

Narratives of Growth Mindset among High School Students with High Mathematics Anxiety

Oleh :

Muhammad Rizal Usman¹⁾, Sri Satriani²⁾, Sukmawati³⁾, Kristiawati⁴⁾

^{1,2,3,4}Faculty of Teacher Training and Education, Universitas Muhammadiyah Makassar

Abstrak

Kecemasan matematika merupakan salah satu faktor yang menghambat prestasi dan sikap positif siswa terhadap pembelajaran matematika. Sementara itu, growth mindset diyakini mampu menjadi faktor protektif yang mendorong resiliensi belajar. Penelitian ini bertujuan mengeksplorasi narasi growth mindset pada siswa dengan kecemasan matematika tinggi. Penelitian menggunakan pendekatan kualitatif naratif dengan tiga siswa kelas XI SMA di Kabupaten Malang yang dipilih secara purposif berdasarkan hasil Math Anxiety Questionnaire (MAQ). Data dikumpulkan melalui wawancara semi-terstruktur, refleksi tertulis, dan catatan lapangan, kemudian dianalisis menggunakan thematic narrative analysis. Hasil penelitian menunjukkan lima tema utama, yaitu: (1) persepsi awal terhadap matematika yang cenderung negatif, (2) respon emosional terhadap kegagalan berupa rasa gugup, frustrasi, atau malu, (3) upaya bangkit melalui beragam strategi coping, (4) dukungan sosial dari guru, teman, dan keluarga yang memengaruhi resiliensi, serta (5) indikasi growth mindset berupa keyakinan bahwa usaha lebih penting daripada bakat dan kesalahan merupakan bagian dari proses belajar. Temuan ini menegaskan bahwa meskipun kecemasan matematika tinggi menjadi hambatan, growth mindset dapat berfungsi sebagai faktor protektif yang membangun ketahanan siswa. Penelitian ini memperkaya literatur mengenai hubungan math anxiety dan growth mindset, serta memberikan implikasi praktis bagi guru dalam menciptakan iklim kelas yang mendukung perkembangan mindset positif siswa.

Kata kunci—Growth mindset, kecemasan matematika, narasi siswa, resiliensi belajar, pendidikan matematika

Abstract

Mathematics anxiety is one of the major barriers to students' achievement and positive attitudes toward learning mathematics. Conversely, a growth mindset is considered a protective factor that fosters learning resilience. This study aims to explore the narratives of students with high levels of mathematics anxiety in relation to their growth mindset. A qualitative narrative approach was employed with three 11th-grade high school students in Malang Regency, Indonesia, selected purposively based on their scores on the Math Anxiety Questionnaire (MAQ). Data were collected through semi-structured interviews, written reflections, and field notes, and analyzed using thematic narrative analysis. The findings reveal five major themes: (1) initial negative perceptions of mathematics, (2) emotional responses to failure such as nervousness, frustration, or shame, (3) efforts to recover through diverse coping strategies, (4) social support from teachers, peers, and families that influences resilience, and (5) indications of growth mindset reflected in the belief that effort is more important than innate talent and mistakes are part of the learning process. These results highlight that although high mathematics anxiety poses challenges, a growth mindset can serve as a protective factor in building students' learning resilience. This study contributes to the literature on the intersection between mathematics anxiety and growth mindset and provides practical implications for teachers to create a classroom climate that fosters positive mindset development.

Keywords—growth mindset, mathematics anxiety, student narratives, learning resilience, mathematics education

1. INTRODUCTION

Mathematics anxiety is a psychological phenomenon experienced by students when facing mathematics learning or evaluation. This condition is characterized by feelings of fear, nervousness, and emotional pressure that negatively affect cognitive abilities and academic performance (Ashcraft & Krause, 2007; Ramirez et al., 2018). Research has shown that mathematics anxiety can lower achievement, hinder student participation, and influence their attitudes toward mathematics in the long term (Dowker, Sarkar, & Looi, 2016; Luttenberger et al., 2018). In Indonesia, mathematics anxiety has also been reported to be

relatively high and is considered one of the inhibiting factors in achieving numeracy literacy in international assessments (Kismiantini et al., 2021; Wijaya et al., 2023).

On the other hand, the concept of a growth mindset introduced by Dweck (2006) offers an optimistic perspective in the learning process. A growth mindset is defined as the belief that intellectual ability can be developed through effort, appropriate strategies, and environmental support. Students with a growth mindset tend to be more persistent, resilient to failure, and perceive mistakes as opportunities for learning (Claro, Paunesku, & Dweck, 2016; Yeager & Dweck, 2020). In the context of mathematics learning, a growth mindset has been shown to reduce anxiety, increase motivation, and enhance academic achievement (Boaler, 2016; Dong et al., 2023).

A number of international studies have confirmed the positive relationship between growth mindset and mathematics achievement (Sarrasin et al., 2018; Burnette et al., 2013). Intervention studies have also demonstrated that students who receive mindset training experience increased confidence and perseverance in solving difficult problems (Paunesku et al., 2015; Yeager et al., 2019). Nevertheless, most of these studies employed quantitative approaches focusing on correlational or experimental relationships, thus providing limited understanding of students' subjective experiences, particularly those with high levels of mathematics anxiety (Stohlmann, 2024; Bui et al., 2023). In the Indonesian context, similar research remains limited. Some studies examined growth mindset as a predictor of achievement (Kismiantini et al., 2021) or its relationship with numeracy skills (Wijaya et al., 2023). However, qualitative studies exploring student narratives on how growth mindset is formed and interacts with mathematics anxiety are still scarce. In fact, student narratives can provide important insights into the psychological dynamics they experience (Susanto & Retnawati, 2019; Rohim et al., 2025).

From the above discussion, two research gaps can be identified. First, international studies on growth mindset predominantly focus on quantitative and intervention aspects, leaving personal student narratives largely unexplored. Second, in Indonesia, research on growth mindset in mathematics education emphasizes quantitative analysis, while qualitative narrative studies are nearly absent. This underscores the need for an in-depth exploration of how students with high mathematics anxiety interpret their learning experiences and to what extent a growth mindset is reflected in their narratives.

Based on the background, literature review, and research gaps, the main objective of this study is to explore the narratives of students with high mathematics anxiety regarding their learning experiences in mathematics and how a growth mindset is reflected in this process. The findings are expected to enrich the literature on the relationship between mathematics anxiety and mindset, as well as provide practical recommendations for teachers in creating a more supportive learning climate.

2. RESEARCH METHOD

This study employed a descriptive qualitative approach, as it is appropriate for exploring students' personal experiences through the stories they construct themselves (Clandinin & Connelly, 2000). The focus of the study was not merely on the quantitative level of mathematics anxiety, but rather on the meanings that students developed in dealing with their learning experiences.

The research subjects consisted of three 11th-grade high school students in one of the districts of Malang, selected using a purposive sampling technique. The selection was carried out using the Math Anxiety Questionnaire (MAQ) (Luttenberger et al., 2018) to identify students with high mathematics anxiety. Participants were chosen based on the following criteria: having high MAQ scores, being enrolled in the 11th grade, and being willing to participate in the entire research process. Basic information such as gender, academic performance, and learning experiences was also recorded to enrich the interpretation.

Table 1. Criteria for Mathematics Anxiety Scores (MAQ – 24 Items)

Total Score Range	Category of Mathematics Anxiety	Interpretation
24 – 47	Low	Students are relatively comfortable in learning mathematics; anxiety rarely occurs.
48 – 84	Moderate	Students sometimes feel anxious in certain situations, for example during examinations or when asked to solve problems in front of the class.
85 – 120	High	Students frequently experience significant anxiety that may interfere with concentration, motivation, and academic performance.

Note:

The instrument consists of 24 items with a 5-point Likert scale.

Minimum score = 24 (if all responses = 1/not anxious at all).

Maximum score = 120 (if all responses = 5/very anxious).

Data were collected through three techniques, namely semi-structured interviews, written reflections, and field notes. The interviews were employed to explore students' experiences related to anxiety, failure, and the emergence of a growth mindset. Written reflections were utilized to complement the interviews and strengthen triangulation, while field notes were used to record students' non-verbal expressions during the process.

Data analysis was conducted using thematic narrative analysis (Riessman, 2008) through several stages: verbatim transcription, repeated readings, initial coding, categorization of narrative themes, and interpretation by linking the findings to the theory of growth mindset (Dweck, 2006) and the literature on mathematics anxiety. The validity of the data was ensured through source triangulation, member checking, and peer debriefing, so that the findings could provide an authentic picture of students' growth mindset narratives in the context of high mathematics anxiety.

3. FINDINGS AND DISCUSSION

3.1 Findings

General Description of the Subjects

This study involved three 11th-grade high school students in one of the districts of Malang who were selected based on high scores on the Math Anxiety Questionnaire (MAQ). To maintain confidentiality, the students were coded as S1, S2, and S3. A brief profile of each subject is presented in Table 2.

Table 2. Profile of Research Subjects

Code	Age	Gender	Academic Achievement	Main Characteristics	Dominant Dimension of Anxiety
S1	16	Female	Average	A diligent learner who often reports nervousness and anxiety when facing mathematics examinations	<i>Test anxiety</i>
S2	17	Male	Fairly good in other subjects, but low performance in mathematics	Experiences physical tension (sweating, rapid heartbeat) when solving mathematics problems in front of the class	<i>Learning anxiety</i>
S3	16	Female	Fairly good, but has negative past experiences with frequent failures in mathematics tests	Lacks self-confidence, tends to avoid active participation, and feels anxious when required to explain solutions in front of peers	<i>Social anxiety</i>

In general, all three students showed high levels of mathematics anxiety but with different manifestations. This variation highlights that mathematics anxiety is multidimensional rooted in personal experiences, social interactions, and individual psychological conditions. These distinctions also provide a valuable basis for interpreting how growth mindset narratives develop differently across students.

Research Findings Based on Narrative Themes

a. Initial Perceptions of Mathematics

All participants initially perceived mathematics negatively, though the sources of their anxiety differed. S1 associated mathematics with high-stakes assessments, triggering anticipatory stress even before lessons began. S2 viewed mathematics as an overwhelmingly difficult subject that limited his self-efficacy, while S3's perception stemmed from repeated failures that generated avoidance behaviors. Despite these negative appraisals, all students retained an intrinsic desire to succeed in mathematics, indicating the coexistence of fear and motivation.

b. Failure and Emotional Responses

Failure experiences were central to the emergence of mathematics anxiety. S1 felt disappointment and fear of disappointing her parents; S2's emotional responses manifested as frustration and temporary withdrawal from studying; and S3 developed low self-esteem and social shame due to poor performance. These emotional reactions demonstrate how mathematics anxiety operates both cognitively and affectively, consistent with Hidayat and Arifin (2020), who noted that emotional vulnerability in mathematics learning often leads to avoidance and decreased performance motivation among Indonesian students.

c. Efforts to Recover and Coping Strategies

Each student employed different coping mechanisms to manage anxiety. S1 used problem repetition and structured note-taking as a cognitive regulation strategy. S2 relied on temporary avoidance before re-engaging through peer discussions, while S3 adopted positive self-talk to rebuild confidence. These findings suggest that self-regulation strategies mediate the relationship between anxiety and persistence, reflecting the dynamic process of self-efficacy reconstruction as noted by Ramadhani and Suryadi (2021).

d. Social Support (Teachers, Family, Peers)

Social support emerged as a crucial factor influencing how students coped with anxiety. S1 received emotional encouragement from parents, though sometimes perceived as pressure. S2 benefited primarily from peer collaboration, while S3 emphasized the importance of teacher empathy and appreciation for effort rather than results. These findings reveal that social support can function as a mediator between mathematics anxiety and growth mindset: it not only reduces emotional distress but also reinforces adaptive beliefs about learning potential. This resonates with findings from Indonesian studies by Maulana and Hidayat (2022), who found that supportive teacher feedback significantly decreased student anxiety while fostering a belief in personal capability improvement.

e. Indications of Growth Mindset

Despite high anxiety levels, all three participants exhibited emerging growth mindset tendencies. S1 believed improvement was achievable through consistent practice. S2 began to reinterpret failure as a temporary obstacle, and S3 demonstrated the most visible transformation transitioning from avoidance to persistence through positive self-regulation. These findings indicate that growth mindset acts not merely as a protective factor, but as a transformative mechanism enabling students to reinterpret anxiety-inducing experiences into opportunities for learning and self-development.

3.2 Discussion

The findings of this study indicate that the three students with high mathematics anxiety had diverse narrative experiences; however, in general, they confirmed that anxiety stemmed from negative perceptions of mathematics, repeated experiences of failure, and social pressures from teachers, families, and peers. These findings are consistent with Ashcraft and Krause (2007), who explained that mathematics anxiety directly affects working memory capacity, thereby hindering students' cognitive performance. Similarly, Dowker, Sarkar, and Looi (2016) emphasized that mathematics anxiety not only decreases academic achievement but also influences students' motivation and attitudes toward the subject.

In the context of student narratives, emotional responses to failure played a decisive role in the development of their mindset. For example, S3, who initially avoided mathematics, gradually showed changes by employing *positive self-talk*. This aligns with Boaler's (2016) finding that students with a growth mindset tend to perceive mistakes as learning opportunities rather than final failures. Claro, Paunesku, and Dweck (2016) further demonstrated that a growth mindset can neutralize the negative effects of low socioeconomic status on mathematics achievement. This suggests that the belief in one's ability to develop makes a significant contribution to sustaining learning resilience, even among students with emotional barriers.

The coping strategies adopted by the students varied, ranging from avoidance coping to proactive efforts such as practicing problems or engaging in self-reflection. These findings reinforce the results of Ramirez et al. (2018), who showed that emotional regulation strategies play a crucial role in reducing mathematics anxiety and become more effective when combined with mindset interventions. Yeager et al. (2019) also supported this, showing that simple mindset interventions can enhance academic resilience, particularly among students with high levels of anxiety and vulnerability.

Social support also emerged as a key factor in the students' narratives. Teacher support that emphasized process rather than outcomes was perceived as significant in helping students with high anxiety gain confidence. This finding is consistent with Sarrasin et al. (2018), who highlighted that teachers' beliefs about students' abilities shape how students construct their own mindsets. Indonesian research by

Kismiantini et al. (2021) likewise confirmed that students' growth mindset is strongly linked to the school context, including teachers' pedagogical practices.

Furthermore, the differences in students' narrative experiences demonstrate that a growth mindset is not static but dynamic, evolving according to experience and environmental support. This finding resonates with Yeager and Dweck's (2020) assertion that mindset can change and be strengthened through appropriate learning experiences. A local study by Wijaya et al. (2023) also reported a positive correlation between growth mindset and numeracy skills among junior high school students, although the strength of the relationship was modest, indicating the need for more targeted pedagogical interventions.

Overall, these findings contribute to a deeper understanding of the relationship between mathematics anxiety and growth mindset. Rather than viewing anxiety as an absolute barrier, the narratives revealed that through coping strategies, social support, and appropriate teaching approaches, students can continue to develop the belief that their mathematical abilities can improve. This underscores the crucial role of teachers in creating a classroom climate free from fear of mistakes and supportive of students' mindset growth.

This study was limited by its small number of participants and the qualitative narrative design, which restricts generalization. However, the in depth exploration of student narratives offers rich contextual insight into the interplay between anxiety, mindset, and social support in Indonesian mathematics classrooms. Future research could involve larger samples or longitudinal designs to explore how these dynamics evolve over time.

4. CONCLUSION

This study explored the narratives of growth mindset among three high school students with high mathematics anxiety. The results showed that anxiety emerged from negative perceptions of mathematics, repeated experiences of failure, and social pressures. Although students exhibited varied emotional responses, they continued to make efforts to recover through coping strategies. Support from teachers, peers, and families played an important role in strengthening the belief that abilities can be developed. Indications of a growth mindset were evident in the belief that effort is more important than innate talent, as well as in the willingness to view mistakes as part of the learning process.

Theoretically, this study expands the understanding of the dynamics between mathematics anxiety and growth mindset, emphasizing that mindset is dynamic and shaped by experience and social interaction. Practically, the findings highlight the crucial role of teachers in creating a safe classroom climate, providing constructive feedback, and appreciating students' efforts. School and family support are also essential to reduce anxiety and foster a growth mindset, for instance through self-reflection, positive self-talk, and peer mentoring.

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