



Contents lists available at DJM

DESIMAL: JURNAL MATEMATIKA

p-ISSN: 2613-9073 (print), e-ISSN: 2613-9081 (online), DOI 10.24042/djm
<http://ejournal.radenintan.ac.id/index.php/desimal/index>



The influence of study habits and self-concept on students' mathematical reasoning ability

Khairunnisa*, Zul Amry

Universitas Negeri Medan, Indonesia

ARTICLE INFO

Article History

Received : 29-09-2021

Revised : 08-11-2021

Accepted : 21-11-2021

Published : 30-11-2021

Keywords:

Study Habits; Self-Concept;
Mathematical Reasoning Ability.

*Correspondence: E-mail:

hair_khairunnisa@yahoo.com

Doi:

[10.24042/djm.v4i3.10154](https://doi.org/10.24042/djm.v4i3.10154)

ABSTRACT

This research aimed to determine the effect of study habits and self-concept on students' mathematical reasoning abilities in class VIII. This research is quantitative with the ex-post facto method. Sampling in this research using random sampling totaling 39 samples. The research instruments were two questionnaires totaling 30 items and an essay test totaling 3 items. The research results showed that there was an effect of study habits on students' mathematical reasoning abilities. There was no effect between self-concept on students' mathematical reasoning abilities. And there was an effect between self-concept and study habits on students' mathematical reasoning abilities. The conclusions of this research are learning habits does affect but self-concept doesn't affect students' mathematical reasoning abilities, and self-concept and study habits affect the mathematical reasoning abilities of students in class VIII with a significant contribution of 25.9%.

<http://ejournal.radenintan.ac.id/index.php/desimal/index>

INTRODUCTION

Mathematics is one of the disciplines in education that plays a significant part in the other sciences. Mathematics is a tool for cultivating rational, methodical, and creative thinking. Mathematics is studied and applied at all levels of education, from kindergarten to university. According to this viewpoint, every student should be knowledgeable in mathematics. Not only problem solving or communication ability but also mathematical reasoning ability are needed by students.

Mathematical reasoning is a thought process that uses deductive justifications

to draw conclusions (Hasratuddin, 2018). Mathematical reasoning ability is the ability to establish mathematical opinions and make new logical decisions and can explain or prove correct based on previously acquired concepts or understandings. Reasoning ability is not only what students need in mathematics, but also in many aspects of life. But unfortunately, the mathematical reasoning ability of students in Indonesia is still relatively low seen from the rankings obtained by Indonesia in the TIMSS, PISA assessments, and at the national level, namely the Indonesian

Student Competency Assessment (AKSI). Based on this, the mathematics ability of North Sumatra students is still relatively low (Mansur, 2018).

After conducting an interview with one of the teachers, it was also found that the students' mathematical reasoning ability was still relatively low. It is known that students have difficulty in understanding the questions, students often misinterpret what is given and asked in the questions. Students in Indonesia have a low mathematical reasoning ability due to a variety of internal and external factors. Internal factors such as intelligence level, attitude, interest, motivation, study habits, or self-concept. External factors such as how to teach teachers, media, family, and the environment (Aini, 2020). To improve students' mathematical reasoning abilities, teachers must pay attention to these factors.

The authors tried to choose two internal factors that influence students' mathematical reasoning abilities, namely study habits and self-concept. This selection is because the authors have conducted journal mapping and no one has discussed the influence of study habits and self-concept on students' mathematical reasoning abilities. For example, research by Ansori et al. (2019) still discusses the effect of learning independence, as well as research by Sholihat et al. (2018) which discusses the effect of self-esteem on students' mathematical reasoning abilities.

Study habits are actions that persist in students when receiving lessons, reading books, doing assignments, and managing time in completing activities (Djaali, 2018). Students' mathematical reasoning abilities will not work well if they do not have good study habits because in the learning process students not only receive the lessons given by the teacher in front of the class but also students are required to enrich the subject

matter by studying independently. This is in line with the results of research conducted by Patimbangi (2018) and Dusalán & Sartika (2019) that study habits have a positive effect on students' mathematics learning outcomes.

In addition to study habits, self-concept also affects students' mathematical reasoning abilities. Self-concept is a person's answer to the question "who am I" (Widyastuti, 2014). In line with that, Desmita (2016) defines self-concept as an idea about oneself that includes one's beliefs, views, and assessments of oneself. Self-concept can be positive or negative. Self-concept is one of the effective concepts that influence students' views in learning and this is supported by several studies conducted by Magfirah et al. (2015), Alamsyah (2016), and Patimbangi (2018) which found that self-concept has a positive effect on students mathematics learning outcomes, because a person's view of himself, both positive and negative, can affect one's behavior in class.

According to this viewpoint, students' mathematical reasoning abilities are affected by their study habits and self-concept. If students have good study habits, their mathematical reasoning ability will show high results, and conversely. If a student has a positive self-concept, they will have high mathematical reasoning ability. On the other hand, if the students' self-concept is negative, their mathematical reasoning ability will suffer.

The aim of this research was to determine the existence of (1) a significant influence between study habits on the mathematical reasoning ability of class VIII students, (2) a significant influence between self-concept on the mathematical reasoning ability of class VIII students, (3) a significant influence between study habits and self-concept together on the mathematical reasoning ability of class VIII students, and (4) knowing the percentage contribution of the influence of

study habits and self-concept on the mathematical reasoning ability of class VIII students.

METHOD

This research was carried out at SMP Negeri 36 Medan in 2020. The research samples consisted of 39 grade VIII students using a random sampling technique. This type of research is quantitative which uses the ex post facto method to see whether students' self-concepts and study habits affect their mathematical reasoning abilities. The research instrument used 2 questionnaires with 30 items each and a test of 3 questions.

Some of the indicators used include indicators of self-concept according to Fits

(Agustiani, 2018), namely self-identity, self-perpetrators, self-assessment, physical self, ethical-moral self, personal self, family self, and social self. Indicators of study habits according to Slameto (2013), namely making a schedule and its implementation; reading and taking notes; repeating the lesson material; concentration; and doing the work. Also, the indicators of mathematical reasoning ability studied were presenting mathematical statements orally, in writing, diagrams, and pictures; making allegations; performing mathematical manipulations; and drawing conclusions.

The design of this research is a multiple regression with a scheme as shown in Figure 1.

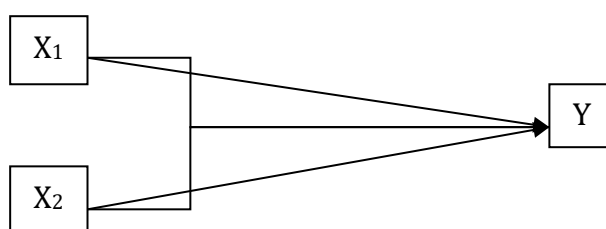


Figure 1. Influence Diagram between Research Instrument

With,

X₁ : Study Habits

X₂ : Self Concept

Y : Mathematical Reasoning Ability

Statistical testing was carried out by performing normality tests, linearity tests, multicollinearity tests, and heteroscedasticity tests as multiple linear regression requirements. Then perform multiple linear regression calculations to find the regression equation, t-test (partial), F-test (simultaneous), and the magnitude of the contribution.

RESULTS AND DISCUSSION

Based on the calculations, the residual data obtained are normal. For the linearity test, it was found that there was a linear relationship between study habits

and reasoning abilities and between self-concept and students' mathematical reasoning abilities. In the multicollinearity test, there was no correlation between study habits and self-concept. Similarly, in the last test, it was found that there were no symptoms of heteroscedasticity. Because the four classical assumption tests are met, the data analysis can be continued.

Effect of Study Habits (X₁) on Mathematical Reasoning Ability (Y)

Based on the research that has been done in class VIII students at SMP Negeri 36 Medan with a sample of 39 students, the results of the regression analysis are as follows:

Table 1. Regression Linearity Test Result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.616	23.078		-.200	.843
	x1	.701	.273	.504	2.567	.015
	x2	.016	.402	.008	.040	.969

The regression equation obtained based on table 1 is $\hat{Y} = -4.616 + 0.701X_1 + 0.016X_2$. Partial (t-test) study habits variable (X_1) is obtained ($2.567 > 2.0281$) with a significance value obtained of 0.015 which is smaller than 0.05. So, it can be concluded that H_0 is rejected, namely the study habits variable (X_1) has a significant influence on the mathematical reasoning ability variable (Y) of class VIII students.

Study habits are one of the important things that are needed in order to increase the value of students' mathematical reasoning abilities to be better in the future. In addition, students' mathematical reasoning abilities will not work well if they do not have good study habits because in the learning process students not only accept the lessons given by the teacher in front of the class but students are required to enrich the subject matter by studying independently. This is in accordance with the explanation of Mubin (2019) which explains that if learning activities are carried out with regular scheduling which is the right way of learning, it will improve students learning outcomes.

In line with the research results obtained, several research results such as research conducted by Dusalan & Sartika (2019) explained that there was a positive influence of study habits on mathematics learning outcomes. There is also the influence of study habits on other dependent variables, which can be seen in Sirait (2019) which explains that study habits have a significant effect on mathematical critical thinking abilities.

If a regression analysis is carried out for each indicator of study habits on mathematical reasoning abilities while

still paying attention to the prerequisite tests in linear regression analysis, namely the residuals with normal and linear values, it is found that the first indicator of study habits, namely the making of schedules and their implementation is not linear with the students' mathematical reasoning abilities so it cannot be followed by linear regression. As for the second indicator, namely reading and taking notes, it also does not meet the requirements of linear regression because the residual is not normal. So that only regression analysis was carried out on the third, fourth, and fifth indicators of students' mathematical reasoning abilities.

The results of the analysis show that the indicator of study habits that has the most influence on students' mathematical reasoning abilities is concentration, which is 24.8%. In learning, it must be based on good concentration. If one cannot concentrate well, then students won't be able to absorb the subject matter being studied well and will be easily disturbed or disturb other friends. Thus, it is obtained that before learning, students must stay away from things that can interfere with their concentration in learning in order to improve their mathematical reasoning abilities.

The Effect of Self-Concept (X_2) on Mathematical Reasoning Ability (Y)

Based on the research that has been done in class VIII students at SMP Negeri 36 Medan with a sample of 39 students, the regression equation obtained in multiple linear regression analysis is $\hat{Y} = -4.616 + 0.701X_1 + 0.016X_2$. In the partial hypothesis test (t-test) the self-

concept variable (X_2) is obtained ($0.040 < 2.0281$) with a significance value obtained of 0.968 greater than 0.05. So, it can be concluded that H_0 is accepted, namely, the self-concept variable (X_2) does not have a significant effect on the mathematical reasoning ability variable (Y) of class VIII students.

This is not in accordance with the theory which reveals that self-concept is one of the effective concepts that influence students' views in learning. With a positive self-concept, one will know what one must do to become a better person, including in terms of learning so that one can improve one's learning outcomes.

The results of this research are not in line with Alamsyah (2016) with the results of his research showing that there is a positive and significant influence between self-concept on the mathematics learning achievement of students in class XI SMA Negeri 102 Jakarta. It is also seen that the indicators of self-concept used are different, where indicators in Alamsyah (2016) use two indicators of self-concept, namely self-confidence and self-esteem. This indicator is also used by research conducted by Hikmah (2013) and Firdaus (2017). Likewise with the research of Handayani (2016) and Priyastutik et al. (2019) with research indicators namely physical, psychological, and social aspects, each of which shows that self-concept affects the ability to understand concepts and the ability to solve mathematical problems.

However, if you look at the indicators in Handayani (2016), there are still similarities in the indicators used. This can be because the research focuses on only three indicators so that the number of items per indicator is more, while in this research the authors have eight self-concept indicators. If seen in the theoretical study of Handayani (2016), it is known that the social aspect used is more about how a person's role is in the scope of one's social role and one's assessment of

that role. While in this research, it shows the individual's perception of one's interactions with other people such as being friendly, easy to make friends, and others. Differences in the results of this research can also be caused because the population and the dependent variable studied are different. This research also did not interact directly with the respondents face to face, but only online due to the existing pandemic so that they did not pay attention to the respondents to read each item well and answer them more thoroughly according to what it is.

However, there are also other studies that also obtain the same thing as the results of this research, where there is no influence of self-concept on mathematics learning outcomes or specifically in this research on students' mathematical reasoning abilities. As research conducted by Nur & Massang (2016) explains that self-concept does not affect students' mathematics learning achievement. Likewise, in Rohmat & Lestari (2019), the dependent variable is mathematical critical thinking ability, explaining that there was no influence of self-concept on students' mathematical critical thinking ability.

The absence of self-concept influence on students' mathematical reasoning abilities can be seen from the large difference in average between self-concept and mathematical reasoning abilities which is too far away. It is also seen that the magnitude of the coefficient of self-concept in the regression equation is too small so that on the partial effect, self-concept has no effect on students' mathematical reasoning abilities. Self-concept should influence student learning outcomes, but it is back to the students themselves to react to it. Self-concept that is too excessive can cause no proper effort against him because one thinks one has become a good person.

If a regression analysis is carried out for each indicator of self-concept on

mathematical reasoning abilities while still paying attention to the prerequisite test in linear regression analysis, namely the residuals with normal and linear values, it is found that the indicator that has the least effect on students' mathematical reasoning abilities is the physical self-indicator. As has been stated in theoretical studies that the physical self is an individual's perception of one's physical state, the more confident one is about one's appearance or physical condition, it does not mean that one's mathematical reasoning ability will also increase.

On the other hand, although self-concept has no effect on students' mathematical reasoning abilities, if a regression analysis is carried out for each indicator, it is found that the perpetrator's self and family self-have a positive effect on students' mathematical reasoning abilities. The self-perpetrator is a person's awareness of what one is doing, with this awareness one will know that what one is doing is good or not. Otherwise, one will try not to do it again. Meanwhile, the family self is an individual's perception of one's position in the family. As we know that the family is the starting place for a person to learn about how one is. From this family, a person builds one's self-concept to be positive or negative.

The Influence of Study Habits (X_1) and Self-Concept (X_2) on Mathematical Reasoning Ability (Y)

Based on the research that has been done in class VIII students at SMP Negeri 36 Medan with a sample of 39 students, the score ($6.295 > 3.26$) with a significance

value obtained is 0.004 less than 0.05. So, it can be concluded that H_0 is rejected, namely study habits (X_1) and self-concept (X_2) variables together have a significant influence on the variable mathematical reasoning ability (Y) of class VIII students. The better the study habits and self-concept of students, the better the acquisition of students' mathematical reasoning abilities.

Although the results of the partial test show that self-concept has no effect on students' mathematical reasoning abilities, if there are other factors that support students' mathematical reasoning abilities as in this research, namely study habits, then self-concept will also have an influence on students' mathematical reasoning abilities. But if study habits also do not support or affect students' mathematical reasoning abilities, the joint effect will also not occur.

The results of this research are in line with similar research, namely the research of Patimbangi (2018) with the results of the research that study habits and self-concept go hand in hand with the same effect on the mathematics learning outcomes of class VIII SMP YP PGRI 4 Makassar. Likewise with the research of Magfirah et al. (2015) which examined eighth-grade students at SMP Negeri 6 Bontomatene, Selayar Islands.

Contribution

The percentage contribution of the influence of study habits (X_1) and self-concept (X_2) on students' mathematical reasoning abilities (Y) was calculated using the SPSS for Windows program and R language.

Table 2. Contribution Calculation Result

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.509	.259	.218	14.601

The contribution was 25.9%, meaning that study habits (X_1) and self-

concept (X_2) have an effect of 25.9% on students' mathematical reasoning ability

(Y). The percentage of the effect is not too large, this is because there is no influence of self-concept on students' mathematical reasoning abilities partially so that the contribution to the simultaneous influence is not too large. On the other hand, if the two independent variables in this research, namely study habits and self-concept, partially affect students' mathematical reasoning abilities, the contribution to be made will be greater.

Based on the magnitude of the existing contribution from this research, it can be seen that there are other factors that affect the mathematical reasoning ability of eighth-grade students. The magnitude of the influence of other factors, in addition, to study habits and self-concept, is 74,1%. These factors can be internal factors or external factors in students who can improve their mathematical reasoning abilities. From the results of journal mapping that had been done previously by Ansori et al. (2019), it was found that learning independence had a positive effect on students' mathematical reasoning abilities. In addition, there is also research by Sholihat et al. (2018) which explains that the mathematical reasoning ability of MTs students is positively influenced by their expectations. There is also research by Wijayanti & Suhendri (2017) which reveals that intrapersonal intelligence and critical thinking affect students' mathematical reasoning abilities.

In addition to the internal factors mentioned above, there are also external factors such as learning approaches, learning models, learning media, and variations in types of questions that can improve students' mathematical reasoning abilities. However, it is also necessary to test directly on the respondents because there is an influence or not the research will be

different from other research if the samples used are different.

CONCLUSIONS AND SUGGESTIONS

Conclusions can be taken based on the discoveries of prior research and discussions, with the multiple linear regression equation $\hat{Y} = -4.616 + 0.701X_1 + 0.016X_2$ with a constant (b_0) of -4.616, the coefficient of study habits (b_1) is 0.701 and the coefficient of self-concept (b_2) is 0.016. The results of the partial significance test (t-test) that study habits (X_1) significantly affect students' mathematical reasoning ability (Y), but self-concept (X_2) does not significantly affect students' mathematical reasoning abilities (Y). The results of the simultaneous significance test (f-test) that study habits (X_1) and self-concept (X_2) simultaneously have a significant influence on the mathematical reasoning ability (Y) of class VIII students with an effect of 25.9% and 74.1% comes from other factors outside of this research.

Teachers and students should be able to work together to develop study habits and self-concept in order to improve or get better mathematical reasoning abilities. It is recommended that other researchers who want to conduct similar researches pay more attention to what the researchers have overlooked and extend this research by providing additional material presentations.

REFERENCES

- Agustiani, H. (2018). *Psikologi perkembangan: Pendekatan ekologi kaitannya dengan konsep diri dan penyesuaian diri pada remaja*. PT. Refika Aditama.
- Aini, L. Q. (2020). Analisis kemampuan penalaran matematis siswa ditinjau dari self-efficacy siswa smp kelas vii. *Jurnal Edumath*, 6(1), 30–39.
- Alamsyah, N. (2016). Pengaruh konsep

- diri terhadap prestasi belajar matematika siswa sman 102 jakarta. *SAP (Susunan Artikel Pendidikan)*, 1(2), 155–164.
- Ansori, Y., Herdiman, I., Fajriah, L., Nugraha, Y., Akbar, P., & Bernard, M. (2019). Pengaruh kemandirian belajar siswa SMP terhadap kemampuan penalaran matematis. *Journal on Education*, 1(2), 288–296.
- Desmita. (2016). *Psikologi perkembangan peserta didik*. PT. Remaja Rosda Karya.
- Djaali. (2018). *Psikologi pendidikan*. Bumi Aksara.
- Dusalan, & Sartika, D. (2019). Pengaruh motivasi dan kebiasaan belajar terhadap hasil belajar matematika siswa smp negeri 5 wera bima. *Pedagos: Jurnal Pendidikan STKIP Bima*, 1(2), 55–63.
- Firdaus, I. C. (2017). Pengaruh penggunaan media pembelajaran dan konsep diri siswa. *Jurnal Informatika Universitas Pamulang*, 2(1), 51–58.
- Handayani, S. D. (2016). Pengaruh konsep diri dan kecemasan siswa terhadap pemahaman. *Jurnal Formatif*, 6(1), 23–34.
- Hasratuddin. (2018). *Mengapa harus belajar matematika*. Perdana Publishing.
- Hikmah, N. (2013). Pengaruh penggunaan model pembelajaran dan konsep diri terhadap kemampuan berpikir kreatif mahasiswa. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 3(3), 236–249. <https://doi.org/10.30998/formatif.v3i3.129>
- Magfirah, I., Rahman, U., & Sulasteri, S. (2015). Pengaruh kebiasaan belajar dan konsep diri terhadap hasil belajar matematika siswa kelas viii smp negeri 6 bontomatene kepulauan selayar. *Mapan: Jurnal Matematika Dan Pembelajaran*, 3(1), 103–116.
- Mansur, N. (2018). Melatih literasi matematika siswa dengan soal pisa. *Prisma*, 1, 140–144.
- Mubin, N. (2019). Strategi metode student facilitator and explaining dalam meningkatkan prestasi belajar peserta didik. *Attaqwa: Jurnal Ilmu Pendidikan Islam*, 15(2), 120–131.
- Nur, A. S., & Massang, B. (2016). Pengaruh pola asuh orang tua, konsep diri, dan motivasi berprestasi terhadap prestasi belajar matematika siswa kelas ix smp negeri di kota merauke. *Suska Journal of Mathematics Education*, 2(2), 89–96.
- Patimbang, A. (2018). Pengaruh kebiasaan belajar dan konsep diri terhadap hasil belajar matematika siswa kelas viii smp yp PGRI 4 makassar. *EKSPOSE: Jurnal Penelitian Hukum Dan Pendidikan*, 17(2), 615–625.
- Priyastutik, S., Suhendri, H., & Kasyadi, S. (2019). Pengaruh kemandirian dan konsep diri terhadap pemecahan masalah matematika siswa. *JKPM (Jurnal Kajian Pendidikan Matematika)*, 4(1), 1–10. <https://doi.org/10.30998/jkpm.v4i1.2826>
- Rohmat, A. N., & Lestari, W. (2019). Pengaruh konsep diri dan percaya diri terhadap kemampuan berpikir kritis matematis. *JKPM (Jurnal Kajian Pendidikan Matematika)*, 5(1), 73–84.
- Sholihat, N. A. N., Hidayat, W., & Rohaeti, E. E. (2018). Penghargaan diri dan penalaran matematis siswa mts. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 1(3), 299–304.
- Sirait, E. D. (2019). Pengaruh gaya dan kebiasaan belajar terhadap kemampuan berpikir kritis matematika. *Susunan Artikel Pendidikan*, 4(1), 9–16.

- Slameto. (2010). *Belajar dan faktor-faktor yang mempengaruhinya*. PT Rineka Cipta.
- Widyastuti, Y. (2014). *Psikologi sosial*. Graha Ilmu.
- Wijayanti, H., & Suhendri, H. (2017). Pengaruh kecerdasan intrapersonal dan berpikir kritis terhadap kemampuan penalaran matematika. *Prosiding Diskusi Panel Nasional Pendidikan Matematika*.

