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# Is mathematics still scary? Primary school pupils' perceptions of mathematics

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***Abstract*:**
For a long time, research has shown that mathematics is an unpleasant subject. This study examines whether mathematics remains scary today. Previous research has limitations, particularly in terms of why primary school students have negative perception of mathematics. This study uses a descriptive qualitative design supported by quantitative data to obtain more in-depth results. The subjects of this study were 153 fifth-grade students from nine primary schools in the city of Palu, selected at random. Data were collected via a questionnaire, and responses were categorized as positive or negative. Based on this, 109 students (71%) gave negative responses, namely "mathematics has a lot of formulas", "mathematics is difficult", "mathematics is scary", and "mathematics is boring". Meanwhile, 44 other students (29%) gave positive responses, namely "mathematics is challenging" and "mathematics is enjoyable". Subsequently, six participants were selected who were representatives of each type of response to be interviewed. Data credibility was tested using the member check technique. Then, it was analyzed using three stages, namely data condensation (summarizing and connecting meaning between data), data presentation (displaying data in tables and descriptions) and drawing conclusions (connecting data with theory, data categorization, and data interpretation). The results of this study indicate that many primary school students still find mathematics intimidating. This perception is driven by two factors: the nature of mathematics and the way it is taught. This situation necessitates the continued development of learning strategies that can shift students' perceptions from negative to positive.
**Keywords:** Perception, mathematical perception, mathematical anxiety, mathematical phobia.

## Introduction

The opinion that mathematics is a scary, boring, uninteresting subject that often causes stress and anxiety is one that we have heard for a long time (Petronzi et al., 2024). Words used to describe responses to mathematics include confusion, restlessness, doubt, chaos, fear, embarrassment, difficulty, boredom, helplessness, disappointment, intimidation, stupidity, pressure, dislike, tension, worry, nervousness, shame, and fear (Reyes & Rothstein-Fisch, 2021). These negative responses have an impact on math anxiety. This condition occurs across age groups and in countries worldwide, including Indonesia (Adeniyi et al., 2021; Uddin, 2022).

Although students realize that mathematics is an important subject, many of them are not interested in learning mathematics (Batiibwe et al., 2020). Students' dislike of mathematics affects many aspects of learning, ranging from a lack of enthusiasm to difficulty concentrating during class to the formation of cognitive rejection that impedes proper understanding of the material presented by the teacher. Poor understanding of mathematics will also affect students' perceptions of mathematics itself. Students' negative perceptions of mathematics interact with their understanding and achievements, forming a vicious cycle. The negative perceptions that students hold toward mathematics pose a challenge for teachers. The mathematics teacher has a responsibility to ensure that students understand mathematics and create a pleasant learning atmosphere (Lumbantoruan & Manalu, 2024).

Many innovative learning models have been developed, and interactive learning approaches have also been the subject of much research. Technology-based learning media and games integrated into learning are efforts to make mathematics enjoyable for students, so that their perceptions improve (Ana et al., 2025; Harmini et al., 2024). However, we still find that many students are not interested in learning mathematics. One factor contributing to low achievement in mathematics is students' reduced motivation and their behavior toward mathematics. They feel afraid, anxious, and even stressed when learning mathematics. This condition is certainly a challenge for all of us to solve. In Indonesia, low motivation to learn and poor mathematics achievement, attributable to students' aversion to mathematics, remain common. Therefore, the topic of enjoyable learning remains widely studied by researchers. This condition is not ideal. We hope that, with the development of educational technology, there will no longer be students with a negative attitude toward mathematics. They will enjoy mathematics and learn effectively in class and independently. A positive perception will increase motivation, reduce the tendency to give up when encountering difficult material, and foster a strong desire to continue learning mathematics. Conversely, a negative perception will certainly reduce enthusiasm for learning and even lead to a reluctance to learn, even when the material presented is easy.

Primary school is a foundational level of education, but it has an important impact on students' future. Students' positive attitudes toward mathematics need to be maintained and, if possible, improved. However, students who hold negative attitudes or perceptions toward mathematics should be identified and addressed promptly. Therefore, this study aims to examine primary school students' attitudes and perceptions toward mathematics. The results of this study are expected to reveal students' perceptions of mathematics. In addition, the results of this study can serve as a basis for reflection for all parties, including teachers, researchers, and the government, to continue striving to develop innovations in mathematics education.

## Research Methods

This study uses a descriptive qualitative design supported by quantitative data to obtain more in-depth results. The subjects of this study were 153 fifth-grade students from nine primary schools in Palu City, selected at random. The research instruments consisted of the main instrument, namely the researcher himself, and a supporting instrument, namely a questionnaire. The questionnaire contained three main questions designed to reveal students' perceptions of mathematics. The main focus of the questionnaire was responses to mathematics and the factors causing them.

Data collection used two methods: a survey and in-depth interviews. The survey was administered to 153 respondents, who were then grouped based on their responses. One representative from each group was selected based on the criteria of having good communication skills. This selection was made based on suggestions from the class teachers at each school. Each representative was then interviewed in-depth. Data credibility was tested using a member checking technique. Data analysis then took place in three stages: data condensation (summarizing and connecting meaning between data), data presentation (displaying data in tables and descriptions), and conclusion drawing (connecting data to theory, categorizing data, and interpreting data).

The data analysis flow is presented in Figure 1.

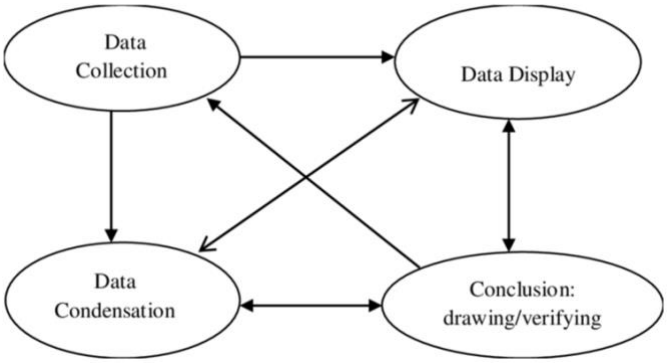


**Figure 1. Qualitative data analysis flowchart (Miles et al., 2014)**

## Results and Discussion

The research data presented are credible, as supported by the credibility tests conducted. The survey results for primary school students' perceptions of mathematics are presented in Table 1.

**Table 1.** Categories of primary school students' perceptions of mathematics

| No. | Categories | Types of perceptions | Frequency |
|---|---|---|---|
| 1 | Negative | Many formulas | 43 |
| 2 | | Difficult | 32 |
| 3 | | Scary | 19 |
| 4 | | Boring | 15 |

| No. | Categories | Types of perceptions | Frequency |
|---|---|---|---|
| 5 | Positive | Challenging | 20 |
| 6 | | Enjoyable | 24 |
| Total | | | 153 |

Table 1 shows six types of student perceptions of mathematics. These perceptions are grouped into two categories: negative and positive. The grouping is based on the meanings that students assigned to the expressions when completing the questionnaire. Responses such as "many formulas, difficult, scary, and boring" tend to indicate a negative meaning. These responses make students avoid mathematics. Responses such as "challenging" and "fun" tend to convey positive meanings. Therefore, students who gave these responses tend to enjoy mathematics. Based on these data, 71% of students have a negative perception of mathematics, whereas 29% have a positive perception.

The factors underlying students' perceptions were revealed through in-depth interviews. The subjects interviewed comprised six individuals, one from each type of perception. The selection of subjects also took into account students' communication skills to ensure the interview process proceeded smoothly. The in-depth interview data collected was coded as P for the researcher and S1 for the first subject representing the group of students with the perception that "mathematics has many formulas," S2 for the second subject representing the group of students with the perception that "mathematics is difficult," S3 for the third subject representing the group of students with the perception that "mathematics is scary," S4 for the fourth subject representing the group of students with the perception that "mathematics is boring," S5 for the sixth subject representing the group of students with the perception that "mathematics is challenging," and S6 for the sixth subject representing the group of students with the perception that "mathematics is easy."

**Negative category**

In this category, there are four subjects (S1, S2, S3, and S4) representing four types of students' perceptions of mathematics, namely, mathematics has many formulas, mathematics is difficult, mathematics is scary, and mathematics is boring.

**Mathematics has many formulas.**

Interview data on S1 (first subject), representing the group of students with the perception that "mathematics has many formulas," is presented in Table 2 below.

**Table 2.** Interview S1

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S1 | *I imagined many formulas and numbers.* |

| Code | Interview |
|---|---|
| P | *Why do you imagine lots of formulas when you hear the word "mathematics"?* |
| S1 | *Because mathematics has many formulas, if you want to learn mathematics, you have to memorize many formulas. Different problems have different formulas.* |
| P | *Did your teacher tell you to memorize all the formulas?* |
| S1 | *Not really, but if you want to do the problems, you definitely need to know the formula, so you have to memorize it.* |

This interview excerpt reveals that the subject considers mathematics to involve many formulas, as evidenced by the subject's tendency to memorize them. The concern of memorizing a set of formulas makes learning difficult for some students; however, it is necessary, according to the conception of teachers and students themselves (Pereira et al., 2023). There are negative effects of learning mathematics by rote memorization in primary school students (Wang & Yin, 2023). Memorization hinders cognitive development, making memorized material more easily forgotten. In the literature review, memorization of math facts was shown to harm student learning and to increase math anxiety.

Learning mathematics requires an analytical process to enhance memorability. The subjects considered that if they could not memorize formulas, they would have difficulty learning mathematics. Each problem has a distinct formula, so many formulas must be memorized. This condition became a burden for the subjects when studying mathematics, so they did not enjoy the subject. This gives rise to the perception that mathematics involves numerous formulas that must be memorized to solve problems. Learning by simply memorizing formulas makes learning uninteresting. Subjects do not enjoy learning mathematics independently or with teachers and classmates, thereby forming a negative perception of mathematics.

**Mathematics is difficult**

Interview data on S2 (second subject), representing the group of students with the perception that 'mathematics is difficult', is presented in Table 3 below.

**Table 3.** Interview S2

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S2 | *Mathematics is a difficult subject to understand.* |
| P | *Why do you think of difficult words when you hear the word mathematics?* |
| S2 | *Because for me, maths is difficult. There are too many rules, which makes my head spin. The material provided by the teacher is often difficult as well.* |

This interview excerpt reveals that the subject considers mathematics difficult to understand. Students and the community also considered mathematics a difficult

subject. This is because the subject is considered strict and has rules that must be followed, especially when solving problems. Mathematics is a hierarchical subject (Petronzi et al., 2024). The hierarchical nature of mathematics makes it difficult for someone to understand a subject if the prerequisites for that subject are not understood. Such conditions will lead to ongoing confusion, further complicating the subject's learning of mathematics. The modified exercise format, which differs from the examples presented in class, is also a factor contributing to the subject's aversion to mathematics. The subject is unable to find patterns of relationships between topics or between the questions given. This can also occur due to a tendency toward memorisation. This condition places a cognitive burden on the subject whenever they study mathematics, thereby leading them to dislike mathematics. This forms the perception that mathematics is a difficult subject.

The schema formed in students' memories is that many formulas must be memorised to learn mathematics. Schemas influence a person's perspective on something, including mathematics. Students act based on the schemas they have, so their historical traces will be reflected in attitudes toward mathematics, feelings, and behaviours toward practices influenced by mathematics (Quaye & Pomeroy, 2022). Schema theory offers a comprehensive framework for understanding how individuals organise and interpret information, significantly impacting learning, memory, and academic achievement. Schemas serve as tools for responding and as references for attitudes and actions. The cognitive load of memorising formulas is substantial, which is why the subjects have a negative perception of mathematics.

**Mathematics is scary**

Interview data on S3 (third subject), representing the group of students with the perception that 'mathematics is scary', is presented in Table 4 below.

**Table 4.** Interview S3

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S3 | *Mathematics is a scary subject.* |
| P | *Why do you feel afraid when you hear the word mathematics?* |
| S3 | *Because there are many questions when learning mathematics, teachers usually call on students to answer them, so I am afraid. Especially when doing it on the blackboard. If it is correct, it is good, but if it is wrong, it is terrible.* |
| P | *Will you be punished if you cannot answer?* |
| S3 | *No, but sometimes I feel embarrassed when I cannot answer.* |

This interview excerpt reveals that the subject considers mathematics scary. This view arises from students' lack of self-confidence and the courage to answer teachers' questions. The feeling of embarrassment at not being able to answer the teacher's

questions also haunts the subject's mind during mathematics instruction. Teachers often randomly select students to check their understanding. This strategy makes some students afraid of being selected to solve problems. Students with low self-confidence are uncomfortable with uncertain situations. This shapes their perception that mathematics is a difficult subject. In mathematics learning, students' mental condition is an important aspect (Smedsrud et al., 2022). Students' belief systems determine their success in solving mathematical problems. Quaye & Pomeroy (2022) also argue that students' attitudes are the most important factor in achieving success. Because not all students have a positive attitude towards mathematics, difficulties in learning mathematics and experiences of failure in mathematics are reasons for students' negative attitudes towards mathematics.

**Mathematics is boring**

Interview data on S4 (fourth subject), representing the group of students with the perception that 'mathematics is boring', is presented in Table 5 below.

**Table 5.** Interview S4

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S4 | *Mathematics is a boring subject.* |
| P | *Why do you feel bored when you hear the word mathematics?* |
| S4 | *Because I do not like mathematics, I have difficulty understanding much of the mathematical material. I feel bored when studying mathematics.* |
| P | *Why don't you understand the material?* |
| S4 | *Because it is difficult* |

This interview excerpt reveals that the subject considers mathematics boring. Students often find learning math in primary school difficult and boring. Research shows that students feel bored in mathematics class between one-third and almost half of the time they spend in school lessons. This view occurs because students are unable to understand the material presented by the teacher. On the other hand, they do not have the skills to ask questions to express what they do not understand (Cevikbas et al., 2024). This condition becomes even more complex because when they do not ask questions, they will fall further behind and find it even more difficult to understand the material. This will affect many aspects, including their perception of mathematics.

A negative perspective can foster negative emotions that have detrimental effects on motivation and academic achievement. The schema formed in students' memories is that many formulas must be memorized to learn mathematics. Existing schemas influence a person's perspective on something, including mathematics. Schema theory offers a comprehensive framework for understanding how individuals organize and

interpret information, significantly impacting learning, memory, and academic achievement. Schemas serve as tools for responding and as a reference for attitudes and actions. The processing of information is guided by a set of active schemata that harbor negative generalizable knowledge about the self, the world, and others, which are accumulated through previous life experiences (Wang & Yin, 2023). The cognitive burden of memorizing formulas is substantial, which is why the subjects (S4) hold a negative perception of mathematics.

Negative perspectives towards mathematics have existed for a very long time. We have read numerous studies indicating that mathematics is a difficult subject. They expressed various sentiments to show that they did not like mathematics. Words that are often heard are confusion, anxiety, doubt, chaos, fear, embarrassment, difficulty, boredom, helplessness, disappointment, paralysis, intimidation, stupidity, pressure, dislike, tension, worry, nervousness, struggle, and fear (Reyes & Rothstein-Fisch, 2021). In addition, mathematics is often perceived as scary, unpleasant, and boring, as well as by other negative perspectives expressed by students. Uwineza et al., (2018) revealed that mathematics is a tough and abstract subject, time and energy consuming in that it has many difficult formulae that require more reasoning for students to understand and use. Many students consider mathematics a challenging subject. The characteristics of mathematics, such as its reliance on abstract concepts and the use of symbols to express them, make the subject difficult to understand.

This opinion is reinforced by statements from primary school students in interviews. These statements indicate that many students feel confused when faced with questions that differ from those provided by teachers, and most dislike the challenge posed by varied questions. Some students view mathematics as an uninteresting subject that is difficult to understand, limited to calculations, involving various formulas and symbols, and irrelevant to everyday life. In their learning experiences to date, students typically receive information directly from teachers without engaging in independent thinking. As a result, students' learning abilities do not reach their maximum potential. The lack of student interaction during learning and negative views of mathematics as an unpleasant or difficult subject influence students' perceptions of the subject. Therefore, if the stimuli or stimulation that students receive regarding mathematics is unpleasant, this will lead to a less positive view of the subject. This perception harms student learning outcomes.

A negative perception of mathematics continuously affects students' anxiety when learning mathematics, and even leads to a phobia of mathematics (Commodari & La Rosa, 2021; Oda et al., 2021). In mathematics learning, math anxiety can occur when students lack interest and have a negative view of mathematics (Mutlu, 2019). Math anxiety has an immediate effect in math-related situations, such as examinations or the classroom. However, it influences individuals throughout their academic and vocational lives. Avoiding mathematics leads to a lack of proficiency, increases

students' anxiety, and leaves them mathematically unprepared to achieve their learning goals.

Some efforts that can be made to minimize students' negative perceptions of mathematics include using an ethnomathematics approach, which connects mathematics with culture. According to Rua (2025), ethnomathematics has an important role in mathematics learning, including reducing students' negative perceptions of mathematics, increasing students' motivation in participating in the learning process, and encouraging educators' creativity and innovation in integrating subject matter with local culture. In addition, Nurhikmah (2024) revealed that the use of educational games makes students enthusiastic about learning, do not feel bored, and forms a positive perception of mathematics.

**Positive Category**

In this category, there are two subjects (S5 and S6) representing two types of students' perceptions of mathematics: challenging and enjoyable.

**Challenging mathematics**

The interview data for S5 (the fifth subject), who represents the group of students with the perception that 'mathematics is challenging,' is presented in Table 6 below.

**Table 6.** Interview S5

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S5 | *Mathematics is challenging. Sometimes it feels difficult, but when I can solve a problem correctly, I feel happy and satisfied.* |
| P | *Why do you feel challenged when you hear the word mathematics?* |
| S5 | *If we understand, we can answer the questions correctly, so we are satisfied. Especially if there are difficult questions that we can answer, it is very satisfying. If we do not understand the material, it can be difficult, but if we study hard, we will definitely be able to do it.* |
| P | *Do you enjoy learning mathematics?* |
| S5 | *Sometimes I feel happy, sometimes I do not.* |

This interview excerpt reveals that the subject considers mathematics challenging. This perception depends on the challenging aspects of the questions and the learning atmosphere created by the teacher (Trigueros et al., 2020). Many students may enjoy learning mathematics through challenging problem-solving tasks, rather than through more traditional teaching approaches (e.g., teacher explanations, followed by more routine practice problems) (Russo & Minas, 2020). Problems are considered challenges, and their successful resolution brings a sense of satisfaction. In addition, teachers play an important role in creating the learning atmosphere that

students desire. Children learn mathematics in primary school, so the school environment largely shapes their skills and attitudes toward mathematics. During learning, primary school teachers become strong role models for their students (Artemenko et al., 2021). These various factors shape students' perceptions that mathematics is challenging.

**Mathematics is Enjoyable**

Interview data from S6 (sixth subject), representing the group of students with the perception that 'mathematics is challenging', is presented in Table 7 below.

**Table 7.** Interview S6

| Code | Interview |
|---|---|
| P | *What do you imagine when you hear the word mathematics?* |
| S6 | *Mathematics is enjoyable. If you can do it correctly, you usually get a reward from the teacher. There are usually engaging quizzes and games as well.* |
| P | *Why does the word "mathematics" conjure up images of fun?* |
| S6 | *Because mathematics learning is engaging, teachers often create educational games.* |

This interview excerpt reveals that the subject finds mathematics enjoyable because teachers sometimes reward students who can answer the teacher's questions correctly. In addition, mathematics is considered enjoyable if the problems given can be solved correctly. This shapes the perception that mathematics is enjoyable. Many students may enjoy learning mathematics through challenging problem-solving tasks rather than through more traditional teaching approaches (e.g., teacher explanations followed by routine practice problems) (Russo & Minas, 2020). The interview reveals that teachers are among the factors that enable children to enjoy learning mathematics. Various innovative learning models and techniques make learning more enjoyable. Children learn mathematics in primary school, so their skills and attitudes toward mathematics are primarily shaped within the school environment. During instruction, primary school teachers serve as strong role models for their students (Artemenko et al., 2021). These various factors shape students' perceptions of whether mathematics is fun.

The positive perceptions expressed by students provide renewed enthusiasm for teachers and a continued hope that students will enjoy learning mathematics. Intelligence theory in mathematics is deemed necessary to be able to create a fun and meaningful environment while learning the subject. Primary school students are drawn to sing-along sessions and fun activities. Infotainment can be applied during teaching and learning sessions, for example, by having students sing while constructing multiplication tables. Teachers play an essential role as catalysts and moderators, singing songs while teaching Magic Maths in classrooms. The concept of learning while playing allows them to master (learn) the skills or the lesson in a fun

situation. This atmosphere exists because the attitude to win is certainly innate in every child (Rahaimah & Farah, 2017).

## Conclusions and Suggestions

This research shows that mathematics remains a daunting subject for primary school students. Many students still hold negative perceptions of mathematics. This perception stems from two factors: the characteristics of mathematics and the way it is taught. The hierarchical nature of mathematics, its abstract objects, and its numerous symbols, while the learning of mathematics is not entirely enjoyable and provides meaningful experiences for students, are the dominant factors that make mathematics intimidating. Based on the findings of this study, recommendations are needed for continuous improvement in mathematics learning. Further research is also needed to further explore learning strategies that can foster positive perceptions of mathematics in primary school students.

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