MINDING THE GAP IN PRIMARY SCHOOL

examining the interplay between working memory, math anxiety, spatial anxiety, and mathematical ability

Mila Marinova
Department of Behavioural and Cognitive Sciences
University of Luxembourg
mila.marinova@uni.lu

Heleve Vos
Faculty of Behavioural and Movement Sciences
Vrije Universiteit Amsterdam
h.m.w.vos@vu.nl

Introduction

VSWM
advantage for **boys**
Voyer et al. (2017).*PsychBullRev*
VWM
advantage for **girls**
Voyer et al. (2021).*PsychBull*

MA **negatively** correlates with math performance
Barroso et al. (2021).*PsychBull*
Finell et al. (2022).*Frontiers*
MA girls > MA boys

Spatial skills are important predictors of math
Casey et al. (2021). *DevReview*
SA girls > SA boys

Math Abilities

GOAL:
To examine how VWM, VSWM, MA, and SA contribute to sex differences in math performance of primary school children

H1:
mathematical ability is partially explained by VWM and VSWM, but on top of that, also by MA and SA

H2a:
boys would outperform girls on measures of VSWM and math performance

H2b:
MA and SA would mediate the sex-based differences in math and VSWM performance

Methods and Results

211 primary school students aged 9 to 13 years (Mage= 10.32, SD= 0.79), **53% girls**

Timed Test Arithmetic
addition, subtraction, multiplication, division, mixed

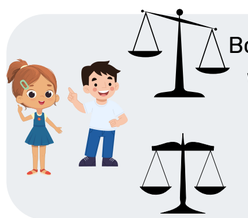
CITO
National Math Performance Test in the Nethelands

Monkey Game (VWM)
backward word span test

Lion Game (VSWM)
visual - spatial span task

CMAQ

CSAQ



Boys performed better on the mathematical performance test (CITO), while girls reported higher anxiety scores on the CMAQ and CSAQ.

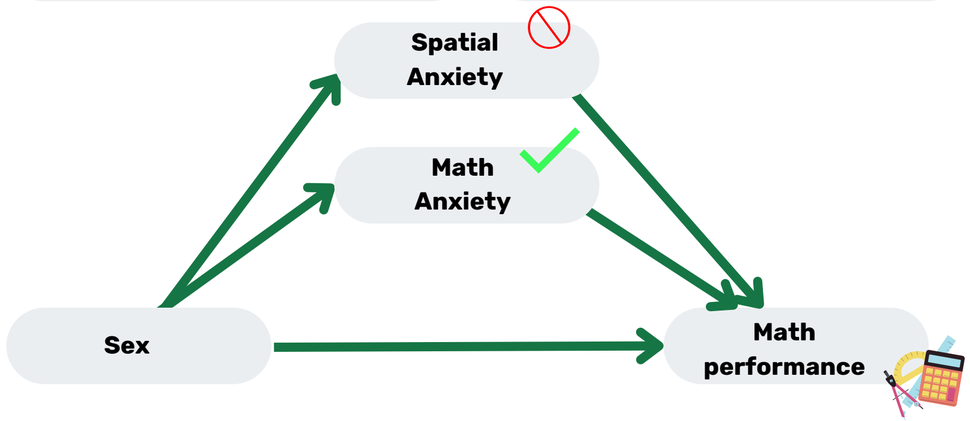
No sex differences were present for arithmetic (TTR), VWM (Monkey Game) and VSWM (Lion Game)

Hierarchical regression
Outcome: Tempo Test Arithmetic

Step 1: VWM ⊘, VSWM ✓
Step 2: Math Anxiety ⊘, Spatial Anxiety ⊘

Hierarchical regression
Outcome: CITO

Step 1: VWM ⊘, VSWM ✓
Step 2: Math Anxiety ⊘, Spatial Anxiety ⊘



Discussion

H1: **Only VSWM** contributed to math performance across the whole sample. **MA and SA did not** explain additional variance.

Analyses should be separate for boys and girls.

H2a: Boys outperformed girls **only on the math performance test**, but not on VSWM.

Sex-differences in WM occur later in development (Voyer et al., 2017;2021)

H2b: **MA fully mediated** the relationship between math performance and sex

MA drives differences in math perfomance in primary school. MA is possibly the result of re-appraisal and not of cognitive differences.

Conclusions

VSWM is important for mathematics

Sex differences in math perfomance are present in primary school children. At this age, they are probably driven by math anxiety and not differences in WM.

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