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THE EFFECT OF MATH ANXIETY ON ACADEMIC PROCRASTINATION OF JUNIOR HIGH SCHOOL STUDENT

Lusiana Nur Maghfiroh[1], Trisna Roy Pradipta[2*]
[1,2] Department of Mathematics Education, Universitas Muhammadiyah Prof. DR. Hamka, Jakarta Province, Indonesia

*Correspondence: troymath@uhamka.ac.id

ABSTRACT

Academic procrastination is a form of task avoidance that occurs due to the inability to complete a task. One of the effects of academic procrastination on students is that it causes students to have limitations in learning mathematics, which is often referred to as math anxiety. This study aims to determine the effect of academic procrastination on math anxiety experienced by junior high school students facing the dynamics of the transition of learning from online to offline. This study used a quantitative approach with a survey and the subjects of this study were seventh grade junior high school students in one of the cities in Bekasi. The instruments in this study used valid instruments and had gone through expert testing with a total of 11 indicators and 28 items for math anxiety and 4 indicators and 16 items for academic procrastination. This study describes a descriptive quantitative measure measured by RASCH model using Winstep and SPSS software. The results showed that the person correlation coefficient was 0.312 with a Sig, (2-tailed) = 0.004 <0.05, indicating a correlation between variables of 9.7%, which means that math anxiety may underlie academic procrastination, which is classified as weak. Since the regression coefficient is positive, the conclusion is that math anxiety has a positive effect on academic procrastination.

Keywords: Math Anxiety, Academic Procrastination, Rasch Model, Pearson Correlation

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PRELIMINARY

Mathematics is the science of magnitude, shape, order and size and is important in the way and process of finding correct concepts and consistent symbols, properties, relationships between numbers and sizes (Mustafa 2021). Therefore, the purpose of learning mathematics is set so that students can understand numbers and mathematical language and have a good understanding of the number system and symbols to improve the learning of mathematics in any textbook as a whole. Conceptual understanding can be seen as the ability of students to understand concepts that implement procedures (algorithms) that are systematic and sequenced systematically, flexibly, accurately, efficiently, and precisely (Septian, Agustina, and Maghfirah 2020). Despite the importance of mathematics, some

students still find it difficult to acquire mathematical knowledge because they do not understand the number system, symbols, mathematical concepts and values, or because they have limited ability, perseverance and persistence to learn in this area. Pupils' difficulties in understanding mathematical symbols lead to mathematical anxiety, which is characterized by irregular heartbeat, worry, panic and discomfort during the learning process.

Many factors influence the occurrence of mathematics anxiety factors, such as the correlation between students and educators about poor writing used in class (Ihechukwu, Nwoke and Ugwuegbulam 2016) and negative perceptions of mathematics (Kunwar, Education, and Campus 2020). One of these is shown in Fatrima's research (Santri 2017), which shows that mathematics anxiety affects learning outcomes, meaning that some students feel anxious and fearful about their level of self-efficacy in dealing with what their mathematics teacher is teaching (Ikhsan 2019).

Therefore, for students who feel uncomfortable, scared or anxious about mathematics, there are many factors that arise from mathematics anxiety that limit their understanding of mathematics and cause them to avoid mathematics. Students with high levels of anxiety are more likely to avoid situations related to learning, especially mathematics. The habit of studying only at certain times, such as before exams or when students do not have a certain study schedule, also affects the effectiveness of learning, which leads to the lack of certain study habits or schedules that have an impact on the influence of anxiety levels (Istikomah, Herlina, and Nurmaliza 2022). As a result, students develop a procrastinating attitude towards mathematics learning activities (Putri and Kurniasari 2020). Someone who tends to postpone work or does not do it immediately can be called a procrastinator (Ilyas and Suryadi 2017). Procrastination occurs due to negative effects that become unmanageable obstacles and interfere with cognitive functions of concentration, causing ignorance in planning something or prioritizing tasks or homework. One of the factors or aspects that cause academic procrastination occurs due to internal and external factors, including students' lack of understanding of learning materials, lack of confidence, poor time management skills, and boredom with assigned tasks (Wulandari, Fatimah, and Suherman 2021).

Procrastination plays an important role in mathematics learning because it can have a significant impact on student productivity. One of the efforts to reduce academic procrastination is to identify causal factors, effects, and effective strategies (Aviani and Primanita 2020). Procrastination behavior has a different impact according to the previous explanation, where students' math anxiety has a significant negative relationship. Evidence

in research conducted by I Komang (Putra 2022) suggests that there is a contribution of math anxiety to procrastination when viewed from mathematical literacy. There is a continuum between math anxiety and academic procrastination, but what is interesting is that students who experience math anxiety are less likely to experience academic procrastination and have a higher level of mathematical literacy. However, this statement is not consistent with the results of the study conducted by Bayu Permana (2019), namely academic procrastination during the COVID-19 pandemic among Grade XI students, which explains the indirect relationship with math anxiety when students cannot complete their assignments on time. As a result, they do not have enough time to understand math problems well, which increases their stress level while learning math and also leads to anxiety attacks.

This academic procrastination increases during the pandemic, so it has the potential for boredom in the learning process, not to mention that students are faced with demands to learn and get good grades without any learning motivation from teachers or peers (Zega 2022). This situation makes students think negatively about themselves, especially in the face of difficult learning such as mathematics. Anxiety in dealing with mathematics is important because of the interpersonal relationships involved in understanding mathematics. Therefore, math anxiety is subjective for each individual and affects the level of difficulty in understanding math (Wicaksono and Saufi 2013).

In this regard, this study aims to examine and identify the impact of math anxiety on academic procrastination among junior high school students in Bekasi, especially after facing the dynamics of learning transition from online to offline.

METHODS

This research is a descriptive quantitative research with a survey research method. Based on the slovin formula as a sample determination with a size of 100 students, 82 students consisting of 4 classes grade VII from junior high school in Bekasi as respondents in this study. Through random sampling technique, 4 classes were obtained, namely VII-13 = 25 students, VII-14 = 19 students, VII-15 = 24 students, and VII-16 = 15 students. Data collection procedures in this study include math anxiety and academic procrastination questionnaires that have gone through the validation test stage by expert tutors from lecturers and will be analyzed by using Winstep and SPSS software. The data analysis used is the presentation of the scaling results obtained by Winstep for the variables Math Anxiety (X) and Procrastination Behavior (Y) in the form of statistical output and variable tables (lightmap).

Below is a table of indicators of math anxiety, which includes three aspects (cognitive, affective, and physiological), while procrastination has four aspects (outcome satisfaction, pressure preference, intentional decision, and ability to meet deadlines) as in tables 1 and 2.

Table 1. Math Anxiety Scale Indicator

No	Aspects of Math Anxiety	Indikator	Item Number		Total
			Favorable	Unfavorable	
1	Cognitive	Self Ability	4	1	2
		Self-Confidence	3	2	2
		Difficult to Concentrate	6	5	2
		Fear of Failure	8	7	2
2	Affective	Nervousness	10	9	2
		Unhappy	12	11	2
		Restlessness	16	13	2
3	Physiological	Nausea	15	14	2
		Cold Sweat	18	17	2
		Heart palpitations	20, 21	19	3
		Headache	23, 24	22	3
Total			15	13	28

(Sholichah and Aini 2022)

Table 2. Academic Procrastination Scale Indicator

No	Aspects of Academic Procrastination	Item Number		Total
		Favorable	Unfavorable	
1	Outcome Satisfaction (OS)	-	1,2,3,4	4
2	Preference for Pressure (PP)	-	5,6,7,8	4
3	Intentional decision (IDP)	9,10,11,12	-	4
4	Ability to Meet Deadline (AMD)	-	13,14,15,16	4
Total		4	12	16

(Purwanto and Natalya 2019)

Positive statements include sentences that support aspects rated 1 to 4, while negative statements do the opposite. Thus, the higher the score on the questionnaire, the higher the aspects of math anxiety and procrastination experienced.

Data were collected on two consecutive days from seventh grade students attending math classes at the school. The students were asked to voluntarily complete a math anxiety questionnaire covering cognitive, emotional, and physiological aspects of math anxiety, as well as academic procrastination behaviors in terms of outcome satisfaction, preference for pressure, internal decision, ability to meet deadlines. The results of this research questionnaire include 28 items on math anxiety and 16 items on academic procrastination behavior, which can be answered by students using a 1-4 Likert scale. The questionnaire

asked students to define the extent of their math anxiety and procrastination behaviors in dealing with daily situations and learning math.

In this study, the assumption of questionnaire data, which was previously in the form of ordinal data, is converted to interval data with the RASCH model using Winstep software. Ordinal data are semi-quantitative data that are visualized by numbers as symbols of qualitative data, such as number 1 (strongly disagree), number 2 (disagree), number 3 (agree), number 4 (strongly agree).

The data analysis used is quantitative descriptive analysis using a linear regression model to determine the relationship between two variables and the Pearson correlation coefficient to determine the level of relationship between variables. The type of relationship between variable X (math anxiety) and variable Y (academic procrastination) is determined based on the Sig. value decision and determine the level of relationship according to the coefficient interval. The guidelines for the degree of relationship are described in the following table:

Table 3. Degree of Relationship Guidelines

Coefficient Interval	Relationship Level
0,00 – 0,199	Very Weak
0,20 – 0,399	Weak
0,40 – 0,599	Medium
0,60 – 0.799	Strong
0,80 – 1,000	Very strong

RESULTS AND DISCUSSION

This study examines the relationship and influence of math anxiety (X) and academic procrastination (Y) using a questionnaire consisting of 28 items with 11 indicators for math anxiety and 16 items with 4 indicators for academic procrastination involving 82 students. After obtaining ordinal data, the data are transformed into interval data using logit with Winstep software.

The minimum logit obtained is -1 and the maximum is 3. The average math anxiety questionnaire has a person reliability of 0.78 and academic procrastination of 0.40. A score of 0.80 is considered an ideal item reliability score that can interpret the consistency of respondents (Siska Pramasdyahsari et al., 2022). To view the respondents' responses, logit-based statistical tables visualized the high and low scores on the math anxiety and academic procrastination measures in three categories: high, medium, and low.

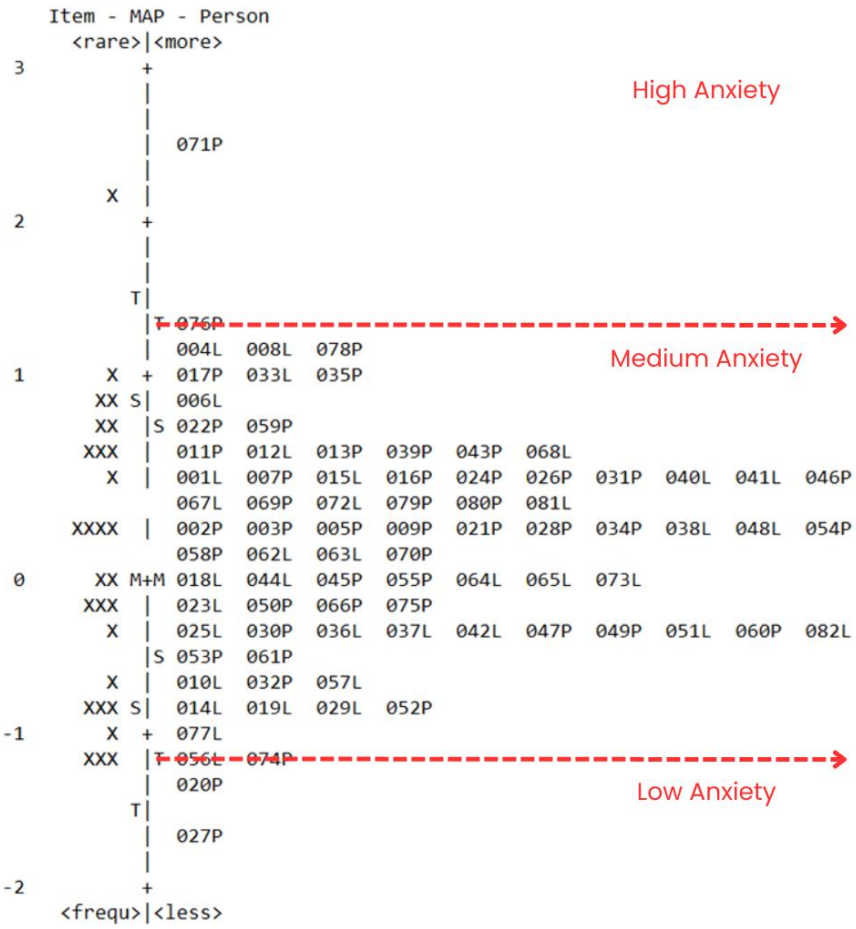

Figure 1. Results of Person Maps Output Table Math Anxiety

In Figure 1, the left column represents the item column and the right column represents the respondent column. An average value greater than logit 0.0 indicates that respondents tend to respond to statements that they agree with across items (Sumintono & Widhiarso, 2014). The results of data analysis in the figure above show that there is one student who has the highest level of math anxiety, namely the student with code 071P with a logit value of +2.45. Math anxiety at a moderate level is dominated by 96.3% and students who experience low levels of anxiety by 2.4%. Students with low levels of anxiety have been shown to be more receptive and enthusiastic about learning mathematics than students with moderate or high levels of anxiety (Wantika and Nasution 2019).

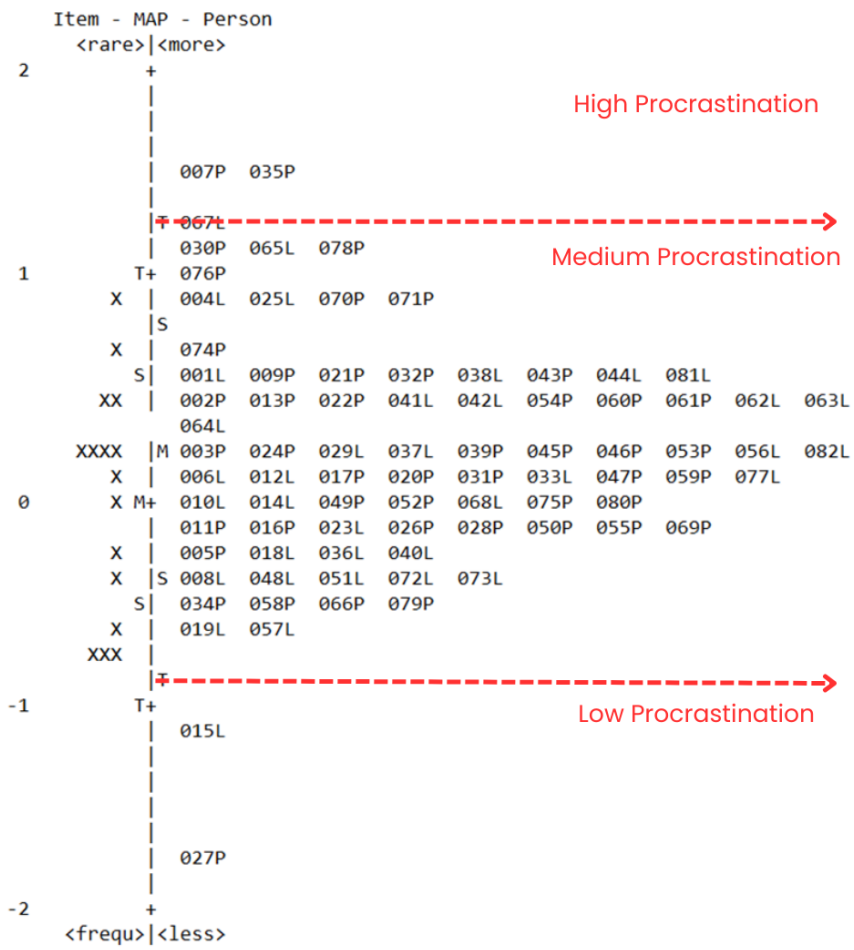

Figure 2. Results of Person Maps Output Table Academic Procrastination

While the results of data analysis in Figure 2 show that there are two students who have the highest level of academic procrastination, namely students with code 007P and 035P with a logit value of +1.55. Academic procrastination is dominated at a moderate level of 95.1% and students who experience low level of anxiety are 2.4%. In addition, the research data will be tested for normality to assess whether or not a set of data is normally distributed on the variables.

The results obtained in this study show that students have a fairly high percentage for each variable found in Wright's map scale. Math anxiety associated with cognitive impairment is another definition of math anxiety, which manifests itself in the panic and helplessness that some people feel when asked to solve math problems. Meanwhile, the correlation between the occurrence of academic procrastination can be said to be lazy and complacent people who have no self-control because they know what they need to do, what they want to do, what they can do, and what they want to do but do not (Putri and Edwina 2020).

Table 4. Research Data Normality Test Results

N		82
Normal parameters	Mean	0.50412835
	Std. Deviation	0.82
Most Extreme Differences	Absolute	0.82
	Positive	0.66
	Negative	0.82
Asynm. Sig. (2-tailed)		0.200

Survey data related to math anxiety and academic procrastination were analyzed using a logit model with winstep and analyzed in SPSS, resulting in normally distributed sample data with a significance level of 0.200 > 0.05. This indicates that the data is normally distributed. The data will then be continued with the linearity test to determine the relationship between the variables.

Table 5. Linearity Test Results of Research Data

			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Academic Procrastination * Math Anxiety	Between Groups	(Combined)	9.179	31	0.296	1.087	0.389
		Linearity	2.212	1	2.212	8.122	0.006
		Deviation from Linearity	6.966	30	0.232	0.852	0.675
	Within Groups		13.620	50	0.272		
	Total		22.798	81			

The results of the linearity test between math anxiety and academic procrastination in the table above have several parts including determining the amount of variability with a total square of 9,179. Focusing on the existence of linearity, the Sig. value is a p-value that indicates the significance value of the statistical test. A p-value below a certain level of significance (usually 0.05) proves that there is enough evidence to reject the null hypothesis and conclude that there is a linear relationship between the variables analyzed (Agam et al. 2023). Table 4 shows that there is a significant linear relationship between the dependent and independent variables when looking at the value of deviation from linearity, which has a significance value of 0.675, which is greater than 0.05. This is consistent with the research of Leonard and Amanah (2014) that there is a linear relationship between math anxiety and

academic procrastination when the significance value is greater than 0.05. In the next step, the researcher will conduct a regression test to determine the effect of math anxiety on academic procrastination.

Table 6. Summary of Research Data Regression Test Results

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	2.212	1	2.212	8.597	0.004
	Residual	20.586	80	0.257		
	Total	22.798	81			

a. a. Dependent Variable: Academic Procrastination
b. b. Predictors: (Constant), Math Anxiety

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.312	0.097	0.086	0.50727

a. Predictors: (Constant), Math Anxiety

The regression test results show that math anxiety has a significant effect at the 5% significance level with an R-squared value of 0.097. This shows that the effect of academic procrastination is 9.7% and the remaining 90.3% is still influenced by other factors.

Table 7. Pearson Correlation Test Results of Research Data

		Math Anxiety	Academic Procrastination
Math Anxiety	Pearson Correlation	1	0.312
	Sig. (2-tailed)		0.004
	N	82	82
Academic Procrastination	Pearson Correlation	0.312	1
	Sig. (2-tailed)	0.004	
	N	82	82

The pearson correlation analysis technique was used to test whether there is a relationship or correlation between math anxiety and academic procrastination. Table 6 shows that there is a significant correlation between math anxiety and academic procrastination. This is confirmed by the sig value (2-tailed) = 0.004 < 0.05 (5%) and the Pearson correlation coefficient of 0.0312. Based on this description, the correlation between math anxiety and academic procrastination is in the low category, so hypothesis H_0H_0 is

rejected and hypothesis H_1H_1 is accepted which leads to the conclusion that there is a correlation between math anxiety and academic procrastination behavior.

The results of the correlation between math anxiety and academic procrastination in junior high school students after the dynamic transition of learning from online to offline. This can be seen with the Sig value, (2-tailed) = 0.004 < 0.05 (5%). This shows that the correlation value of the relationship between math anxiety and academic procrastination is in the weak category. This shows that there are still many other factors or variables that influence the variables studied, both from outside the discipline and from factors within the discipline itself. This is different from the research by Zuraidah et al. (2020) on the relationship between math anxiety and academic procrastination on students' learning achievement, which explains that students' math learning achievement tends to increase as math anxiety and academic procrastination decrease. The most likely reason for the lack of correlation between these variables is that the indicators used do not adequately describe the variables being studied. Because the independent variables in this study had little correlation with math anxiety, future research is expected to investigate factors that influence math anxiety in school settings and other situations.

In addition, due to the limitations of data collection in this study, the reliance on students' honest responses as represented in the statistical data also causes a lack of direct introduction of students through observation and interviews, so that the factors that influence math anxiety can be clearly and definitively known for further study.

The results of this study are also expected to provide input for educators to anticipate math anxiety, which can lead to reactions that cause mental disorganization leading to a negative view of mathematics. One solution that can be minimized by educators is to increase the effectiveness of passive comprehension in mathematics learning, increase interest in learning, provide a more interactive learning atmosphere, and provide consistent punishments and rewards. This is in line with a study conducted by Harimatus Solikah (2019), who found that teacher innovations that optimize the learning environment can increase students' motivation to learn and improve their academic performance. When learning is effective and students feel confident in completing their tasks, their use of time and ability to complete tasks can also reduce academic procrastination.

CONCLUSION

Rasch model tests combined with logit data showed that 96.3% and 95.1% of the students' responses to math anxiety and procrastination were based on interval data suitable

for normality tests. It was found that there was a significant relationship between math anxiety and procrastination based on the scales used. However, only about 9.7% of the correlation regression results for the sample data were found to be linear, meaning that there is a rather weak relationship between the x and y variables influenced by math anxiety, and the remaining 90.3% is influenced by factors other than math anxiety. The results of this analysis suggest that, in addition to the factors already mentioned in this study, further research is needed to follow up on external factors of academic procrastination, such as the influence of the academic environment, tense and stressful learning situations before performing tasks, which are the consequences of math anxiety itself in experimental studies.

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