International Seminar on Student Research in Education, Science, and Technology
ISSN 3047-1532 | Volume 1 April 2024, pp. 324-331

https://www.issrestec.id/
http://journal.ummat.ac.id/index.php/issrestec
Universitas Muhammadiyah Mataram, Indonesia

A Review of Mathematical Anxiety and Its Effect on Middle School Students' Mathematics Assignment Grades

Aisyah Fajri Nur Fatimah[1], Akhsanul In'am[2], Siti Khoiruli Ummah[3]
[1,2,3]Mathematics Education Study Program, Muhammadiyah University of Malang, Indonesia
aisyahfajr10@gmail.com[1]

Abstract: Mathematical anxiety requires special attention in learning mathematics because it is often experienced by students, especially junior high school students. Therefore, the aim of this research was to analyze the influence of junior high school students' mathematics anxiety on mathematics assignment grades. The research method used descriptive with a quantitative approach. The research instrument used was a mathematics learning motivation questionnaire consisting of 36 statements with 5 alternative score choices and 100 random respondents. The data was analyzed using inferential statistical tests. Based on inferential statistical tests, the results obtained were that the data obtained t-test and f-test results with the significance of the results being smaller than the predetermined significance so that the null hypothesis (H0) was rejected. Thus, it can be concluded that there was an influence between the independent variable (test anxiety) on the dependent variable (task value). The next research recommendation is to design learning to reduce mathematical anxiety so that it can increase students' mathematics assignment scores.

Keywords: Mathematical Anxiety; Assignment Value; Mathematics Learning; Junior High School Students.

Article History:
Received: 20-03-2024
Online : 07-04-2024

A. INTRODUCTION

Student anxiety still often occurs among students. Some students consider mathematics to be a difficult and unsatisfying subject, so that before starting learning, students are filled with anxiety, making it difficult to concentrate. Anxiety will develop if students encounter situations that they perceive as threatening. This situation causes students to think negatively about themselves, causing them to become excessively anxious and avoid mathematics lessons (Mukti et al. 2022). Mathematical anxiety is a feeling of anxiety, fear and discomfort caused by unstable emotions, which is characterized by feelings of restlessness, tension, fear and anxiety about actions that do not want to be associated with learning mathematics (Ikhsan 2019). Students with math anxiety tend to avoid threatening or stressful situations, and of course these individuals will have negative self-esteem. Students' physical and intellectual functions are stimulated and enhanced by anxiety, so that when anxiety is controlled and considered normal it has a negative effect. The negative consequences of lack of control and excessive anxiety make it difficult for students to concentrate (Juliyanti and Pujiastuti 2020).

The mathematical anxiety indicator consists of three aspects, namely cognitive, affective and physiological. Cognitive aspects include self-efficacy, self-confidence, concentration problems, and fear of failure. Affective aspects include feelings of anxiety, tension, nausea,

and excessive sweating. Physiological aspects include increased heart rate and headaches. This research is also supported by previous research which states several indicators of mathematical anxiety, including (1) mood characterized by feelings of tension, anxiety, fear, anxiety and nervousness; (2) motor skills characterized by tension in movement (motor), such as trembling and awkward or hasty body posture; (3) cognitive characterized by problems concentrating and inability to make decisions when solving problems; and (4) semantic characterized by heart problems such as fast heartbeat and sweaty palms (Julya and Nur 2022).

Students who experience mathematical anxiety will experience learning difficulties. Learning difficulties are defined as a condition that causes students to have difficulty carrying out academic activities well. Learning disabilities are disorders of one or more psychological processes related to the understanding and use of language or writing, which manifest as problems with hearing, thinking, speaking, reading, writing, spelling and arithmetic. (Setyawati and Ratu 2021). This will affect students' qualities and result in slow thinking and lack of motor response. The negative impacts of mathematical anxiety on students include students having a pessimistic attitude and excessive fear, so they feel anxious about mathematics. The feeling of anxiety experienced by students is also reinforced by previous research which states that students will conceptualize themselves as incapable and not ready to face challenges and obstacles in learning mathematics, so that feelings of anxiety arise during the mathematics learning process. (Fauziah et al., 2019).

Various efforts have been found to result from students' mathematical anxiety. Based on previous research, efforts that can be made to overcome students' mathematical anxiety are by developing learning that allows students to overcome their mathematical anxiety gradually, both internally and externally. Teachers play a very important role in understanding students and trying to make mathematics learning more acceptable and enjoyable for students (Sumadi et al., 2019). The role of the teacher is very important to know and recognize what mathematical anxiety looks like, what indicators there are of mathematical anxiety, and what impact mathematical anxiety has. (Julya and Nur 2022). Apart from that, there are several ways teachers can help reduce students' math anxiety, including a) reducing the possibility of students feeling embarrassed when studying, b) encouraging active learning, c) asking students to work in cooperative groups, d) building strong skills and positive attitudes towards mathematics, and e) encourage students to think critically (Sumadi et al., 2019).

In learning mathematics, of course it is closely related to assignments. Assignments take various forms. In mathematics learning books there are many questions aimed at practicing counting skills and using formulas. The assignment method used can be in the form of giving certain tasks so that students carry out learning activities and are responsible for the tasks given. Apart from that, mathematics learning also uses the question and answer method which will encourage students to practice activeness during the learning process (Amam 2017). Low assignment scores result in various obstacles in learning and will have an impact on learning outcomes. Students who get low assignment scores are one of the characteristics of students whose ability to understand mathematics is still low (Nasrullah et al., 2018). This is also supported by previous researchers regarding learning outcomes that are correlated with students' abilities in mathematics. There are several components that influence the mathematics learning process, including teaching materials, learning atmosphere, media and

learning resources, and the teacher as a facilitator. If one component cannot run according to the provisions, it can cause the learning objectives to not be achieved (Septian et al., 2022). Learning objectives require the role of students and teachers. During the learning process, students and teachers must work together to achieve learning goals. In order to achieve learning objectives, teachers play an important role in creating a motivational situation during the learning process, because this situation can enable a conducive learning process so that students can easily accept teaching materials and get assignment grades and satisfactory learning outcomes. (Heyder et al. 2020).

From various references regarding the impact of mathematical anxiety and low assignment scores, this research aims to analyze the influence of students' mathematical anxiety on junior high school students' math assignment scores. Based on previous research, researchers are of the opinion that to improve students' mathematical connection abilities, a learning approach is needed that can make students active and find learning mathematics fun (Wiharso and Susilawati 2020). Other researchers also argue that delivery in the mathematics teaching and learning process can be expected to encourage positive emotional responses in students (Heffernan et al. 2020). The contribution of this research to mathematics learning is that it is hoped that it can be realized well and have a positive impact on students and teachers in achieving optimal learning goals. This research was created in an effort to help teachers motivate and change the way they teach to make it fun so that students can be motivated and increase their interest in learning mathematics. The purpose of this research is to help students and teachers to have a better understanding of identity in order to achieve the desired learning goals

B. METHOD

This research method uses a quantitative approach with descriptive research type and uses inferential statistical tests. The research subjects were junior high school students with a total of 32 students from class 7, 62 students from class 8, and 78 students from class 9. The location of this research was at SMP Negeri 2 Pasuruan City which is located on Jl. Soekarno Hatta No. 84, Bangilan, District. Panggungrejo, Pasuruan City, East Java 67114. Data was collected using a non-test method, namely a questionnaire adapted from the article The Survey of Mathematics Motivated Strategies for Learning Questionnaire (MMSLQ) For Grade 10-12 Taiwanese Students written by Eric Zhi Feng LIU and Chun Hung LIN. This research instrument uses a non-test method which was created using Google Form and distributed online via the WhatsApp application. The questionnaire used in collecting data for this research contained 36 statements addressed to participants regarding the current state of students' mathematics learning motivation. The questionnaire assessment includes 5 scores, including score 1 (disagree), score 2 (disagree), score 3 (neutral), score 4 (agree), score 5 (strongly agree).

Table 1. Indicator Motivation Study Mathematics

Variable Free	Items	Dependent Variable	Items

Test Anxiety	6, 12, 17, 23, 29, 35, 36	Assignment Value	1, 2, 3, 7, 8, 9, 13, 14, 15, 18, 19, 20, 24, 25, 26, 30, 31, 32

This research uses percentage analysis techniques and multiple regression analysis techniques. Testing in this research is used to state the relationship between the dependent variable, namely the assignment value and the independent variable, namely test anxiety. These three variables will be tested in order to assess the motivation to learn mathematics currently being experienced by students at SMP Negeri 2 Pasuruan City.

C. RESULTS AND DISCUSSION

1. Indicator Mathematical Anxiety

This research obtained results collected during a survey of the distribution of participating students at SMP Negeri 2 Pasuruan City. The following data from the research on motivation to learn mathematics will be described in quantitative form based on the assignment value variable with 18 statements tested, resulting in an average score of 3.86 and the largest score percentage is score 5 with 333.33%. Based on the presentation of research data with assignment variable values, students at SMP Negeri 2 Pasuruan City have advanced mathematics learning abilities so that many of them have the desire to deepen mathematics which is useful and distributed to those in need.

Data from research on mathematics learning motivation based on the test anxiety variable will be described in quantitative form with 7 statements tested, resulting in an average score of 3.65 and the highest score percentage being a score of 4 of 32.29%. Based on the presentation of research data with the variable anxiety facing exams, students at SMP Negeri 2 Pasuruan City have a higher feeling of curiosity about mathematics, so that students experience anxiety in solving questions because they feel dissatisfied with learning mathematics.

Table 2. Motivation Study Reviewed Based on Task Values and Test Anxiety

No	Aspect	Score					Average
		1	2	3	4	5	
1	Assignment Value	4.11 4.11%	5.39 5.39%	23.89 23.89%	33.28 33.28%	33.33 33.33%	3.86
2	Test Anxiety	6.14 6.14%	9.57 9.57%	24.86 24.86%	32.29 32.39%	27.14 27.14%	3.65
	Amount	5.12 5.12%	7.48 7.48%	24.37 24.37%	32.78 32.78%	30.23 30.23%	3.75

Based on the data from the research conducted and described above, where there are two indicator aspects that review students' mathematics learning motivation, the highest average value was obtained on the indicator side with an assignment value of 3.86 and an assignment value of 3.86. index of anxiety aspects in specific tests. The average value is 3.65. The exposure above also gets an overall average value of 3.75 and a score ratio. The highest score is 4 at 32.78%, where students are motivated and enthusiastic in learning through mathematics subjects.

2. Effect Test Results Mathematical anxiety to mark task mathematics

Table 3. Summary of Motivational Data Identification Results Study

Variable	β	t- count	Sig(α)
Test Anxiety	0.360	3,043	0.003
Constant		19,765	
R^2; Adjusted R^2		0.699; 0.693	
F-test		112,827 (significance 0.000)	
DW		1,189	
Tolerance and VIF		X1 (0.221; 4.523) X2 (0.221; 4.523)	

Source: Data Processing Results with SPSS Software Version 26.0

Based on table 3 will obtained entered values into the formula regression multiple like following:

$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon$

Y_i = assignment grades (variable bound),

X_i = anxiety in test (variable free second),

β_0 = point cut

β_j = coefficient regression to -j (j = 1, 2)

i = observation i

ε = factor disturbance

$Y_i = 5.818 + 0.501X_1 + 0.360X_2 + \varepsilon$

(4,332) (3,043)

Description: located numbers in the brackets are values from t- count.

Interpretation on done based on equality regression linear multiple that will explained in more detail using the model suitability test (f test) and the suitability test for the estimator parameters (t test).

a. Model Fit Test

Model suitability testing can be done with the f test, which is to test influence whole independent variable together against variable bound . This will be tested on the hypothesis following :

H0 : $\beta_1 = \beta_2 = 0$, which means that all variable free consisting of two variables motivation Study mathematics participant educate together No have meaningful influence to variable bound, task value.

Ha : H0 No true, which means that all variable free consisting of two variables motivation Study mathematics participant educate in a way together have meaningful influence to variable bound, task value.

Data analysis will be carried out using SPSS version 26.0 with a significance test of the visual level F test α = 5%, if the significance level of the calculation is smaller than the specified significance level then it can be concluded that in this case the H0 test is rejected and as a result Ha is accepted. It can be seen in Table 3 that the value of F = 112.827 with a significance level of 0.000, which means the level of significance. The calculation in this F test is smaller than the specified significance level (0.000 < 0.005). We can conclude that the hypothesis H0 which states that all independent variables (test anxiety) together do not have a significant influence

on the variable in question (task grades) is rejected, and the results also accept the hypothesis, and the independent variable (test anxiety) is generally accepted. together have a significant influence on the related variable (task value). To measure how significant the independent variable is on participants' mathematics learning motivation (test anxiety) can be obtained by interpreting the coefficient of determination (R^2). It is recorded in Table 3 that the score obtained from the coefficient of determination (R^2) = 0.699 and the adjusted coefficient of determination (Adjusted R^2) = 0.693.

b. Suitability Test of Estimator Parameters

Test the suitability of the estimator parameters , each independent variable with the variable bound will tested using the t test. This will tested on the hypothesis following :

H_0 : $\beta j = 0$

Ha : $\beta j \neq 0$

H0 is hypothesis zero, Ha represents the alternative hypothesis β_j which shows the correlation coefficient of j independent variables. Hypothesis zero $\beta_j = 0$ which means there is no influence between the independent variable j (j = 1) (test anxiety) on the related variable (task value). Alternative Hypothesis $\beta_j \neq 0$ which means there is an influence between the independent variable j (j = 1) (test anxiety) on the related variable (task value). Testing can be carried out by comparing the significance level determined at $\alpha = 5\%$ with the results of the calculation of the significance level. If the results of the level of importance are greater than the specified level of importance, then H0 is accepted, which means there is no influence between the independent variable j (test anxiety) on the related variable (task value) and vice versa. conversely Ha is rejected.

The explanation in table 3 will explained as following: For test anxiety in the test, the value obtained was t = 3.043 with a significance level of 0.003, which means the significance level of the calculation results is smaller than the specified significance level (0.003 < 0.005). This matter means that hypothesis zero (H0) is rejected because there is no influence between the independent variables, namely test anxiety, connecting variables, and assignment grades. Therefore, the alternative hypothesis (Ha) is accepted as a meaningful hypothesis. There is an influence between the independent variables, namely anxiety in testing the value of the assignment which is associated with this variable.

Discussion

In contrast to research (Noviarti; Utami and Prihatiningtyas 2020), this research obtained an R-squared result of 0.466 by squaring the correlation coefficient and multiplying it by 100% to obtain a result of 46.6%. It is proven that the motivation to learn mathematics for class VIII students at SMP Negeri 8 Singkawang reached 46.6%. In this study, the R squared value was 0.699, and if the correlation coefficient was squared and multiplied by 100%, the result was 69.9%. It is clear that the motivation to study mathematics at SMP Negeri 2 Pasuruan City is 69.9%. The difference between the two studies can be concluded that the mathematics learning motivation of students at SMP Negeri 2 Pasuruan City is higher than the mathematics learning motivation of class VIII students at SMP Negeri 8 Singkawang (Noviarti; Utami and Prihatiningtyas 2020).

D. CONCLUSIONS AND SUGGESTIONS

Based on analysis of result data research and discussions that have been carried out done , properly general can concluded that motivation Study mathematics to participants student at SMP Negeri 2 Pasuruan City own average values are included into the group Good with mark the average number reached 3.73. The average results obtained based on three reviewing variables results motivation Study mathematics participant educate, that is mark task, control trust and confidence yourself, as well anxiety in test. So that's the conclusion taken on research This is level motivation participant student at SMP Negeri 2 Pasuruan City including into the category Good.

Based on results study about identification motivation Study mathematics to participant student at SMP Negeri 2 Pasuruan City has walk with Good. So that researcher recommended to SMP Negeri 2 Pasuruan City For maintain internal teaching methods and models learning mathematics. However, there are some suggestions from possible researchers can build and become material consideration or input in increase motivation Study mathematics to participant educate, that is teachers should be facilitator participant educate can more follow development technology for become more of a teacher creative and innovative during explained teaching materials. Nowadays it is very diverse method used For convey material with creative and easy understood by participants educate, so that teachers can too Study master increasingly technological programs develop.

ACKNOWLEDGMENTS

Praise thanks to Allah SWT who has bestowed His grace and guidance so that the author can complete the thesis entitled "A Review of Mathematical Anxiety and Its Effect on Middle School Students' Mathematics Assignment Grades". Thank you to the people who have contributed to my life, namely to both parents who have provided prayers and moral support and material support, to the supervisor who has provided guidance and input both technically, theoretically and morally, to both siblings and both brothers-in-law who always provide moral support, to close friends who are always willing to accompany and help during the thesis process, and to people who are always patient with all moods during the process of working on this thesis until it is completed.

REFERENCES

Amam, Asep. 2017. "Penilaian Kemampuan Pemecahan Masalah Matematis Siswa Smp." *Teorema* 2(1): 39.

Fauziah, Endah Nisa, M Gilar Jatisunda, and Nia Kania. 2019. "Analisis Kecemasan Matematis Siswa Madrasah Aliyah." *Seminar Nasional Pendidikan*: 424–29.

Heffernan, Kayla, Steven Peterson, Avi Kaplan, and Kristie J. Newton. 2020. "Intervening in Student Identity in Mathematics Education: An Attempt to Increase Motivation to Learn Mathematics." *International Electronic Journal of Mathematics Education* 15(3).

Heyder, Anke, Anne F. Weidinger, Andrei Cimpian, and Ricarda Steinmayr. 2020. "Teachers' Belief That Math Requires Innate Ability Predicts Lower Intrinsic Motivation among Low-Achieving Students." *Learning and Instruction* 65.

Ikhsan, Muhamad. 2019. "Pengaruh Kecemasan Matematis Terhadap Hasil Belajar Matematika." *De Fermat : Jurnal Pendidikan Matematika* 2(1): 1–6.

Juliyanti, Annisa, and Heni Pujiastuti. 2020. "Pengaruh Kecemasan Matematis Dan Konsep Diri Terhadap Hasil Belajar Matematika Siswa." *Prima: Jurnal Pendidikan Matematika* 4(2): 75.

Julya, Dina, and Iyan Rosita Dewi Nur. 2022. "Studi Literatur Mengenai Kecemasan Matematis Terhadap Pembelajaran Matematika." *Didactical Mathematics* 4(1): 181–90.

Mukti, Nuzula, Nyoman Sridana, Tabita Wahyu Triutami, and Ketut Sarjana. 2022. "Pengaruh Kecemasan Matematika Dan Motivasi Belajar Terhadap Prestasi Belajar Matematika Siswa." *Jurnal Ilmiah Profesi Pendidikan* 7(4): 2324–32.

Nasrullah, Anton, Mira Marlina, and Widya Dwiyanti. 2018. "Development of Student Worksheet-Based College e-Learning through Edmodo to Maximize the Results of Learning and Motivation in Economic Mathematics Learning." *International Journal of Emerging Technologies in Learning* 13(12).

Noviarti; Utami, Citra, and Nindy Citroresmi Prihatiningtyas. 2020. "Hubungan Motivasi Belajar Matematika Dengan Kemampuan Numerik Siswa Pada Materi Aljabar." *Jurnal Pendidikan Matematika Indonesia* 5(September): 92–99.

Septian, A N F, L Ariyanto, and ... 2022. "Profil Kesalahan Siswa Dalam Menyelesaikan Soal Matematika Berupa Soal Cerita Berdasarkan Newman's Error Analysis (NEA) Ditinjau Dari Gender." *… : Jurnal Matematika dan …* 4(2): 86–97. http://journal.upgris.ac.id/index.php/imajiner/article/view/8894.

Setyawati, Arini, and Novisita Ratu. 2021. "Analisis Kesulitan Belajar Matematika Siswa SMP Pada Materi Aljabar Ditinjau Dari Mathematics Anxiety." *Jurnal Cendekia : Jurnal Pendidikan Matematika* 5(3): 2941–53.

Sumadi, Norma Galih, Nur Sholihah, and Rina Musannadah. 2019. "Penerapan Model Think-Talk-Write (TTW) Dalam Pembelajaran Matematika Sebagai Upaya Meningkatkan Kemampuan Komunikasi Matematis Dan Menurunkan Mathematics Anxiety Siswa." *Prosiding Seminar Pendidikan Matematika dan Matematika* 1(1): 105–11.

Wiharso, Tri Arif, and Helfy Susilawati. 2020. "Meningkatkan Kemampuan Koneksi Matematik Dan Self Efficacy Mahasiswa Melalui Model CORE." *Mosharafa: Jurnal Pendidikan Matematika* 9(3): 429–38.