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Mathematics Anxiety Related to Geometry and Geometric Reasoning in Primary Education

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INTRODUCTION

Mathematics anxiety has been widely studied as a factor that negatively affects students' learning and academic performance.

However, **anxiety toward geometry** has received less attention, despite the specific cognitive demands of this area, such as spatial visualization and reasoning about geometric properties.

Exploring this relationship in Primary Education is particularly relevant, as this stage plays a key role in the **development of geometric thinking**.

AIMS

- Analyse **geometric anxiety and geometric reasoning** in primary school students.
- Examine possible **differences** between 4th and 6th grade students.
- Explore the **relationship** betw**een geometric anxiety** and **geometric reasoning**.

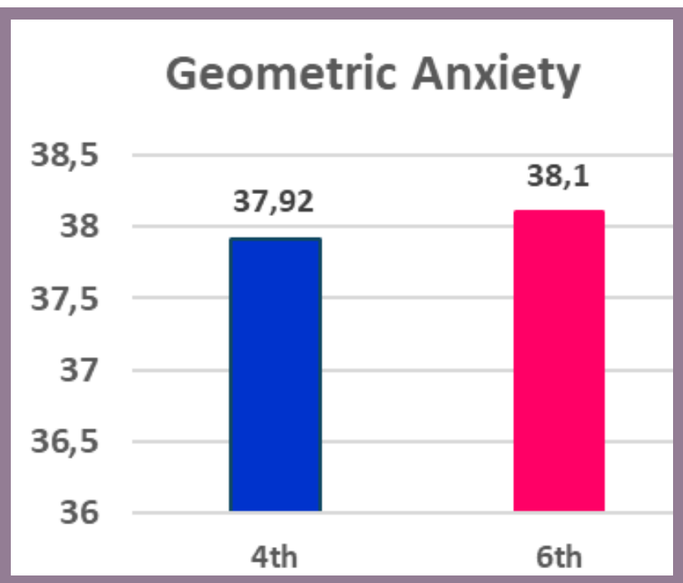

Figure 1: Geometric Anxiety in both grades.

No significant differences

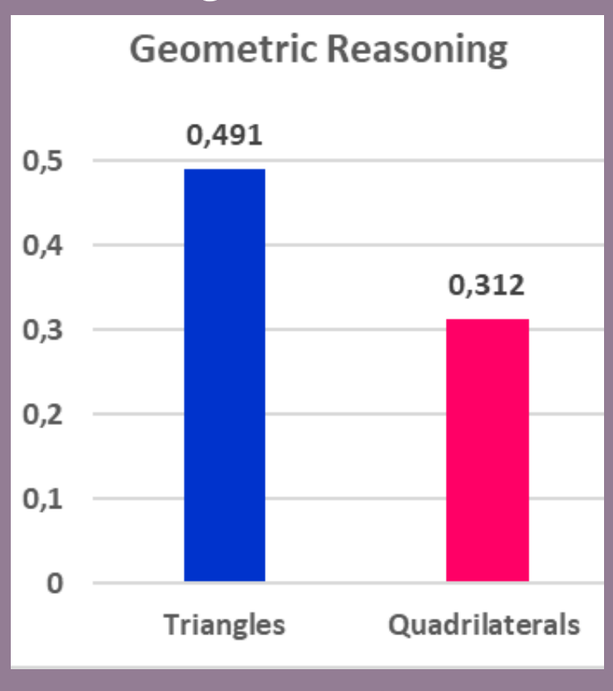

Figure 2: Geometric Reasoning.

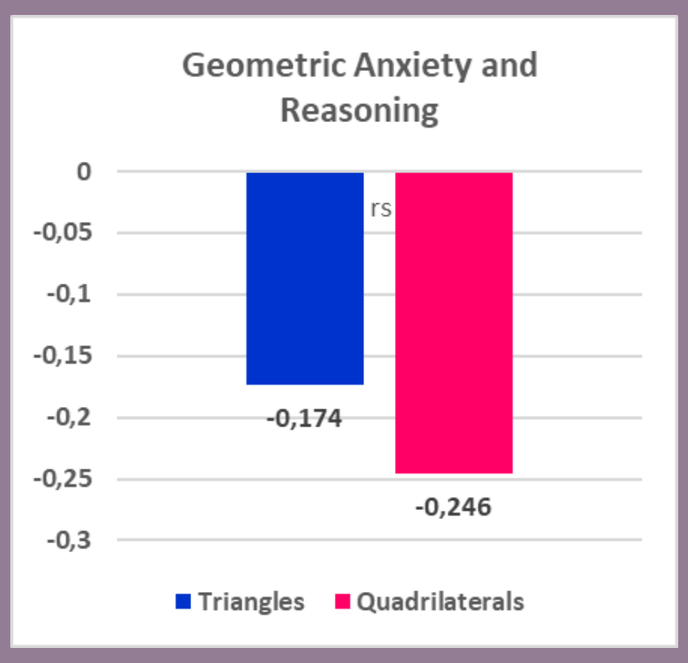

Figure 3: Relationship between Geometric Anxiety and Geometric Reasoning.

Significant negative relationship.

METHODOLOGY

Design: Quantitative non-experimental study.

Participants: 221 primary school students from three schools in Badajoz (Spain), 109 from 4th grade and 112 from 6th grade - **Age range:** 9 - 12 years.

Instruments

- Geometric Anxiety Scale (adapted scale; Cronbach's α = .939).
- Geometric Reasoning Test based on the Van Hiele model, including tasks with triangles and quadrilaterals.

RESULTS

Most students reported **low or very low levels of geometric anxiety** in both grades. The mean scores were very similar between groups, and no statistically significant differences were found ($t(219) = -0.135$, $p = .893$).

Regarding **geometric reasoning**, no significant differences were observed between grades in tasks involving triangles ($p = .491$) or quadrilaterals ($p = .312$).

The analysis based on the Van Hiele model showed that a large proportion of students in both grades remained at the **initial level of visualization**.

Finally, a **significant negative correlation** was found between geometric anxiety and geometric reasoning. Students with higher levels of geometric reasoning tended to report lower levels of anxiety.

CONCLUSIONS

- Students generally report low geometric anxiety.
- Many remain at early Van Hiele levels.
- There is a negative correlationbetween Geometric Anxiety and Geometric Reasoning.

Teaching approaches should address both cognitive and affective aspects of geometry learning.

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