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EMOTIONAL EXPERIENCES OF JUNIOR HIGH SCHOOL STUDENTS IN ALGEBRA: A PHENOMENOLOGICAL STUDY OF MATHEMATICAL ANXIETY

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Abstract

This study aims to explore the emotional experiences of junior high school students in learning mathematics in algebra using phenomenological studies. This qualitative study involved six eighth-grade students at SMP 11 Surabaya who were selected using purposive sampling based on their emotional comfort levels. Data collection techniques included a mathematics anxiety questionnaire, in-depth interviews, and documentation. The results showed that 42.85% of students had a high level of emotional comfort, while 57.14% were in the moderate to low category. Math anxiety mainly appeared in the aspects of mathematical symbols (score of 3.50), performing in front of the class (score of 3.20), and facing exams (score of 3.10). The analysis identified four main factors: intellectual (difficulty understanding abstract concepts and manipulating symbols), personality (perfectionism and low self-confidence), social (pressure from the environment), and pedagogical (inappropriate teaching methods). The study recommends the development of communicative learning strategies such as group discussions, educational games, and the creation of an emotionally safe learning environment to reduce students' math anxiety.

INTRODUCTION

Mathematics is a field of science that plays a crucial role in every advancement in science and technology, such as a tool in supporting other sciences and in improving mathematics itself in perfecting various aspects of human life (Ay Emanet & Kezer, 2021). Mathematics is an important foundation in human life. Mathematical knowledge and skills are used in activities such as

shopping, cooking, time management, playing video games, and conducting scientific research. Mathematical skills support individuals in realizing their potential in various fields such as social sciences, music, and art (Yurt, 2016). The important role of mathematics is recognized by (Intan et al., 2022) as a subject that aims to improve students' reasoning abilities, develop intellectual intelligence, and shape positive attitudes by applying systematic thinking. The subject of mathematics itself is a subject that is directly related to the real-life situations of students.

The importance of mathematics does not make students enthusiastic about learning mathematics. This is because students perceive mathematics as complicated and a frightening subject, especially algebra. Algebra is considered the main gateway to learning mathematics and is often referred to as the "language of mathematics." It is the link that connects concrete thinking to abstract thinking and the ability to generalize. However, the complexity of algebra poses a number of challenges in learning. Many students have difficulty using algebraic symbols, understanding the concept of variables, and performing algebraic manipulations. These difficulties are not only due to the complexity of the procedures, but also due to misunderstandings of the basic concepts (Ulfa & Hamdi, 2025).

The abstract nature of algebra in junior high school causes some students to dislike mathematics. Math tests become a nightmare for every student. Each student has different views on mathematics based on their experiences and personal perspectives, which can be divided into two types: negative perceptions and positive perceptions. Pleasant experiences give rise to positive attitudes that can lead to enjoyment, optimism, and interest in mathematics, while unpleasant experiences give rise to negative attitudes that can lead to fear, pessimism, and even anxiety when facing mathematics lessons (Gur et al., 2023). Since most formal mathematics learning takes place in the classroom, it is important to understand whether and to what extent students who experience mathematics anxiety exhibit avoidance behavior towards mathematics learning in the classroom environment (Quintero et al., 2022).

This statement is reinforced by (Palmwood, 2024) that "students with negative perceptions will show themselves to be incapable or unprepared to face various challenges in the process of learning mathematics, which ultimately causes them to feel anxious and worried when facing mathematics learning. This response can have negative consequences when students interact with mathematics (Westfall et al., 2021). According to the Big Indonesian Dictionary (KBBI), anxiety is defined as a feeling of unease accompanied by worry, fear, and restlessness. Mathematics

anxiety refers to feelings of fear, tension, and apprehension that arise when students engage in mathematics, particularly when they hold negative perceptions of the subject (Milena et al., 2022). (Indah Sari et al., 2025) explain that these reactions may be triggered by psychologically demanding situations or environmental factors that hinder the achievement of expected learning outcomes. At the junior high school level, mathematics anxiety continues to negatively influence students' learning processes. Learners often experience difficulties in understanding abstract concepts, feel overwhelmed by academic demands, and develop an intense fear of failure. Such conditions frequently interfere with their ability to focus, engage in critical thinking, and build a strong conceptual understanding of mathematics (Fadila & Kamid, 2025).

Many studies have shown that math anxiety is an important factor in mathematics learning and is the cause of low student test scores, both in standard and special assessments, which has an impact on school academic achievement (Polydoros, 2024). Anxiety is a subjective experience of mental pressure that creates uneasiness as a common reaction and an inability to cope with problems or a reduced sense of security (Meador & Ramos Salazar, n.d.). Mathematics anxiety is an important aspect that must be addressed because it can hinder students' success in mathematics and influence their career choices, especially those related to mathematics (Klee et al., 2022). (Gur et al., 2023) define anxiety towards mathematics as feelings of tension or fear that disrupt activities related to mathematics. This is described as feelings of fear or tension arising from the process of manipulating numbers and solving mathematical problems. In addition, math anxiety can cause serious psychological and psychosomatic disorders if not handled properly, because students who experience math anxiety face a double challenge, namely dealing with the complexity of mathematical problems and controlling negative thoughts (Musa & Maat, 2021).

The results of an interview conducted with a mathematics teacher at SMP 11 Surabaya stated that there were obstacles in mathematics learning, especially when studying algebra. Many students still had difficulties in understanding mathematics questions, translating story problems into mathematical models, and performing algebraic operations. Algebra itself is still considered difficult by students. This is because algebra is abstract, full of symbols, and contains variables (Gella & Bien, 2020). This can be interpreted as a difficulty experienced by students, especially when learning mathematics.

A deep understanding of students' emotional experiences in mathematics learning is a crucial component for developing effective learning strategies to reduce mathematics anxiety

among students (Harahap et al., 2025). According to earlier research (Septiani et al., 2025) employing a phenomenological approach in mathematics education, the learning process should take into account students' social interactions and emotional experiences in addition to the cognitive dimension. It is expected of teachers to establish a learning environment that is both academically successful and personally fulfilling for their students. True mathematics education encompasses all facets of students' lives; they not only comprehend ideas and methods but also sense how the subject matter relates to their experiences in life, gain self-assurance, and cultivate a positive attitude toward mathematics.

METHOD

This research adopts a qualitative phenomenological approach to explore students' emotional experiences in mathematics learning at SMP Negeri 11 Surabaya. The qualitative approach employs inductive reasoning, in which conclusions are drawn from objective, participatory observations of social phenomena as they occur in real learning contexts. A phenomenological method was selected because it enables researchers to examine and gain an in-depth understanding of students' learning experiences from their own perspectives. Through this approach, the studied phenomena can be comprehensively understood from the students' viewpoints, allowing for a contextual and holistic interpretation of their emotional experiences in mathematics learning.

The study was conducted at SMP Negeri 11 Surabaya between October and November 2025. Research participants were selected based on their levels of emotional comfort, involving six eighth-grade students from the 2024/2025 academic year who experienced anxiety toward mathematics learning, particularly in algebra. The participants were chosen using purposive sampling, which involves the intentional selection of informants according to specific criteria. These criteria included junior high school students in grades VII to IX who showed indications of mathematics anxiety based on preliminary observations or questionnaire results, were willing to participate as research informants, and were able to clearly articulate their emotional experiences. Data were collected through questionnaires, in-depth interviews, and documentation. The research instruments included a mathematics learning anxiety questionnaire and an interview guide consisting of open-ended questions designed to explore students' emotional experiences in greater depth.

RESEARCH RESULTS AND DISCUSSION
RESEARCH RESULTS

Research conducted on 15 eighth-grade students at SMP 11 Surabaya revealed several variations in students' emotional experiences in mathematics learning. The researchers distributed an online questionnaire to six selected students who became the subjects of the study. The results showed that most students exhibited a level of math anxiety in the “poor” category (range 61-80). This indicates that some of them still feel emotional pressure, fear, and lack of confidence when facing mathematics learning, especially algebra material.

Based on the results of the initial questionnaire and in-depth interviews, there was variation in students' emotional experiences in mathematics learning. To measure the level of emotional comfort, the researcher used a Likert scale ranging from 1 to 5, where 1 indicated very low comfort (poor) and 5 indicated very high comfort (excellent). Based on these results, students were categorized into three levels of emotional comfort, as shown in Table 1 below.

Table 1

Distribution of Students' Emotional Comfort Levels in Mathematics Learning

Category	Number of students	Percentage
High	3	42,85%
Medium	2	28,57%
Low	2	28,57%

Based on Table 1, it can be seen that the majority of students (42.85%) are in the high emotional comfort category, while students with moderate and low emotional comfort have the same percentage, namely 28.57% each. This data indicates that although most students feel relatively comfortable in mathematics learning, there is still a significant proportion (57.14%) who experience moderate to low levels of comfort. This shows the need for special attention to factors that affect students' emotional comfort, especially in the context of algebra learning, which tends to be more abstract and challenging.

To understand students' emotional experiences more deeply, the researchers analyzed five main components that serve as indicators of emotional experiences in mathematics learning. This analysis was based on the results of in-depth interviews, learning observations, and documentation. The five components are presented in Table 2 below.

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Table 2

Average Score for the Emotional Experience Component of Students

Emotional Aspects	Average Score	Category
Mathematics Anxiety	2,42	Fairly Good
Self-Confidence	2,70	Good
Anxiety when presenting in front of the class	3,20	Not So Good
Anxiety when facing exams	3,10	Not So Good
Anxiety towards mathematical symbols	3,50	Not So Good

Based on Table 2, several important findings related to the components of students' emotional experiences can be identified. First, the aspect of anxiety towards mathematical symbols had the highest average score (3.50) in the poor category, indicating that students experienced a fairly high level of anxiety when seeing mathematical symbols. Second, the aspect of anxiety when performing in front of the class had the highest average score (3.50) in the poor category, indicating that students experience a fairly high level of anxiety when they have to present or work on problems in front of their classmates. Second, anxiety about facing exams also showed a high score (3.10) in the poor category, indicating that formal evaluative situations cause significant emotional pressure for students.

On the other hand, students' self-confidence was at a fairly good level with a score of 2.70, indicating that despite experiencing anxiety in certain aspects, students still had adequate confidence in their mathematical abilities. Overall mathematical anxiety was in the fairly good category with a score of 2.42, indicating a moderate and manageable level of anxiety. After selecting six students as research subjects, in-depth interviews and online questionnaires were conducted. The interviews and observations were used to analyze the emotional experiences and difficulties in learning mathematics experienced by students in algebra. The following describes the emotional experiences of students based on their level of emotional comfort:

a. Students with High Emotional Comfort Levels

Subject 1 (female, good performance)

"I am interested in mathematics, especially when I understand the concepts. Algebra is quite difficult at first because there are many variables, but with a lot of practice it becomes easier. I am not afraid to

make mistakes because I can learn from them". In-depth interviews showed that Subject 1 actively asked questions when she did not understand the material and was brave enough to do problems in front of the class. However, Subject 1 still experienced a little anxiety during exams: "During tests, I still feel nervous, afraid of forgetting formulas and making mistakes. But usually, after I start working on the problems, the anxiety disappears."

b. Students with Low Emotional Comfort Levels

Subject 2 (female, low achievement)

Subject 2 showed an attitude that tended to be avoidant and pessimistic towards mathematics. In an interview, subject 2 revealed:

"Mathematics is the subject I dislike the most. Algebra makes me even more confused. I was once asked to come to the front to do a problem on the blackboard, and I got it wrong, so my friends cheered. Since then, I have been traumatized and don't want to try anymore."

c. Students with Low Emotional Comfort Levels

Subject 3 (male, low achievement)

Subject 3 showed a very pessimistic attitude and had strong negative beliefs about his mathematical abilities. In the interview, subject 3 said:

"My brain is just not suited for mathematics. The teacher explains too quickly, so I often fall behind. I've never been able to do it. No one in my family is good at math, so maybe I just don't have a talent for it."

Observations show that Subject 3 is very passive in class, often daydreams, and shows physical signs of anxiety such as a pale face and trembling body when approached by the teacher.

Discussion

Based on the results of in-depth interviews, it was found that junior high school students' emotional experiences in learning algebra showed patterns of anxiety influenced by several factors, namely intellectual factors, personality factors, and environmental factors.

1. Intellectual factor

Some students mentioned during interviews that they had difficulty understanding the material, especially when the teacher explained algebraic concepts. Anxiety about learning mathematics includes activities such as performing mathematical operations, manipulating symbols, or understanding mathematical concepts in class (Commodari & La Rosa, 2021). When students with

high levels of understanding and reasoning are given math problems, they will estimate the solution process, use patterns to perform algebraic operations, manipulate symbols, construct valid arguments, use systematic steps, and draw conclusions (Khawarizmi et al., 2024). However, many students express that they feel confused, dizzy, or uncomfortable when the material begins to involve symbol manipulation.

Difficulty understanding the material will have a direct impact on the emergence of anxiety in students when working on problems, especially when students are unsure of the steps to solve them. Lack of understanding of mathematics is caused by the many assumptions made by students who say that mathematics is complicated, thus causing anxiety among students. In addition, some students mentioned that they did not know where to start when working on algebra problems. The inability to determine a strategy triggers a fear of making mistakes and reinforces the perception that algebra is "difficult" material.

2. Personality Factors: lack of confidence and fear of making mistakes

According to (Meador & Ramos Salazar, n.d.), self-confidence is one of the best predictors of mathematics learning outcomes. Many students experience mathematics anxiety related to a lack of self-confidence, especially when they have to perform in front of the class. The responses that arise tend to describe a fear of making mistakes, embarrassment, or uncertainty about their own abilities.

This condition shows that math anxiety in students arises not only from academic difficulties, but also from social and internal pressures related to self-image. Students who are less able to understand and have difficulty working on algebra problems will feel afraid, hesitant to answer, and become passive. They are afraid to ask questions and hesitate to answer.

3. Environmental Factors: teaching methods and learning situations

Environmental factors emerged as a fairly strong theme, particularly in relation to teachers' communication styles, how teachers explain, classroom atmosphere, and the influence of learning models on student anxiety. The correlation between students' math anxiety and teaching methods confirms previous research that significant math anxiety in children's lives is negatively related to teaching methods (Schaeffer et al., 2021a). When considering math anxiety as a predictive factor, differences in math anxiety at the individual level and differences in math anxiety at the educational environment level may have independent and different effects on students' math

achievement (Lau et al., 2022). The influence of the environment on students' average level of math anxiety depends on their sense of control over their learning situation (Ahmed, 2025).

Group discussions are recognized as an effective approach in overcoming anxiety disorders. Students feel more comfortable when learning through group discussions, as they can help each other understand the material and reduce emotional pressure. Meanwhile, some students hope that mathematics learning can be made more enjoyable, for example through games, ice breakers, or interactive activities. This expectation shows that more communicative and friendly teaching strategies can reduce math anxiety. (Balt et al., 2022)

4. Emotional experiences in social interactions

Some students mentioned that they felt awkward and embarrassed when their classmates understood the material more quickly. These feelings triggered a tendency to compare themselves to others, making students even more afraid to ask questions or express what they did not understand in class. This anxiety arises due to several factors, including personal experiences with teachers or teasing from friends because the student cannot solve math problems. Emotional experiences like this reinforce the concept that negative emotions such as inferiority, embarrassment, or fear are sources of math anxiety. (Schaeffer et al., 2021)

CONCLUSION

The results of this study indicate that junior high school students' emotional experiences in algebra learning show significant variation, with 42.85% of students having a high level of emotional comfort, while 57.14% are in the moderate to low category. These emotional challenges arise in the areas of mathematical symbols (score of 3.50), performing in front of the class (score of 3.20), and facing exams (score of 3.10). Factors that influence anxiety include: intellectual factors (difficulty understanding concepts and operating symbols), personality factors (lack of confidence and fear of making mistakes), environmental factors (teaching style and classroom atmosphere), and emotional experiences in social interactions.

This study emphasizes the importance of developing more communicative and friendly learning strategies, such as group discussions, educational games, and ice breaking to create an emotionally comfortable learning environment. Teachers play a key role in paying attention to students' emotional aspects by providing a safe space to ask questions, reducing evaluative pressure, and building confidence in learning mathematics.

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