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CREATIVE THINKING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS IN SOLVING PROBLEMS BASED ON MATHEMATICS ANXIETY

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Abstract

Creative thinking skills are essential 21st-century skills that students must master. One factor that can hinder the achievement of this skill is math anxiety. This study aims to describe students' creative thinking skills in relation to their level of math anxiety. The research method employed is a descriptive qualitative approach. This research was conducted at SMP Negeri 2 Ungaran with seventh-grade students as the research subjects. The research tools consisted of a mathematics anxiety questionnaire, mathematical problem-solving tasks, and interview guidelines. The data was analyzed through the stages of reduction, presentation, and conclusion. The subjects of this study were selected based on the criteria, in which students with high and low levels of mathematics anxiety were selected. The subjects of this study consisted of one student with low math anxiety and one student with high math anxiety. The creative thinking process is characterized by fluency, flexibility, and novelty. The research result shows students with low levels of math anxiety tend to be able to demonstrate fulfillment of creative thinking skill indicators. Meanwhile, students with high levels of math anxiety are not able to demonstrate fulfillment of creative thinking skill indicators. However, there are differences in the creative thinking process between students with high and low levels of math anxiety.

Keywords: Creative thinking skills; junior high school; mathematics anxiety.

Abstrak

Keterampilan berpikir kreatif merupakan keterampilan esensial abad ke-21 yang harus dikuasai oleh siswa. Faktor yang dapat menghambar pencapaian kemampuan ini adalah kecemasan matematika. Penelitian ini bertujuan untuk menggambarkan kemampuan berpikir kreatif siswa berdasarkan tingkat kecemasan matematika mereka. Metode penelitian yang digunakan adalah pendekatan deskriptif kualitatif. Penelitian ini dilakukan di SMP Negeri 2 Ungaran dengan subjek penelitian kelas VII. Instrumen penelitian terdiri dari angket kecemasan matematika, tugas pemecahan masalah matematika, dan pedoman wawancara. Data dianalisis melalui tahap reduksi, penyajian, dan kesimpulan. Subjek penelitian ini dipilih berdasarkan kriteria,, di mana siswa dengan tingkat kecemasan matematika tinggi dan rendah dipilih. Subjek penelitian ini terdiri dari satu siswa kecemasan matematika rendah dan satu siswa kecemasan matematika tinggi dengan mengontrol kemampuan matematikanya. Proses berpikir kreatif ditandai oleh kefasihan, fleksibilitas, dan keaslian. Berdasarkan penelitian, siswa dengan tingkat kecemasan matematika rendah cenderung dapat menyelesaikan masalah matematika dengan menunjukkan pemenuhan indikator keterampilan berpikir kreatif. Sementara itu, siswa dengan tingkat kecemasan matematika yang tinggi tidak menunjukkan pemenuhan indikator keterampilan berpikir kreatif. Namun, terdapat perbedaan dalam proses berpikir kreatif antara siswa dengan tingkat kecemasan matematika yang tinggi dan rendah.

***Kata kunci**: Kecemasan matematika; kemampuan berpikir kreatif; sekolah menengah pertama.*

INTRODUCTION

Creative thinking is a cognitive activity that generates innovative ideas in students, particularly when solving mathematical problems. Creative thinking skills play a crucial role in addressing real-world challenges (Kwon & Lee, 2025; Levenson, 2013; Rosar &

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Weidlich, 2022; Thornhill-Miller et al., 2023). Students who possess creative thinking skills will be able to provide various ideas for solutions, be more flexible in their methods, detect new ideas or approaches, and elaborate on their knowledge (M. He et al., 2025; Wu et al., 2018). When solving problems, creativity is needed to generate fluent and flexible solutions (Hasan et al., 2025). Therefore, developing creative thinking skills in mathematical problem solving is very important for students.

Several studies mention indicators to identify the achievement of students' creative thinking skills. There are three indicators, namely fluency, flexibility, and novelty (Ardiansyah & Asikin, 2020). These three indicators are the main components of "The Torrance Test of Creative Thinking" (Raivo & Ardiansyah, 2024). Fluency refers to the development of different ideas in solving problems, flexibility refers to the development of ideas in solving problems using different methods, and novelty refers to the development of ideas in solving problems using unusual methods (Bicer et al., 2020; Wimmer, 2016). In addition, according to S. He et al. (2026) creative thinking involves understanding problems, trying different perspectives, and coming up with meaningful solutions. However, the development of a person's abilities can be hampered by other factors, such as mathematical anxiety.

Mathematics anxiety is one of the main problems in learning. Anxiety has an adverse effect that hinders cognitive processes and learning outcomes (Huang et al., 2019; Sari et al., 2022). Additionally, high levels of math anxiety can cause students to lose focus and experience difficulty solving problems (Hasan et al., 2025; Juniati & Budayasa, 2021). Conversely, students who can suppress excessive math anxiety can control their emotions and have stronger mental resilience in facing challenges (Johnston-Wilder et al., 2020). It is essential to pay attention to the level of math anxiety when learning, as it can significantly impact competence (Gressham, 2021; Juniati & Budayasa, 2022). Research on undergraduate students has shown that working memory capacity and math anxiety affect their learning success (Juniati & Budayasa, 2020). Students who have math anxiety will not focus, choose not to engage mentally, and lack the will to learn mathematics. In addition, high math anxiety also has an impact on problem-solving abilities.

Many studies have examined the relationship between math anxiety and math achievement or performance. In addition, studies have been conducted on math anxiety among prospective teachers regarding the influence of working memory capacity and math anxiety on creativity. This study provides micro-level qualitative evidence of how math anxiety shapes each component of creative thinking. This study demonstrates that math anxiety limits the exploration of ideas and the selection of different strategies. Thus, this research offers a novel perspective by considering math anxiety as an affective factor that not only influences the correctness of problem-solving solutions or learning performance but also restricts an individual's mental activities in generating diverse, flexible, and unique solutions. This study aims to fill the research gap by examining math anxiety in relation to each indicator of creative thinking ability at the junior high school level.

Specifically, this study aims to obtain (1) a description of the creative thinking abilities of students with high

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mathematical anxiety in solving mathematical problems and (2) a description of the creative thinking abilities of students with low mathematical anxiety in solving mathematical problems. This study will contribute to the understanding of how affective factors can enhance activities that rely on creative thinking skills. Additionally, this study will broaden our understanding by utilizing various indicators of creative thinking skills. By combining creative thinking skills with a qualitative approach to addressing math anxiety, this study provides considerations for paying attention to math anxiety when enhancing students' creative thinking skills.

METHODS

This study uses a qualitative descriptive approach. The research subjects are be two seventh-grade students at SMP Negeri 2 Ungaran, Semarang, selected based on low and high levels of mathematics anxiety. The research instruments used were a questionnaire to assess the level of mathematics anxiety, a problem-solving test to evaluate and describe students' creative thinking abilities, and interview guidelines to gather in-depth answers from the subjects.

This study began by selecting research participants through the administration of a mathematics ability test and a mathematics anxiety questionnaire, followed by the assignment of a mathematics problem-solving task to assess students' creative thinking abilities based on their mathematics anxiety. The participants were then interviewed for in-depth analysis.

The research instruments, consisting of tests and interview guidelines, were validated by a mathematics education lecturer. In addition, the mathematics anxiety questionnaire used instruments developed by Juniati & Budayasa (2020) which have been proven to be valid and reliable in measuring students' levels of mathematics anxiety. The Mathematics anxiety questionnaire consisted of 15 statements, each with a score ranging from 1 to 4. Specifically, the questionnaire included four statements related to anxiety in mathematics learning, five statements related to anxiety in mathematics lessons, and six statements related to anxiety in mathematics tests. For more details on the questionnaire items and calculations, refer to Juniati & Budayasa (2020). In this study, the research subjects were categorized as students with low math anxiety ($15 \leq Score \leq 37$) or students with high math anxiety ($38 \leq Score \leq 60$).

The test consists of one question related to flat shapes from geometric elements, where students are asked to arrange various flat shapes to form a capital letter H, with the condition that each flat shape can be used more than once and all types must be used. The math problems provided were used to gather data describing the outcomes of students' creative thinking, supplemented by interviews. The problems were designed to prompt students to generate diverse solutions (fluency), employ different strategies or methods (flexibility), and produce unique solutions (novelty). Thus, a single problem-solving task was used to facilitate an in-depth exploration of students' creative thinking. The analysis of the test results is based on the indicators of creative thinking skills in Table 1. The test to measure students' creative thinking skills contains questions related to flat shapes as shown in Figure 1

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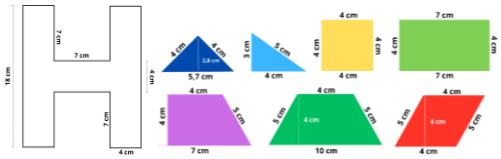
Table 1. Creative Thinking Skills Indicator

Component	Indicator
Fluency	Students' ability to provide various alternative solutions to solve a problem
Flexibility	Students' ability to present solutions in different ways
Novelty	Students' ability to provide unique or unusual alternative solutions to solve a problem

Origami paper is provided in the shape of several flat shapes as follows. In addition, there is a sketch of the capital letter "H" as follows



Arrange the capital letter H pattern using all the provided flat shapes (with specified sizes). Each flat shape may be used more than once. Create as many different and unique capital letter H patterns as possible! Explain how you arranged each alternative and include your reasons for choosing the letter H pattern you created!

Figure 1. Questions on Solving Mathematical Problems Related to Flat Shapes

Next, semi-structured interviews were conducted with the research subjects to explore information based on their test answers. Data analysis, using the Miles & Huberman, (1994) model, consisted of three steps: reduction of data from the mathematics anxiety questionnaire, problem-solving tests, and interview transcripts. Next, the data were presented narratively, and conclusions were drawn based on the three data collection techniques related to students' creative thinking skills in solving mathematical problems. Finally, to ensure the validity of the data, triangulation techniques were used to re-examine the test, questionnaire, and interview data.

RESULTS AND DISCUSSION

Researchers collected data from September 19 to 20, 2025, in class VII of SMP Negeri 2 Ungaran, Semarang. Table 2 shows there were 32 research subjects consisting of 23 research subjects with low mathematical anxiety and 9 research subjects with high mathematical anxiety.

Table 2. Mathematics Anxiety Results

Mathematics Anxiety Levels	Total
Low ($15 \leq Score \leq 37$)	23
High ($38 \leq Score \leq 60$)	9
Total	**32**

From Table 2, one student with high mathematical anxiety and one student with low mathematical anxiety were selected as research subjects. The Mathematics Ability Test (MAT) and Mathematics Anxiety Questionnaire (MAQ) results are shown in more detail in Table 3.

Table 3. The Mathematics Ability Test (MAT) and Mathematics Anxiety Questionnaire (MAQ) Results

Sample	MAT	MAQ	Category
NP; RB	90; 90	37; 39	Low; High
MR; NA	90; 90	32; 38	Low; High
AD; MA	85; 85	27; 38	Low; High

The subjects were selected based on their similar mathematical abilities, allowing for the examination of how mathematical anxiety affects their creative thinking abilities. For example, respondents NP and RB had the same math ability test results, but their math anxiety scores were not significantly different. Therefore, the subjects selected for this study were AD and MA, who had the same math ability test results of 85 and different math anxiety scores.

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The results of the students' problem-solving tests will be analyzed and described to see the achievement of each indicator of creative thinking ability. This is done to see mathematics anxiety on students' creative thinking abilities by minimizing the factor of different initial abilities. Table 4 is contains the research subjects who will be interviewed to explore the answers based on indicators of creative thinking ability.

Table 4. Classification of Mathematics Anxiety Level Categories Based on Mathematics Ability Test

Subject	Mathematics Ability Test	Mathematics Anxiety Score	Mathematics Anxiety Level
HMA	85	38	High
LMA	85	27	Low

Creative Thinking Ability in Subjects with High Mathematics Anxiety (HMA)

The HMA results show that subjects were able to generate different ideas, yet in a similar method. Figure 2 shows the HMA results for the alternative letter H patterns. Figure 2 shows the creative thinking ability of subjects with HMA only meets the fluency indicator.

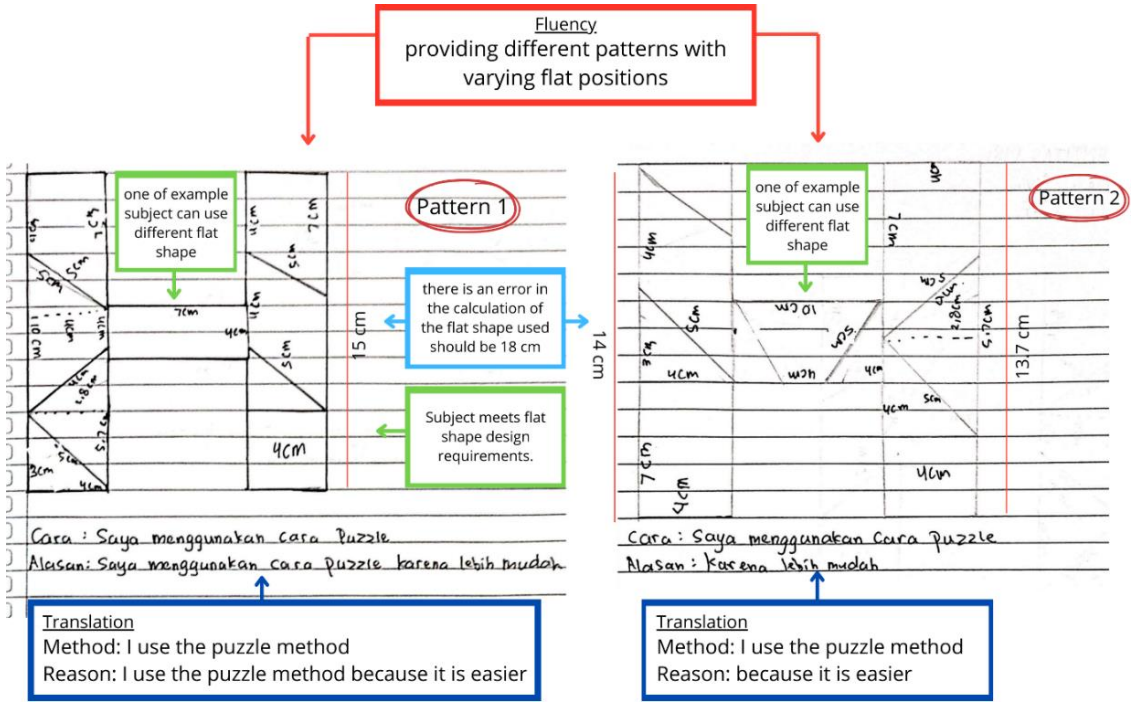

Figure 2. Creative Thinking Ability with High Mathematics Anxiety (HMA)

Based on Figure 2, HMA offers two distinct approaches to arranging the letter H pattern (fluency). There are differences in the placement of flat shapes in each idea. One difference that can be observed is that the two horizontal lines connecting the vertical lines of the letter H are filled with rectangles. In contrast, in the other pattern, the two horizontal lines

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connecting the vertical lines of the letter H are filled with trapezoids and triangles. Each idea employs the same approach, which involves arranging flat shapes using the concept of a puzzle.

The subject did not propose ideas with a new or unusual approach because most students proposed alternative ideas for the H pattern using the puzzle method. However, in the first pattern idea, a calculation error occurred, causing the vertical sides of the H to be the incorrect length. During the interview, the student realized there was a calculation error and was able to correct it verbally. Additionally, the subject wrote down the method and reasons for using the puzzle method because it was considered easier than arranging alternative patterns by considering the perimeter and area of flat shapes. Despite HMA already having an initial scheme, the exploration of varied and new ideas had not been undertaken. HMA chose to provide ideas that were easy in practical terms, thus limiting the provision of ideas with different approaches. So, HMA has not met the three indicators of creative thinking skills, namely fluency, flexibility, and novelty.

During the researcher's interview with HMA, HMA was able to explain important information about the questions asked. HMA explained that there are various types of flat shapes, namely squares, rectangles, right-angled triangles, isosceles triangles, right-angled trapezoids, isosceles trapezoids, and parallelograms. HMA was then able to explain that there were conditions for arranging alternative H patterns, namely that each flat shape could be used more than once and had to be arranged in as many different patterns as possible. The subject stated that when he was first presented with the question, he found it challenging because he had never encountered a similar question, despite having learned about flat shapes in 6th grade. When the researcher asked if he had thought of other ways, HMA said that he had actually tried using the area of flat shapes but found it difficult, so he chose to stop and switch to an easier method because he was "afraid of making a mistake." HMA realized that this problem could be solved in various ways, such as simply matching different types of flat shapes, calculating the perimeter of the letter H and all the flat shapes, and using the area of the flat shapes to place the correct flat shapes in the letter H pattern. However, HMA felt that he had not tried various methods to the fullest because he was unsure of his answers. This was also evident when HMA stated that he was not satisfied with his answer because it was incorrect and still visually messy.

The results of the questionnaire completed by HMA also showed consistency between the answers given during the interview and the results of the problem-solving test. During the interview, HMA said that he was unsure of his answers. One of HMA's statements was that he always lost focus during exams, which prevented him from remembering the material he had previously understood.

Thus, based on the analysis of the test and interview results, students with high mathematical anxiety who possess creative thinking skills are only able to fulfill one indicator of ability, namely fluency. The subjects can think of more than one solution to a problem, but do not produce solutions using different approaches, so they lack flexibility and fail to demonstrate novelty. Limited ideas result from cognitive barriers caused by math anxiety. These

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cognitive barriers reduce the flexibility and originality of solutions.

Creative Thinking Ability in Subjects with Low Mathematics Anxiety (LMA)

The LMA results show that flexibility and novelty in use of methods to generate diverse answers. Figure 3 shows the LMA results for the alternative letter H patterns. Figure 3 shows the creative thinking ability of subjects with low mathematical anxiety (LMA) met all three indicators.

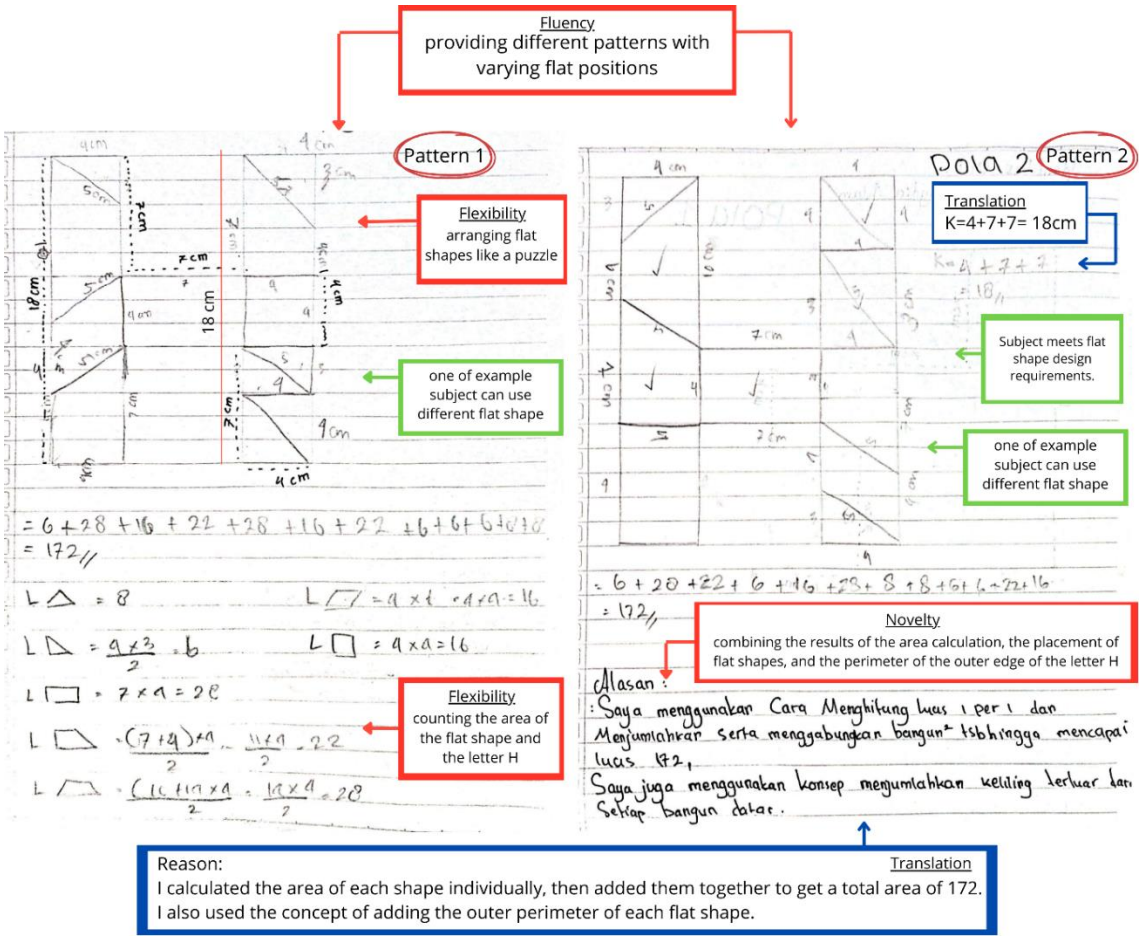

Figure 3. Creative Thinking Ability with Low Mathematics Anxiety (LMA)

Based on Figure 3, LMA provided two alternative ideas to the letter H pattern. One example is the arrangement of flat shapes on the left side of the letter H pattern, filled with right-angled trapezoids, parallelograms, isosceles trapezoids, and right-angled triangles. In contrast, in the other pattern, the arrangement of flat shapes was changed to a rectangle, a right-angled trapezoid, an isosceles trapezoid, and a right-angled triangle. In both patterns, LMA was also able to illustrate that two equilateral triangles would be equal to one square, an answer not found in most students. In addition to the two patterns written down, during the interview, LMA was able to provide two alternative patterns orally. LMA stated that creating different patterns was easier for them if the flat shapes were mirrored. Based on this description, LMA is

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proficient in providing alternative ideas for the H pattern while still adhering to the question's rules (fluency).

LMA meets the flexibility indicator because each idea uses a different approach. During the interview, LMA also explained the details related to the process. In alternative pattern 1, LMA arranged flat shapes by ensuring that the vertical sides of the flat shapes matched the vertical sides of the letter H pattern before arranging them, meaning that LMA chose flat shapes based on the suitability of their side lengths. In alternative pattern 2, LMA used a combination of area and perimeter, calculating the area of each flat shape and the area of the letter H first. LMA found the area of the letter H by imagining that three rectangles formed the letter H. Next, LMA attempted to calculate the total area of the flat shapes to determine if it was equal to the area of the letter H. After checking, it turned out that there was an area of the letter H that had not been filled, so LMA assumed that there was a flat shape that appeared more than once. Then, LMA tried to arrange the flat shapes, paying attention to the outer edges of the letter H pattern so that they matched. Finally, LMA attempted to calculate the total area of the flat shapes again, and when it was equal to the area of the letter H, the pattern was correct. The method used demonstrates that the subject can employ more than one approach (flexibility).

LMA meets the novelty indicator because, out of a total of 32 students who took the test, only 3 students were able to use different methods, one of which was LMA, who employed an unusual approach. This condition can be said to be novelty because LMA was able to think of a unique and uncommon method. Students with low MA first calculated each flat shape that was a component of the H pattern and the total area of the letter pattern. Students said this was done to ensure that each pattern submitted had many flat shapes, as indicated by the total area of all flat shapes used must be equal to the area of the letter H pattern. In line with this, in arranging the patterns, students paid attention to the length of the sides of the flat shapes and letter patterns. The other participants only attempted to arrange the flat shapes without considering the suitability of the area or perimeter of the shapes, resulting in measurement errors. In this study, the novelty in the students' ideas was evident in how they thought differently from their peers. Based on this, LMA is also able to provide an approach to generating unusual or uncommon ideas (novelty).

LMA was able to correctly state the information contained in the questions and those asked. LMA was then able to explain that there were conditions for arranging alternative H patterns, namely that each flat shape could be used more than once and had to be arranged in as many different patterns as possible. When the researcher asked for other alternative ideas, LMA was able to provide two alternative H patterns. Based on the answer, LMA explained that he had considered two other patterns by changing the position of the parallelogram and rectangle, but did not have enough time to implement them. LMA was able to explain the process of arranging flat shapes using methods other than puzzles. While answering the questions, LMA recalled the flat shape material learned in grades 5 and 6 to help understand the questions. LMA had never encountered the questions before, so he struggled to determine the appropriate strategy. In addition, LMA recalled that in 6th

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grade, he had encountered problems involving calculating flat shapes that formed a particular shape, so that simple concept was broken down into a more complex concept of calculating the area of the letter H. LMA said that he chose to use various methods such as puzzles, area, and perimeter of flat shapes because he wanted to get the maximum score and be different from his friends. Then, LMA said that when the teacher gave challenging questions, LMA would try even though it might not be correct because for him, mistakes were typical and confidence was the key. When the researcher asked whether his answers met the requirements of the questions, LMA said that he was sure his answers were in accordance with the requirements and questions, namely, to provide as many ideas as possible in different ways.

The results of the questionnaire completed by LMA also showed consistency between the answers given during the interview and the results of the problem-solving test. LMA never feels anxious if he has not mastered the material or cannot solve a complex problem. In line with the interview, LMA said that if they did not find the answer to a question they did not understand, they would ask a teacher or a friend who understood better. In line with this, LMA stated that they rarely felt anxious when they did not understand the material while studying, and they also verbally confirmed that they would not hesitate to ask the teacher questions. Regarding math tests, LMA never felt worried and was always confident during tests. LMA said that if the teacher gave a question, LMA would try to work on it, but besides that, LMA did not think negatively about the effort he made, and if there were mistakes, LMA considered it normal. Based on the questionnaire results and verbal responses during the interview, it can be concluded that with low anxiety in the mathematics learning process, views on mathematics, mathematics quizzes, and mathematics exams will be more positive, enabling self-control when facing material that requires creativity.

Thus, based on the analysis of test results and interviews, students with low math anxiety demonstrated the achievement of competency indicators, namely fluency, flexibility, and novelty. Low math anxiety allowed subjects to feel free to think of many ideas and solutions without fear of making mistakes. Subjects can think of more than one solution to a problem using different approaches and new combinations that their peers would not have thought of. In other words, low math anxiety provides a psychological boost that optimizes creative thinking skills. Students with low math anxiety do not appear to face obstacles in exploring ideas. This suggests that students with low math anxiety are able to explore ideas until they arrive at flexible and innovative solutions.

Based on the analysis of test answers, interviews, and questionnaire results from HMA subjects, researchers found that psychological barriers arise due to fear of making mistakes and anxiety when encountering non-routine questions. Mathematical anxiety creates barriers for students in exploring ideas. This math anxiety creates self-doubt, fear, and tension. Factors that cause suboptimal creative thinking can be described as low positive attitudes toward ideas and one's own abilities, a lack of confidence during math tests, and fear that causes students to choose the common and avoid risks.

The results of this study indicate that there are differences in students'

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creative thinking depending on their level of math anxiety. Students with high math anxiety tend to lose concentration, which hinders cognitive activity and prevents the exploration of ideas. This finding can be explained by the fact that students with high anxiety tend to focus on a single method. In contrast, students with low math anxiety are more fluent in exploring ideas and open to problem-solving solutions. Math anxiety can affect intrinsic aspects of students, such as self-confidence, belief in their own abilities, and academic achievement (Du et al., 2021; Hasan et al., 2025; S. He et al., 2026; Shimizu, 2025).

This opinion is reinforced by the researchers' findings, which reveal a difference between LMA subjects, who can realize that the combination of two equilateral triangles is a square, and HMA subjects, who do not write this down correctly. Subjects with high math anxiety tend to focus solely on fulfilling the requirements of the question, without considering the correctness of their answers. Anxiety interferes with focus, causing subjects to fail to complete the question even though they understand its meaning (Hasan et al., 2025).

Based on the analysis of test answers, interviews, and questionnaire results from LMA subjects, researchers found that students had a favorable view of mathematics. It was evident that students attempted to apply established schemes to solve problems. These facts were evident based on the answers of LMA students, who were able to provide various ideas and focus on the questions asked. The cognitive process of creative thinking in LMA students performed better than that of HMA students, as shown by the results of the problem-solving test. Creative thinking skills in mathematics require a stress-free thinking process (Wahyuni et al., 2024).

These findings are consistent with Olango (2016) that math anxiety and self-confidence have a direct and significant effect on math achievement. This condition indicates that anxiety about problems or material that is considered difficult will give rise to a negative view of one's abilities, resulting in cognitive conflict, which hinders creative thinking. Mathematical anxiety disrupts the cognitive process by interfering with understanding and thinking activities during problem solving (Listiawati et al., 2025; Shimizu, 2025; Wahyuni et al., 2024). Conversely, if there are effective strategies that can reduce students' anxiety levels, it means that students can view the learning process positively and are motivated to participate actively (Alabdulaziz, 2020; Suren & Kandemir, 2020). Students who feel anxious will struggle to concentrate and find the right strategy. In line with Juniati & Budayasa (2022) there is a significant difference between subjects with high levels of math anxiety, who can only answer one question correctly, and subjects with low math anxiety, who can answer all questions correctly. The results of this study are consistent with the findings of Song et al. (2023), Wahyuni et al. (2024), Juniati & Budayasa (2020), and Quiceno & Alpi (2025) which show that when facing a mathematics test, individuals who work and think in a state of high anxiety will disrupt the thinking process.

The findings of this study theoretically contribute to the knowledge of researchers and academics regarding students' creative thinking abilities as viewed from their level of mathematical anxiety in solving mathe-

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matical problems. Meanwhile, in practical terms, it can help teachers, especially those at SMPN 2 Ungaran, Semarang, develop students' creative thinking abilities by considering their level of mathematical anxiety, allowing for the determination of further learning plans.

This study has the advantage of explaining why and how students' creative thinking is influenced by math anxiety. Through a qualitative approach, a more detailed description of junior high school students' creative thinking can be obtained. However, due to the limited number of subjects, the findings of this study cannot be generalized. The results of this study reinforce the findings of previous research that math anxiety affects students' cognitive abilities, one of which is creative thinking; however, other mathematical abilities require further investigation.

CONCLUSIONS

This study has answered the research question by providing a description of students' creative thinking abilities in relation to mathematics anxiety. Math anxiety constrains logical and divergent thinking processes, and inhibits the exploration of different methods and novel solutions. Therefore, training students' creative thinking skills in mathematics learning, taking into account their level of math anxiety, is essential.

This study makes a theoretical contribution to the understanding of math anxiety and cognitive activities such as creativity. The findings expand upon the theory that affective and cognitive activities are hierarchically dependent on external factors, one of which is math anxiety. This study examines how students' cognitive activities are influenced by math anxiety.

However, other aspects of students' creative thinking abilities may be influenced by other affective factors such as self-confidence, learning motivation, and student engagement. Examining and addressing affective factors that can facilitate the problem-solving process in creative thinking requires further study.

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