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An Anxiety Study on Mathematics in High School Students in Puglia (Italy)

Sergio Maielli

Educational institution - University of Murcia, Spain

Abstract

Anxiety towards mathematics is a widespread phenomenon among high school students, with significant impacts on their learning and attitude towards the discipline. This abstract refers to an ongoing doctoral research and investigates the levels of anxiety related to mathematics through a questionnaire composed of ten questions with gradual answer and involves students of the second year of high school of three institutes in Puglia (Italy). The results strongly echo those of the research conducted in 2024 by the Seraphic Institute of Assisi and published on "Frontiers in Psychology", and that highlight a correlation between anxiety and negative perception of mathematics with reflections on the profit at school. We believe it is essential that teachers adopt teaching strategies to reduce anxiety in pupils, such as creating a positive learning environment, integrating practical activities and using techniques that promote emotional intelligence, as suggested by Daniel Goleman. In particular, we believe that teachers should encourage a growth mindset, value the learning process and provide emotional support. Starting from this type of approach can help to improve the students' attitude towards mathematics and consequently make teaching more effective.

Keywords: *Mathematics education, anxiety, emotional intelligence*

Summary

Mathematics anxiety is a prevalent issue among students, particularly during formative years. This article explores the phenomenon of math anxiety, particularly among 15-year-olds in Puglia, Italy, where nearly 50% of students report feeling anxious when faced with mathematical problems. This anxiety stems not from a fear of poor grades but from a lack of confidence in their mathematical abilities. The article discusses the implications of this anxiety on students' willingness to engage in class, the emotional well-being necessary for effective learning, and the need for a more practical approach to teaching mathematics. By examining recent studies, including those conducted by PISA and Professor Lanfaloni, we aim to shed light on the importance of addressing math anxiety to foster a healthier learning environment.

Introduction

Mathematics is often regarded as a fundamental skill necessary for success in various fields, yet it remains a source of significant anxiety for many students. This phenomenon, known as math anxiety, can hinder students' academic performance and overall well-being. Recent studies, including an analysis conducted in Puglia, Italy, reveal that nearly half of 15-year-old students experience anxiety when confronted with mathematical tasks. This article delves into the causes and consequences of math anxiety, highlighting the need for educators to adopt strategies that alleviate this issue. By understanding the emotional barriers that students face, we can create a more supportive learning environment that encourages engagement and fosters a positive attitude toward mathematics.

The Prevalence of Math Anxiety

The findings from the study conducted in Puglia indicate that approximately 50% of students feel overwhelmed when faced with mathematical problems. This statistic aligns with recent investigations, including the 2022 PISA study and research by Professor Lanfaloni from the Istituto Serafico di Assisi in 2024. The anxiety experienced by these students is not merely a fear of receiving poor grades; rather, it stems from a deep-seated doubt about their mathematical abilities. This lack of confidence can lead to a cycle of avoidance, where students refrain from asking questions in class, fearing that

their perceived inferiority in mathematics is unchangeable. The survey carried out in schools in Puglia used the following statements:

1) A written math test scares me.
2) I often get nervous during a written or oral math test
3) Math makes me uncomfortable, restless, irritable and impatient.
4) When I do math problems my mind is empty and I can't think clearly.
5) The math teachers I had didn't make me love math.
6) Mathematics taught in schools should be more practical and fit for everyday life
7) Mathematics can be useful for those who decide to pursue a scientific career, but not for other students.
8) I believe there are other subjects more important than mathematics for my future profession.
9) I hope to have little use of mathematics in my professional life.
10) Mathematics is too theoretical to be of any use in my life.

The Nature of Math Anxiety

Math anxiety is a constraining form of anxiety, distinct from the stimulating kind that can motivate individuals to perform better under pressure. It creates a mental block that impairs cognitive functioning, making it difficult for students to think clearly when confronted with mathematical tasks. The emotional distress associated with math anxiety can manifest in various ways, including nervousness, irritability, and a sense of restlessness. Students may find themselves unable to concentrate, leading to a further decline in their performance and self-esteem.

Emotional Well-Being and Learning

The relationship between emotional well-being and cognitive functioning is crucial in the context of learning. When students experience anxiety, their ability to absorb and process information diminishes. This is particularly concerning in subjects like mathematics, where understanding foundational concepts is essential for tackling more complex problems. The study conducted in Puglia included questions designed to gauge students' feelings toward mathematics, revealing a significant correlation between anxiety and negative perceptions of the subject. Many students expressed that their previous math teachers did not inspire a love for the subject, further exacerbating their anxiety.

The Role of Educators

To combat math anxiety, educators must adopt a more empathetic and practical approach to teaching mathematics. This includes creating a classroom environment where students feel safe to express their difficulties and ask questions without fear of judgment. Teachers should be trained to recognize the signs of math anxiety and implement strategies that promote a growth mindset, encouraging students to view challenges as opportunities for learning rather than threats to their self-worth.

Practical Applications of Mathematics

One of the recurring themes in the Apulia study was the students' desire for mathematics to be more relevant to their everyday lives. Many students expressed that the theoretical nature of mathematics made it difficult for them to see its value. By incorporating real-world applications and practical problem-solving into the curriculum, educators can help students understand the relevance of mathematics in their daily lives and future careers. This approach not only alleviates anxiety but also fosters a greater appreciation for the subject.

Encouraging a Positive Mindset

Promoting a positive mindset towards mathematics is essential in reducing anxiety. Educators can encourage students to celebrate small victories and progress in their mathematical understanding. By emphasizing effort and improvement rather than solely focusing on grades, teachers can help students build confidence in their abilities. Additionally, providing opportunities for collaborative

learning can create a supportive community where students feel comfortable sharing their struggles and successes.

Conclusion

Math anxiety is a significant barrier to learning for many students, particularly those in their formative years. The findings from the study conducted in Apulia a highlight the urgent need for educators to address this issue by fostering a supportive and practical learning environment. By understanding the emotional challenges that students face and implementing strategies to alleviate anxiety, we can help them develop a more positive relationship with mathematics. Ultimately, promoting emotional well-being is essential for effective learning, and addressing math anxiety is a crucial step towards ensuring that all students can succeed in this vital subject.

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