

MATHEMATICS ANXIETY IN PRIMARY SCHOOL STUDENTS: A Systematic Review

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INTRODUCTION & AIM

Importance of STEM and mathematical competencies in the 21st century

Drop in mathematics performance
Negative attitudes toward mathematics and gender differences
Math Anxiety (MA)

Most research has focused on **secondary school** and **university** students, leaving **primary school** context relatively underexplored

Understanding mathematics anxiety in the early years of schooling is crucial for developing effective preventive interventions and fostering a positive relationship with the subject.

RESULTS & DISCUSSION

MA and PERFORMANCE

Negative relationship between MA and performance even in the early years of schooling

Some children with high MA show average or high performance.

CAUSAL RELATIONSHIPS

Different theoretical models of the relationship between MA and math performance:

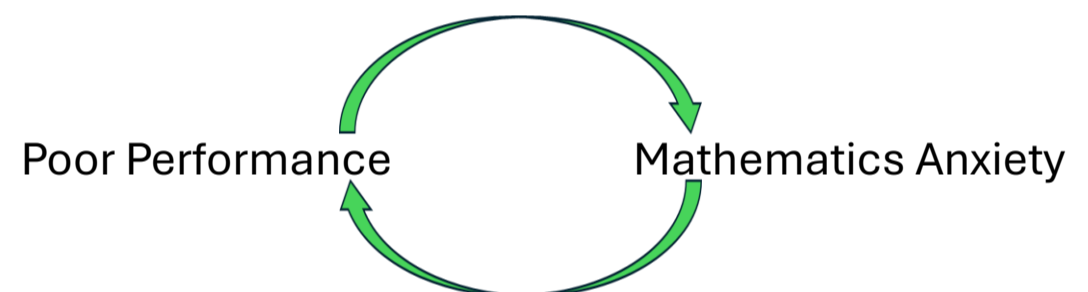
DEFICIT THEORY:

Poor math performance → mathematics anxiety

DEBILITATING ANXIETY MODEL:

Mathematics anxiety → poor math performance

RECIPROCAL THEORY:



INTERVENTION STRATEGIES

MATHEMATICAL INTERVENTIONS

- IMPROVING MATHEMATICAL SKILLS
- TUTORING / COOPERATIVE LEARNING
- GAMES AND DIGITAL TOOLS
- MATHEMATICAL STRATEGIES

Effects: ↑ performance ↓ MA (moderate effect)

COGNITIVE-BEHAVIORAL INTERVENTIONS

- COPING AND EMOTIONAL REGULATION
- EXPRESSIVE WRITING
- MINDSET AND STORYTELLING
- RELAXATION

Effects: ↓ MA, limited effects on performance

CONCLUSION

RECENT EVIDENCE :

- Shows a negative relationship between MA and performance, even in early years of schooling
- Supports a bidirectional relationship between MA and performance (*Reciprocal Theory*)
- Underlines the importance of integrated approaches: cognitive, emotional, and relational

FUTURE WORK / REFERENCES

FUTURE RESEARCH SHOULD FURTHER INVESTIGATE THESE TOPICS:

- The causal mechanisms underlying the relationship between MA and performance.
- The role of environmental, relational, and neurocognitive factors in the early development of MA.
- The identification of effective preventive interventions starting from early years of schooling.

OBJECTIVE OF THE REVIEW

to systematically analyze the literature on MA in primary school, in order to understand the relationship between MA and learning in the early years of schooling, with particular attention to the following aspects:

- Relationship between MA and Math performance
- Directionality of this relationship and the causal mechanism
- Effective educational and psychological intervention strategies



METHOD

SYSTEMATIC REVIEW ACCORDING TO PRISMA 2020 GUIDELINES

DATABASES

Scopus, PubMed, Google Scholar

TIME PERIOD

2014-2024

POPULATION

Primary school students

INCLUDED STUDY TYPES

Scientific articles
Systematic reviews
Meta-analyses
Literature reviews

SEARCH STRATEGY

“math* anxiety” AND “primary school”

ELIGIBILITY CRITERIA

peer-reviewed articles
English, Spanish
and Italian language studies

RECORDS IDENTIFIED: n=178

RECORDS REMOVED

BEFORE SCREENING: n=119

RECORD SCREENED: n=59

RECORD EXCLUDED: n=16

THE STUDY SELECTION PROCESS

IDENTIFICATION

Records identified from:
Scopus
PubMed
Google Scholar

SCREENING

Title and abstract screening according to the inclusion criteria

ELIGIBILITY

Full-text reading of selected articles

INCLUSION

DATA EXTRACTION USING STRUCTURED TABLES

TOPICS ANALYZED:

- **Math anxiety and math performance**
- **Causal relationships**
- **Intervention strategies**

n=43 studies

from 20 different countries → **GLOBAL RELEVANCE**

Increasing research (last 4 years) → **GROWING SCIENTIFIC ATTENTION**

