measure the relationship between students mathematical problem solving skills and mathematic anxiety resulted a coefficient correlation as $r = -0,317$. The low level of relationship between these two variables is transparent. Viewing the significance between the two variables the p value has been found as 0.000. These numbers indicates a low but negative significant relationship. It means every time mathematics problem solving skill is getting bigger, the mathematics anxiety is getting smaller, and vice versa. R square of both mathematical problem solving and mathematics anxiety as independent variable shows a similar number 10,1% that means there are same strong effect of these two variable to each other.

Mathematics problem solving skill and mathematics anxiety are mostly considered to be related to one another. This research shows us clearly that the relationship between the two variables is significant but not strong enough. This means, there are many other factors that affect student problem solving skill and mathematics anxiety. In this case, it appears in the findings section that these two variables only have an affect as much as 10.1% to each other with the same amount of effect. The affect of these two variables to each other can be seen in the following diagram.

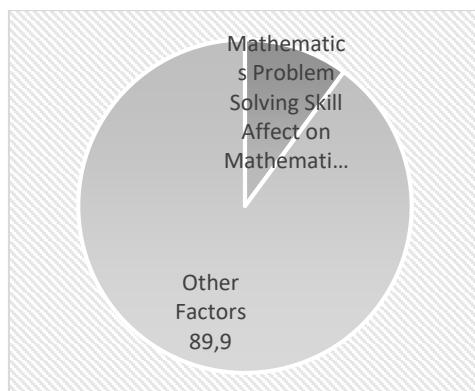


FIGURE 1. Mathematics Problem Solving Skill Affect on Mathematics Anxiety and Vice Versa

There are so many possibility to the other factors that can affect these two variables, it is also possible if one of them got bigger effect. [8] shows in their research that there are some variebles that give affect on student's problem solving skill such as the pupils' mastery of basic skills, attitude towards mathematics, and parental involvement. In addition, [9] stated that mathematics anxiety also had some factors such as cognitive factors, psychological factors, physical factors and environmental factors. There are so many other factors can be found that affects on mathematics problem solving skill and mathematics anxiety and it needs further research to know which one have bigger affect than the others.

CONCLUSION AND RECOMMENDATION

The result of this study shows that students in Banjarbaru has significant weak and negative corellation between mathematics problem solving skill and mathematics anxiety. Research also find that these variables give affect to each others with same percentages.

A similar result had been discovered by [10] where primary education students' anxiety and problem solving skills were measured in the study had affect to each others.

In years before, different studies were administered by researchers Ramirez et al (2016) where student's working memory capacity effect their anxiety levels.

It is considered that if the research consists of more student than studied work group then more effective results can be obtained. It is also better if the further study about mathematics problem solving skill and mathematics anxiety can be held to know the other factors and how much they affect to one another. The same study in other country is also needed as comparation to this study.

The exact solution of the educational issues in Banjarbaru is desired as more significant findings that describes the situation has been founded in this study.

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