ISSN 2715-7458
E-ISSN 2715-7466

Journal of Mathematical Pedagogy
Volume 3, No. 2, July 2022, pp. 98-113

How does Math Anxiety affect Students' Problem Solving Ability? A case of Ill Structured Problem Mathematics Problem

Tika Anjasari[1], Helen Novi Antika[2], Ahmad Wachidul Kohar[3]

[1,2,3] Universitas Negeri Surabaya, Kampus Ketintang Surabaya 60231, Indonesia
Email: tikaanjasari.20010@mhs.unesa.ac.id

Abstract

The process of learning mathematics for some students can cause anxiety. The anxiety experienced by students can interfere with the mathematics learning process, especially in students' ability to solve mathematical problems. This study is qualitative descriptive research that aims to analyze problem-solving abilities in terms of mathematical anxiety. Researchers tested the ability to solve problems ill-structured on six grade VIII students of SMPN 1 Kemlagi in Mojokerto. The six students consisted of two students with high math anxiety, two students with moderate math anxiety, and two students with low math anxiety. The results of data analysis showed ill-structured problem-solving abilities (1) students with low and moderate anxiety levels were able to reach the stage of understanding problems, making plans, and re-examining very well; (2) students with low levels of mathematical anxiety have reached the stage of executing the plan very well, while students with moderate levels of mathematical anxiety have not reached this stage because there are still errors in making calculations; (3) students with high levels of math anxiety have not been able to reach all stages of problem-solving. This study suggests that teachers pay more attention that math anxiety as one of the factors that must be considered in mathematics learning.

Keywords: Problem solving, ill structured problem, math anxiety

Abstrak

Proses belajar matematika bagi sebagian siswa dapat menimbulkan kecemasan. Kecemasan yang dialami siswa dapat mengganggu proses pembelajaran matematika, terutama pada kemampuan siswa dalam memecahkan masalah matematika. Penelitian ini merupakan penelitian deskriptif kualitatif yang bertujuan untuk menganalisis kemampuan pemecahan masalah ditinjau dari kecemasan matematis. Peneliti menguji kemampuan memecahkan masalah yang tidak terstruktur pada enam siswa kelas VIII SMPN 1 Kemlagi di Mojokerto. Keenam siswa tersebut terdiri dari dua siswa dengan kecemasan matematika tinggi, dua siswa dengan kecemasan matematika sedang, dan dua siswa dengan kecemasan matematika rendah. Hasil analisis data menunjukkan kemampuan pemecahan masalah yang tidak terstruktur (1) siswa dengan tingkat kecemasan rendah dan sedang mampu mencapai tahap pemahaman masalah, membuat rencana, dan memeriksa ulang dengan sangat baik; (2) siswa dengan tingkat kecemasan matematis rendah telah mencapai tahap pelaksanaan rencana dengan sangat baik, sedangkan siswa dengan tingkat kecemasan matematika sedang belum mencapai tahap ini karena masih terdapat kesalahan dalam melakukan perhitungan; (3) siswa dengan tingkat kecemasan matematika yang tinggi belum mampu mencapai semua tahap pemecahan masalah. Penelitian ini menunjukkan bahwa guru lebih memperhatikan bahwa kecemasan matematika sebagai salah satu faktor yang harus diperhatikan dalam pembelajaran matematika.

Kata kunci: Pemecahan masalah, *ill structured problem*, kecemasan matematika

How to Cite: Anjasari, T., Antika H. N., & Kohar, A.W. (2022). How does Math Anxiety affect Students' Problem Solving Ability? A case of Ill Structured Problem Mathematics Problem. *Journal of Mathematical Pedagogy, 3* (2), 98-113.

Introduction

A student's ability to solve problems is said to be one of the most important skills for the 21st century because a good problem solver has many advantages, including the ability to solve problems in everyday life, especially when learning mathematics. Problem solving should be considered an important part of learning mathematics and should not be viewed as just an exercise (Khalid et al., 2020). Problem-solving ability according to Agsya et al. (2019) is a high-level thinking ability where

students can combine all the knowledge they already have into new knowledge so that it can be used to solve different problems. Meanwhile, (Simamora et al., 2018) define mathematical problem-solving ability is a student's capacity to comprehend problems, devise strategies for solving them, put those strategies into practice, and reevaluate their approach in order to come up with new solutions or improve their ability to solve problems when faced with them. The process of overcoming obstacles that structure a problem is known as problem-solving (Siswono et al, 2019).

The level of anxiety that students experience while learning mathematics is one factor that can affect their ability to solve mathematical problems. Students' ability to solve a mathematical problem is also impacted by this feeling of anxiety when they receive mathematical information (W. Hidayat & Ayudia, 2019). Wahyudi in (Juliyanti & Pujiastuti, 2020) states that when a person is confronted with an activity that they do not want to do as part of their mathematics learning, mathematical anxiety is a feeling of discomfort that results from unstable emotions such as worry, tension, fear, and anxiety. Feelings of fear and increased reactivity when dealing with math, such as manipulating numbers, solving problems, or evaluating math-related situations, are referred to as "math anxiety" (Rozgonjuk et al., 2020; Luttenberger et al., 2018).

Maths anxiety is brought about by a few distinct factors in particular, absence of suitable numerical foundation of understudies, concentrate on propensities for remembering equations, issues and applications irrelevant to reality, testing and time-restricted tests, absence of substantial material, the trouble of certain subjects in science, character type, pessimistic way to deal with math, absence of certainty, approaches, sentiments, and considerations of educators and guardians about mathematics (Mutlu, 2019). Research conducted by Rozgonjuk et al., (2020) states that one of the factors that contributes to math anxiety is unfavorable teaching and assessment practices for students, such as scheduling tests and making mathematics a punishment. Math anxiety that occurs in students has several levels according to the situation and conditions and problems faced by each individual, some have low, medium, and high mathematics anxiety (Setiawan et al., 2021).

Based on the results of research conducted by Irhamna et al., (2020) show that Ability to solve problems is influenced by mathematical anxiety by 8.5%. Hidayat (2018) said there was a negative and significant correlation between students' academic abilities and math anxiety. That is, a student's academic ability can be predicted using math anxiety. Aunurrofiq & Junaedi (2017); Hidayat & Ayudia (2019) with a research sample of high school students; and Lestari et al. (2020) with a research sample of MTs students stated that the ability of students to solve mathematical problems is harmed by their level of mathematical anxiety; consequently, the ability of students to solve problems is harmed by their level of mathematical anxiety, and vice versa. Meanwhile, in Ikhsan (2019) research anxiety that is moderate or of a low intensity can provide positive values in the form of enthusiasm or encouragement to improve one's own shortcomings. On the other hand, anxiety that is high and negative can be harmful and affect a person's physical and mental state.

There have been many studies on the topic of the influence of mathematical anxiety and problem-solving abilities, namely research conducted by (Yuwono et al., 2018; Ardiani & Azizah, 2021) who use the context of story problems in their research. Researchers have not found many studies with ill-structured problem content. It is still extremely uncommon to encounter unstructured problems (ill-structured problems), which involve non-mathematical factors and can be solved in many different ways or even without a complete solution. Problems that are poorly structured tend to be more real-world than ordinary (Mahmud & Pratiwi, 2019). An unstructured problem is one in which one or more aspects are poorly defined or explained, necessitating knowledge beyond that outlined in the problem description in order to solve it (Malogianni et al., 2021). The ability to solve ill-structured problems in terms of mathematical anxiety is the focus of this study. It is anticipated that this study will provide new information regarding the ability to solve ill-structured math problems, which will help educators and teachers find ways to lessen the negative effects of math anxiety on students and lower their levels of

math anxiety.

Method

The qualitative research method with a descriptive research type was used by the researchers in this study. Selection of research subjects using non-probability sampling with purposive sampling techniques. The subjects of the study were grade VIII students of SMP Negeri 1 Kemlagi for the 2022/2023 school year, totaling 32 students. The six students selected to be the subjects of this study were students who carried out face-to-face learning at school. Written tests and math anxiety questionnaires were used in the research to gauge students' problem-solving abilities.

Student anxiety test questionnaires were used to collect data on anxiety levels, and the results were divided into three categories: high-anxiety students, moderate-anxiety students, and low-anxiety students. The following is a presentation of a table of mathematical anxiety indicators adapted from Cooke, Cavanagh, Hurst, & Sparrow (2011) used in this study.

Table 1. Mathematical Anxiety Indicators

No.	**Components of Anxiety**	**Indicators**
1.	Mathematics knowledge/understanding	Feeling unable to do math problems
		Assuming you don't know enough about maths
		Feeling unsure of the results of your own work
2.	Somatic	Sweaty body
		Difficulty breathing
		Heart palpitations
3.	Cognitive	Forgetting things that are commonly remembered
		Difficulty concentrating
4.	Attitude	Reluctant to do something
		Feeling insecure

To interpret the classification of anxiety levels, a mathematical anxiety grouping based on Rizki et al., (2019) is used as follows:

Table 2. Criteria for Mathematical Anxiety Level

Score Percentage	Math Anxiety Levels
$25\% \leq P \leq 50\%$	low
$50\% < P \leq 75\%$	medium
$75\% < P \leq 100\%$	high

There are five possible answers on the questionnaire: STS (Strongly Disagree), SS (Strongly Agree), S (Agree), R (Undecided), and TS (Disagree). The mathematical anxiety questionnaire was adopted from Jerran's Maths Centre (2012) developed by Mutodi & Ngirande (2014).

The composed test that actions critical thinking skill comprises of one badly organized issue type portrayal question of social number-crunching material which is organized in light of Polya's critical thinking perspectives, specifically understanding the issue, wanting to issue tackle, carrying out plans, and looking back adopted from Nurjanah et al., (2019). Each aspect of problem-solving has indicators that are also used as a gauge of students' problem-solving abilities. Based on the answers that had been worked out, interviews were then conducted with three students representing low, medium, and high

levels of anxiety to investigate their thinking. Furthermore, the results of the Problem-Solving Test answers and interview results are analyzed to see a description of the mistakes made in solving the ill-structured problem.

The following table details the interview guidelines used:

Table 3. Interview Guidelines

Problem Solving Stage	Data and How to Obtain It
Understanding the Problem	Data: The way students understand the problem and see what is desired. The stage of understanding the problem is characterized by: (1) knowing what is known and asked, (2) write or explain it in their language, (3) relate it to other similar problems, and (4) focus on the most important part of the problem. How to obtain data: 1. Have you encountered this kind of context before? Where do you usually encounter it? Try to tell me in your language the meaning of this problem! 2. Determine how many times the question must be read to comprehend its meaning. 3. Ask what is known and asked. 4. Ask if the information contained in the question is sufficient to solve the problem.
Devising a Plan	Data: How students see how problems are related and how vagueness is connected to data to get ideas for creating problem-solving plans. This stage is characterized by: (1) make or explain the plan in its own language, (2) create mathematical models, (3) sketching diagrams, (4) simplifying the problem, (5) find the formula, (6) develop mathematical models, (7) create simulations, and (8) sort the data. How to obtain data: 1. Ask how to do it.

	2. Ask what the initial steps are like.
Carrying out the Plan	Data: The way students realize the completion plan is in the form of calculations. How to obtain data: 1. Ask students to tell the calculation of each step of the process. 2. Ask how to do it part by part. 3. Ask how it can get such results.
Looking Back	Data: The way students check the results, interpret the answers given obtained, and review whether there is another way that can be used to obtain the same solution. How to obtain data: 1. Asking what the conclusion of the answer is like. 2. Ask if there are other events that can used.

The task of solving ill-structured mathematical problems in this study is as follows.

Store A gives a 5% discount on the first purchase of all kinds of goods, a 10% discount on the second purchase, and a 15% discount on the third purchase. Meanwhile, store B applies buy 2 get 1 free (free one after buying two items). If a person is going to buy four items, in which store should he shop so that he can get the cheapest price?

Result and Discussion

Based on data analysis of math anxiety questionnaires that have been given to 32 students. Grouping mathematical anxiety using score provisions from Rizki et al., (2019). 5 students fell into the high math anxiety category, 18 students fell into the moderate math anxiety category, and as many as 9 students were classified as having low math anxiety. 6 subjects with details were selected, two subjects each in each math anxiety group. SKT stands for "high math anxiety," SKS for "moderate math anxiety," and SKR for "low math anxiety". Furthermore, analyze the results of mathematical problem-solving tests using indicators from Polya (1973).

Problem-Solving Students with Anxiety Higher Mathematics

Students who fall into the high math anxiety group are SKT1 and SKT2. Both subjects have similar problem-solving abilities. Figures 1 and 2 show the results of SKT1 and SKT2's work on the steps to solve ill-structured problems, as well as excerpts from interviews conducted after they worked on ill-structured problems.

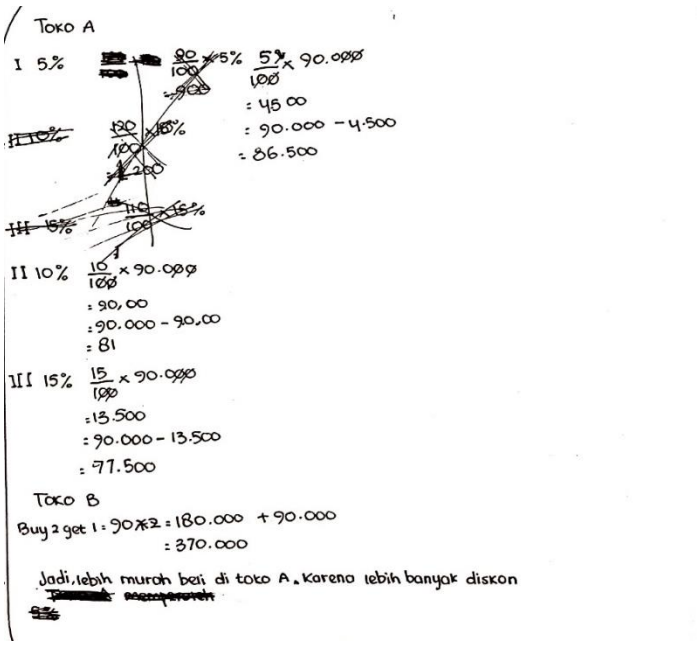


Figure 1. SKT1 Work Results

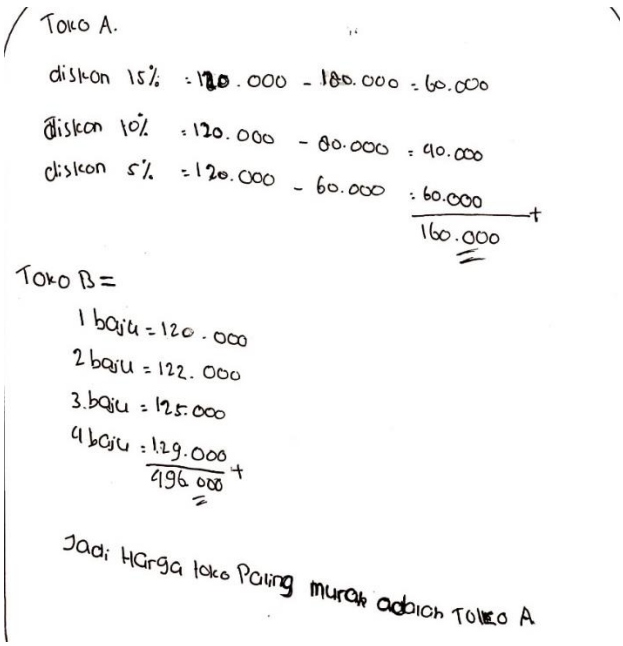


Figure 2. SKT2 Work Results

Students who fall into the category of high math anxiety, namely SKT1, and SKT2, have the same ability in problem-solving. In mentioning the information SKT1 and SKT2 do not write down the information obtained from the problem. SKT1 and SKT2 also could not mention the information correctly during the interview. The following are excerpts of interviews with SKT1 and SKT2,

P : What does that mean?

SKT1 : Looking for discounts

P : What does that ask about it?

SKT1 : Look for the most discounts.

P : What is known in that matter?

SKT1 : Store A has 3 discounts, namely 5%, 10%, 15%. Store B has a buy 2 get 1 free discount.

Based on the interview excerpt above, SKT1 does not mention the discount at store A completely, SKT1 only mentions any discount at the store without any information on how much to purchase. SKT1 is also inaccurate in stating what is asked in the question.

P : Try to explain the meaning of the question!

SKT2 : Two stores provide different discounts, namely store A and store B.

P : What does that ask about it?

SKT2 : Look for the cheapest price from both stores.

P : What is known about the matter?

SKT2 : Store A discounts 5%, 10%, and 15% while store B only discounts buy 2 get 1 free.

From the interview excerpt above, SKT2 only mentioned in the question asked to find the cheapest price from both stores, SKT2 could not mention the information known in the question in full. In re-reading the SKT1 and SKT2 questions, both do not reread the questions. The two only read the question once.

At the stage of making a settlement plan, only SKT1 carried out the stage quite well despite errors in calculations and interpretations of the questions. SKT1 is almost right to solve the discount problem at store A but still does not understand the meaning of discounts at store B. The mistake at this stage is also made by SKT2, which is not writing down the strategy/plan that will be used to solve the problem because it still does not understand the relationship between the information provided and what is asked. This is in line with the opinion of Yuwono et al., (2018) which states that students need prior knowledge in order to implement strategies that make it easier for them to solve the problems they are given when creating a plan for solving problems. Because SKT1 and SKT2 don't know what the problem means, they have trouble coming up with a plan to solve it..

The next indicator of problem-solving ability is to carry out the plan. SKT1 and SKT2 miswrite the desired solution and do not elaborate in detail. SKT1 and SKT2 did not perform well so there was an error in the test work. SKT1 miscalculated the price of goods minus discounts ($90.000 – 4.500 \neq 86.500$ and $90.000 – 13.500 \neq 77.500$). SKT1 also miscalculated discounts at store B ($180.000 + 90.000 \neq 370.000$).

SKT2 does not understand the meaning of the discount, here is a transcript of the interview with SKT2.

P : How do you do this problem?

SKT2 : Subtracted and then summed. 15% discount 120.000 – 180.000, 10% discount 120.000 – 80.000, 15% discount 120.000 – 60.000.

P : Why deduct 180.000

SKT2 : 15 times 12

P : Now explain which store B

SKT2 : The price of the first shirt is 120.000, the second shirt is 122.000 because it is added 2.000, the third shirt is 125.000 because it is 122.000 plus 3.000, the fourth shirt is 129.000 because it is 125.000 plus 4.000

Based on the interview excerpt with SKT2, SKT2 assumes that a 15% discount means 15 multiplied by

12, and a 5% discount means 5 multiplied by 12. Then at the discount at store B that applies to buy 2 get 1, SKT2 assumes that the price increases and is sequential.

In the last indicator of problem-solving ability, namely looking back, SKT1 and SKT2 did not reach this stage because they still made mistakes at the stage of re-checking the answer. SKT1 made a mistake in the calculation, namely not carrying out the re-checking stage. This is in accordance with (utami &; Wutsqa, 2017 in (Pattisina &; Sopiany, 2021)) which says that students frequently disregard the re-checking stage at this stage. As a result, students in SKT1 and SKT2 have not been able to solve this problem at all stages.

Problem-Solving Students with Medium Math Anxiety

Students who fall into the medium math anxiety group are SKS1 and SKS2. The following is the result of SKS1 and SKS2 work based on the steps to solve ill-structured problems, as shown in Figures 3 and 4.

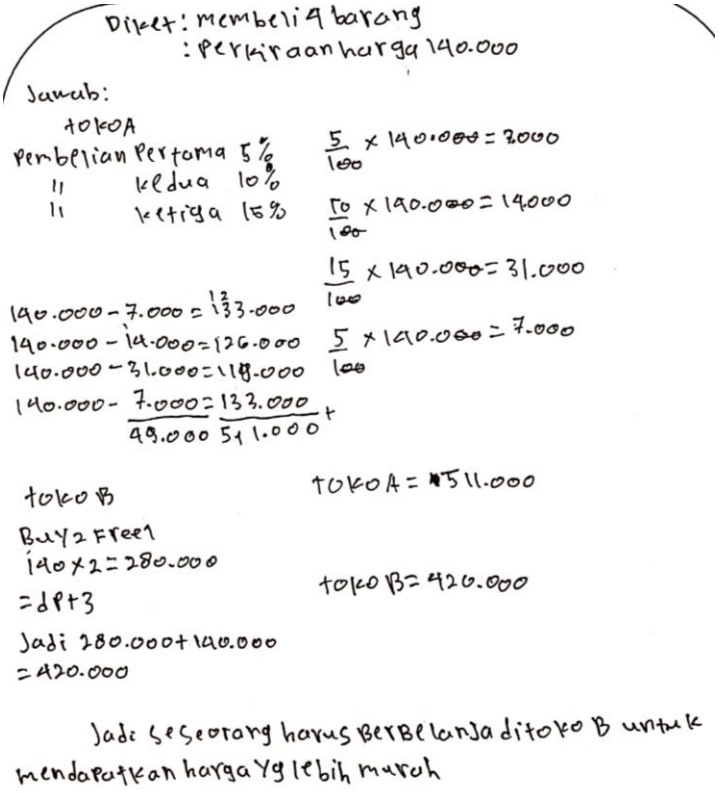


Figure 3. SKS1 Work Results

In understanding SKS1 and SKS2 problems, you can mention the information obtained from these questions correctly during the interview even though you do not write it completely in the results of their work. SKS1 and SKS2 can mention all the information known in the matter, including a 5% discount for the first purchase of all types of goods at store A, a 10% discount for the second purchase, and a 15% discount for the third purchase at store A, store B discount buy 2 get 1 free. This is reflected in the following interview excerpts.

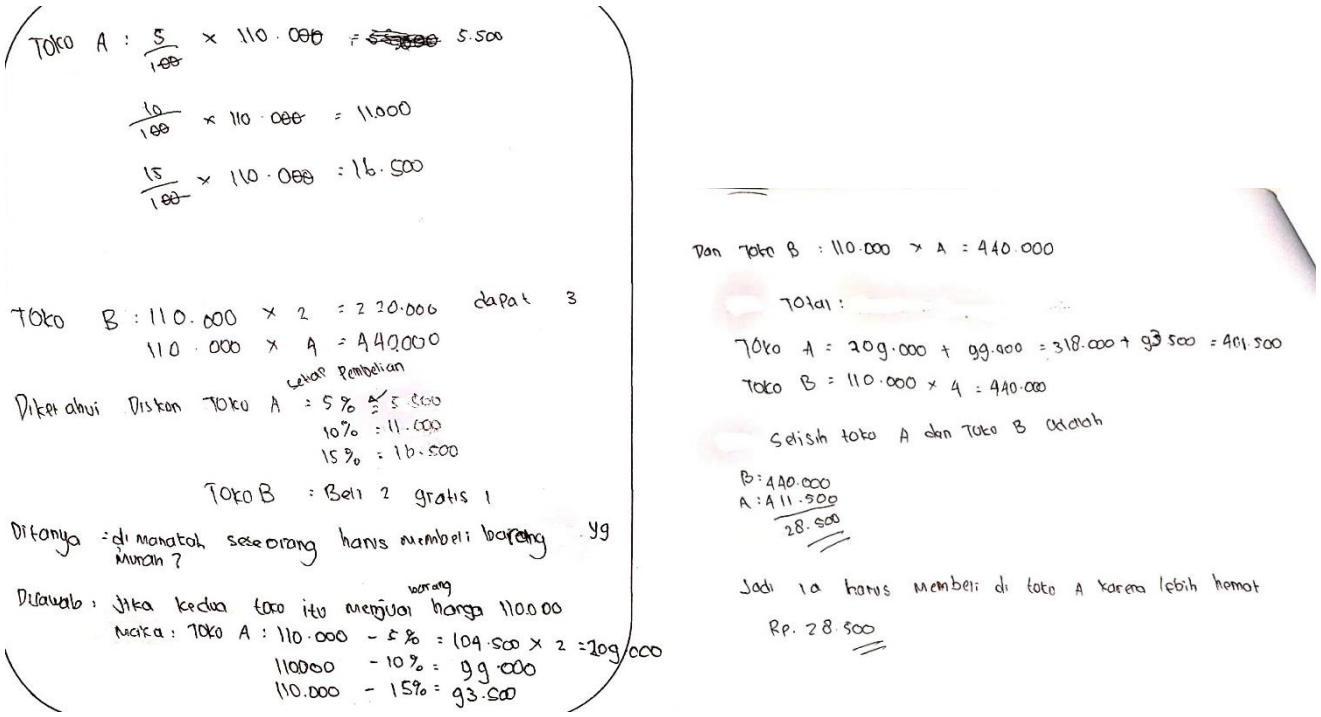


Figure 4. SKS2 Work Results

P : Try to explain what is meant by the question.

SKS1 : We have to choose a cheaper store to shop for 4 pieces of goods.

P : What is known about the matter?

SKS1 : Discounts at individual stores. Store A has a discount of 5% for the first purchase, 10% for the second purchase, and 15% for the third purchase. Store B has a discount buy 2 get 1 free.

Both also reread any information presented in the problem and re-read the problem when solving the problem.

The second indicator of problem-solving ability is to make a plan. SKS1 and SKS2 can describe by writing the details of the steps more clearly. However, there are different steps taken by SKS2, SKS2 writes down the amount of each discount first and then writes down what is known and answered.

The next indicator of problem-solving ability is to carry out problem-solving. SKS1 and SKS2 can solve problems according to the previously written steps well. In solving the problem, SKS1 and SKS2 calculate each discount first and then subtract the starting price from each discount. Below is an excerpt of the transcript of the interview with SKS2.

P : Try to explain how you can find answers like this.

SKS2 : First, I calculate the discount for each store, this is the discount at store A for each purchase.

P : How do I know the discounted price?

SKS2 : This in-store A first purchase of 5% discount means 5 per 100 multiplied by 110.000, the second purchase 10 per hundred multiplied by 110.000, and the third purchase 15 per 100 multiplied by 110.000.

P : Okay, then?

SKS2 : Then to see the price after the discount, I subtract the price of the item from the discount amount.

P : Which store B how?

SKS2 : This if buy 2 get one free means 110.000 times 2. Because buying 4 items means 110.000 times 4, later the total will get 6 items because buy 2 get 1 free.

Based on the excerpt of the interview with SKS2, SKS2 can explain in detail how it is done, there is a slight misunderstanding of discounts in store B. SKS2 still counts the purchase of 4 items even though it should be enough to buy 3 items and already get 4 items. However, the results of the calculations and their work can be described in detail and systematically. SKS1 is comparable to SKS2, SKS1 is able to provide a thorough explanation, and SKS1 correctly comprehends the discounts available at store B. Therefore, it can be concluded that students with moderate anxiety can complete the stages of problem-solving.

In the last indicator of problem-solving ability, namely looking back, SKS1 and SKS2 make conclusions from the answers obtained but the conclusions obtained by SKS2 are wrong because there is a misunderstanding in the previous step. SKS1 writes the conclusions correctly but SKS1 does not re-examine the results of the work because there is a slight miscalculation in the previous step even though the final results obtained are correct.

P : What is the conclusion of this problem?

SKS1 : So one has to shop at store B to get a cheaper price.

P : Are you confident in your work?

SKS1 : Believe

P : Already checked?

SKS1 : Not yet

P : Try checking again

SKS1 : This is an error, 15 times 100 times 140.000 should be 21.000. But my results have been right when reducing the price of goods at a discount.

SKS1 and SKS2 do not re-check the answers at the stage of re-checking based on the results of the student's work and interviews.

Problem-Solving Students with Anxiety Low Mathematics

Students who fall into the low anxiety category are SKR1 and SKR2. The results of SKR1 and SKR2 work based on steps to solve ill-structured problems, shown in figures 5 and 6 below.

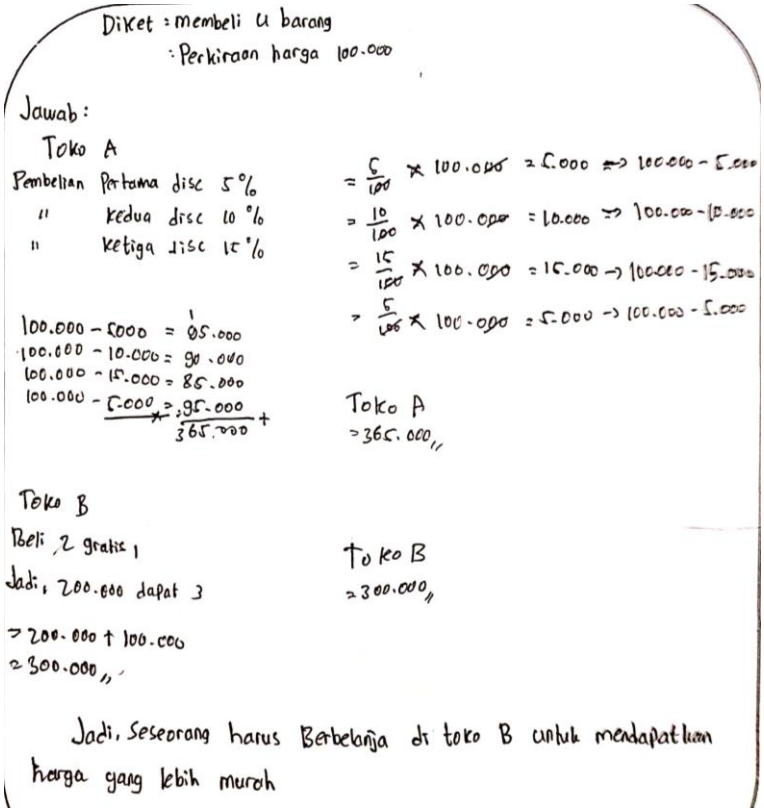
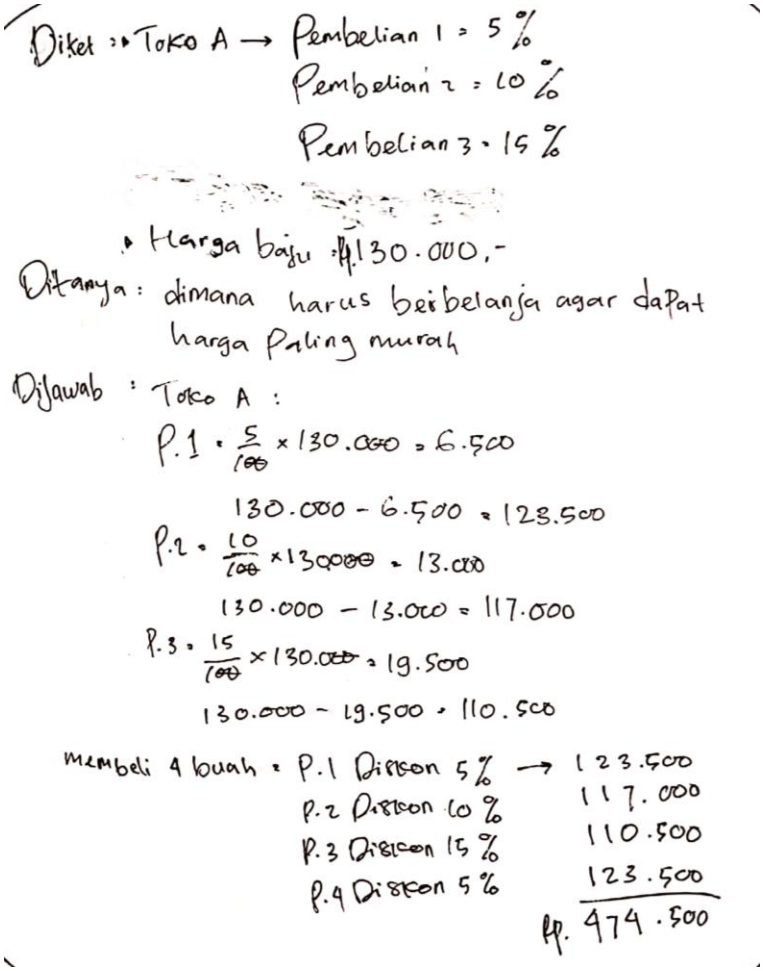


Figure 5. SKR1 Work Results



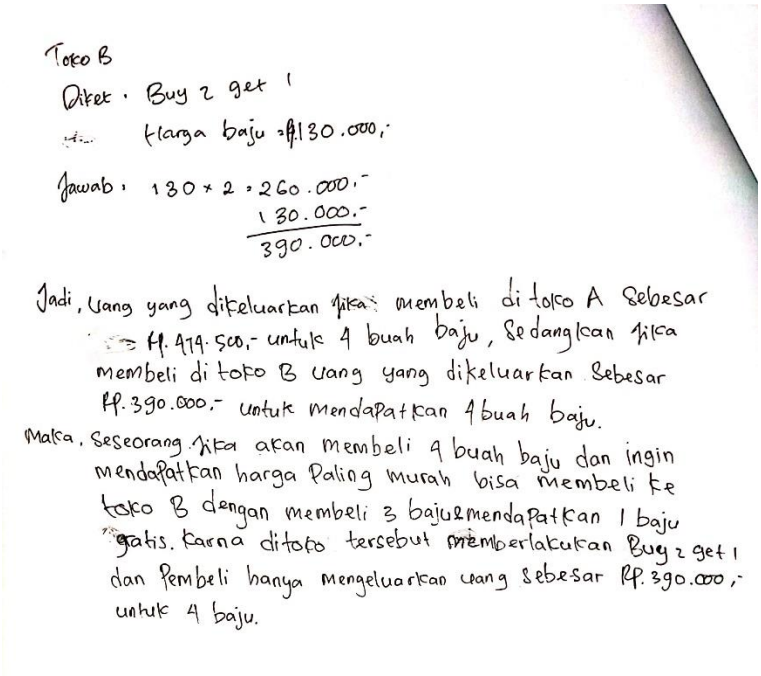

Toko B
Diket : Buy 2 get 1
Harga baju = Rp.130.000,-
Jawab : 130 × 2 = 260.000,-
130.000,-
390.000,-
Jadi, uang yang dikeluarkan jika membeli di toko A sebesar Rp. 479.500,- untuk 4 buah baju, sedangkan jika membeli di toko B uang yang dikeluarkan sebesar Rp. 390.000,- untuk mendapatkan 4 buah baju.
Maka, seseorang jika akan membeli 4 buah baju dan ingin mendapatkan harga paling murah bisa membeli ke toko B dengan membeli 3 baju&mendapatkan 1 baju gratis. karna ditoko tersebut memberlakukan Buy 2 get 1 dan pembeli hanya mengeluarkan uang sebesar Rp. 390.000,- untuk 4 baju.

Figure 6. SKR2 Work Results

Based on the picture's results, it can be seen that understanding the problem is the first sign of problem-solving ability. SKR2 has clearly divided the problem into known and asked parts and written them down completely. SKR1 also does this, it's just that the element asked is not written in the results of his work but when interviewed SKR1 can answer correctly. This is reflected in the following interview excerpts.

P	:	Try to explain what is meant by the question
SKR1	:	We have to determine where to shop to get the cheapest price from both stores.
P	:	What is known in that matter?
SKR1	:	The number of items purchased, the discount of each store, and we have to suppose the price of the goods.
P	:	For what?
SKR1	:	To know which store discounts are bigger.
P	:	What to ask?
SKR1	:	The cheapest price in which store.

SKR1 and SKR2 can understand problems well by reading and repeating several times to ascertain the intent of the question.

In the second indicator of problem-solving ability, namely making plans, SKR1 and SKR2 can describe the solving steps in detail and clearly. SKR1 and SKR2 can connect known information in the question to answer questions.

The next indicator of problem-solving ability is to carry out the plan. SKR1 and SKR2 answers are correct and appropriate and can describe in order and can solve problems according to the steps that have been written previously well. SKR1 and SKR2 understand how the concept of discounts is used, SKR1 and SKR2 calculate the discount price of each purchase first and then subtract the price of goods at that discounted price. SKR1 and SKR1 are also correct in interpreting discounts at store B. The results of purchasing goods at both stores after being discounted will be compared to find the cheapest price.

In the last indicator of problem-solving ability, namely looking back, SKR1 and SKR2 have been

able to check answers properly to avoid mistakes in answering questions. This is reflected in the following interview excerpts.

P : Are you confident in the results of your work?

SKR1 : Believe.

P : Have you re-examined the results of his work?

SKR1 : Already?

P : How do you check?

SKR1 : I read and look again at the problem then I check my calculations.

P : What conclusion did you get?

SKR1 : The cheapest price is to buy at store B.

SKR1 and SKR2 correctly conclude the results of their work, and SKR2 explains the results in detail in figure 6, which shows the results of student work. So, SKR1 and SKR2 carry out the re-checking stage very well.

According to the Polya problem-solving indicator, the researchers here include the stages of the subject's problem-solving ability based on their level of anxiety.

Table 4. Results of Problem-Solving Research Subjects

Problem Solving Stage	**Research Subjects**					
	SKT1	**SKT2**	**SKS1**	**SKS2**	**SKR1**	**SKR2**
Understanding the Problem	No	No	Yes	Yes	Yes	Yes
Devising a Plan	No	No	Yes	Yes	Yes	Yes
Carrying out the Plan	No	No	Yes	No	Yes	Yes
Looking Back	No	No	No	No	Yes	Yes

According to Polya's indicators of problem-solving ability, subjects in the high and moderate anxiety categories were unable to complete all four stages of problem-solving, whereas subjects in the low anxiety category were able to do so. According to Polya, students with high levels of anxiety did not complete all of the stages of problem-solving, and students with moderate levels of anxiety did not complete the stages of re-examination of the results of the work that had been done. In line with the results of Isnawati et al (2015) that subjects with high mathematics anxiety were unable to use most of the strategy stages and thought processes in solving problem solving questions correctly so that the answers were incorrect. Then, Ardani (2021) also explained that the results of his research showed that subjects in the mathematics anxiety level category were unable to complete the problem solving stages according to Polya so they did not recheck the students' answers. The findings of interviews also indicated that subjects in the anxiety level category were not re-examining the results of their work.

Conclusion

In conclusion, if the student correctly answers the question and knows what is known, they are said to have reached the stage of understanding the problem. Students with low and moderate anxiety levels can reach the stage of understanding problems, but students with high anxiety levels do not because they do not write down what is known and asked on the answer sheet and are unable to answer correctly when interviewed. Then, students need prior knowledge to implement strategies that make it easier for them to solve the problem during the planning stage. Students who have low or moderate

levels of anxiety are able to successfully complete this stage, whereas students who have high levels of anxiety have not yet completed it. In carrying out the plan, the student is said to reach this stage if the student has carried out the calculation process by the plan he has prepared based on the requested questions. At this stage who can reach are students with low and moderate math anxiety. Students with high math anxiety do not reach this stage because they do not understand the concepts that result in errors in strategy and implementation. Students are considered to be competent at this stage if they are able to draw conclusions from the results of their work and re-examine those results as well as their calculations. At this point, only students with low anxiety can solve it. Students who have moderate or high math anxiety have not reached the stage of looking back because they did not write down their conclusions or had their conclusions written incorrectly, and they did not check the calculations' results again.

Acknowledgement

The author would like to thank the school and teachers in one of SMP Negeri 1 Kemlagi as well as all parties involved in this research.

References

Ardiani, R., & Azizah, D. (2021). Analisis Kesalahan Siswa dalam Menyelesaikan Soal Cerita Ditinjau dari Kecemasan Siswa Berdasarkan Langkah Polya. Konferensi Ilmiah Pendidikan, 1(1), 165–170.

Ardani, E. R. (2021). Analisis Kecemasan Terhadap Kemampuan Pemecahan Masalah Matematika Pada Materi Aritmatika Sosial. *EDUTAMA*, 1(1), 1-7.

Aunurrofiq, M., & Junaedi, I. (2017). Kecemasan Matematik Siswa dalam Menyelesaikan Soal-Soal Pemecahan Masalah. UJMER: Unnes Journal of Mathematics Education Research, 6(2), 157–166.

Hidayat, R. (2018). Kontribusi Mathematics Anxiety Terhadap Kemampuan Akademik Mahasiswa Pada Pembelajaran Kalkulus. 2(2), 206–216.

Hidayat, W., & Ayudia, D. B. (2019). Kecemasan Matematik Dan Kemampuan Pemecahan Masalah Matematis Siswa Sma. Kalamatika: Jurnal Pendidikan Matematika, 4(2), 205–214. https://doi.org/10.22236/kalamatika.vol4no2.2019pp205-214

Ikhsan, M. (2019). Pengaruh Kecemasan Matematis Terhadap Hasil Belajar Matematika. De Fermat : Jurnal Pendidikan Matematika, 2(1), 1–6. https://doi.org/10.36277/defermat.v2i1.28

Irhamna, I., Amry, Z., & Syahputra, H. (2020). Contribution of Mathematical Anxiety, Learning Motivation and Self-Confidence to Student's Mathematical Problem Solving. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal, 3(4), 1759–1772.

Ismawati, N., Masrukan, M., & Junaedi, I. (2015). Strategi dan proses berpikir dalam menyelesaikan soal pemecahan masalah berdasarkan tingkat kecemasan matematika. *Unnes Journal of Mathematics Education Research*, 4(2).

Juliyanti, A., & Pujiastuti, H. (2020). Pengaruh Kecemasan Matematis dan Konsep Diri Terhadap Hasil Belajar Matematika Siswa. Jurnal Refleksi Edukatika, 4(2), 75–83.

Khalid, M., Saad, S., Abdul Hamid, S. R., Ridhuan Abdullah, M., Ibrahim, H., & Shahrill, M. (2020). Enhancing creativity and problem solving skills through creative problem solving in teaching mathematics. Creativity Studies, 13(2), 270–291. https://doi.org/10.3846/cs.2020.11027

Lestari, H., Fitriza, R., & A, H. (2020). Pengaruh kecemasan matematika (mathematics anxiety) terhadap kemampuan pemecahan masalah peserta didik kelas VII MTs. *Math Educa Journal*, 4(1), 103–113. https://doi.org/10.15548/mej.v4i1.1325

Luttenberger, S., Wimmer, S., & Paechter, M. (2018). Spotlight on math anxiety. Psychology Research and Behavior Management, 11(2018), 311–322. https://doi.org/10.2147/PRBM.S141421

Mahmud, M. R., & Pratiwi, I. M. (2019). Literasi Numerasi Siswa Dalam Pemecahan Masalah Tidak Terstruktur. KALAMATIKA Jurnal Pendidikan Matematika, 4(1), 69–88. https://doi.org/10.22236/kalamatika.vol4no1.2019pp69-88

Maisyaroh Agsya, F., Maimunah, M., & Roza, Y. (2019). Analisis Kemampuan Pemecahan Masalah Ditinjau Dari Motivasi Belajar Siswa Mts. Symmetry: Pasundan Journal of Research in Mathematics Learning and Education, 4(volume 4), 31–44. https://doi.org/10.23969/symmetry.v4i2.2003

Malogianni, C., Luo, T., Stefaniak, J., & Eckhoff, A. (2021). An exploration of the relationship between argumentative prompts and depth to elicit alternative positions in ill-structured problem solving. Educational Technology Research and Development, 69(5), 2353–2375. https://doi.org/10.1007/s11423-021-10019-2

Mutlu, Y. (2019). Math anxiety in students with and without math learning difficulties. International Electronic Journal of Elementary Education, 11(5), 471–475. https://doi.org/10.26822/iejee.2019553343

Mutodi, P., & Ngirande, H. (2014). Exploring mathematics anxiety: Mathematics students' experiences. Mediterranean Journal of Social Sciences, 5(1), 283–294. https://doi.org/10.5901/mjss.2014.v5n1p283

Nurjanah, S., Hidayanto, E., & Rahardjo, S. (2019). Proses Berpikir Siswa Berkecerdasan Matematis Logis Dalam Menyelesaikan Masalah Matematis "Ill Structured Problems." Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan, 4(11), 1441. https://doi.org/10.17977/jptpp.v4i11.12977

Pattisina, Z. C., & Sopiany, H. N. (2021). Kemampuan Pemecahan Masalah Matematis Siswa Ditinjau Dari Kecemasan Matematis pada Materi Lingkaran. Sesiomadika.

Rizki, F., Rafianti, I., & Marethi, I. (2019). Pengaruh Kecemasan Matematika terhadap Kemampuan Pemecahan Masalah Siswa di SMA. GAUSS: Jurnal Pendidikan Matematika, 2(2), 11. https://doi.org/10.30656/gauss.v2i2.1750

Rozgonjuk, D., Kraav, T., Mikkor, K., Orav-Puurand, K., & Täht, K. (2020). Mathematics anxiety among STEM and social sciences students: the roles of mathematics self-efficacy, and deep and surface approach to learning. International Journal of STEM Education, 7(1). https://doi.org/10.1186/s40594-020-00246-z

Setiawan, M., Pujiastuti, E., & Susilo, B. E. (2021). Tinjauan Pustaka Systematik: Pengaruh Kecemasan Matematika Terhadap Kemampuan Pemecahan Masalah Siswa. QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama, 13(2), 239–256. https://doi.org/10.37680/qalamuna.v13i2.870

Simamora, R. E., Saragih, S., & Hasratuddin, H. (2018). Improving Students' Mathematical Problem Solving Ability and Self-Efficacy through Guided Discovery Learning in Local Culture Context. International Electronic Journal of Mathematics Education, 14(1), 61–72. https://doi.org/10.12973/iejme/3966

Siswono, T. Y. E., Kohar, A. W., Hartono, S., Rosyidi, A. H., Kurniasari, I., & Karim, K. (2019). Examining teacher mathematics-related beliefs and problem-solving knowledge for teaching:

Evidence from Indonesian primary and secondary teachers. *International Electronic Journal of Elementary Education*, 11(5), 493-506.

Yuwono, T., Supanggih, M., & Ferdiani, R. D. (2018). Analisis Kemampuan Pemecahan Masalah Matematika dalam Menyelesaikan Soal Cerita Berdasarkan Prosedur Polya. Jurnal Tadris Matematika, 1(2), 137–144. https://doi.org/10.21274/jtm.2018.1.2.137-144