Investigating Socio-Economic, Cognitive, and Motivational Factors Associated with Parental Math Talk

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Background

Importance of Early Math Talk

- The quantity and quality of parental math talk are related to children's understanding of numerical concepts *correlationally* (Casey et al., 2018; Gibson et al., 2020; Vasilyeva et al., 2018) and *causally* (Braham et al., 2018; Gibson et al., 2020; Purpura et al., 2021);
- Substantial variability in parental math talk during early childhood (Levine et al., 2010). Such variability may partially explain the difference in children's early math development (LeFevre et al., 2010; Ramani et al., 2015).

Factors Impacting Early Math Talk

- *Socioeconomic factors*: parents from higher socioeconomic status tend to provide more math talk at home (e.g., Casey et al., 2020; Dearing et al., 2022);
- *Motivational factors*: parental math value and math efficacy impact their interaction with children (Berkowitz et al., 2021; Vasilyeva et al., 2018; Zippert & Rittle- Johnson, 2020);
- *Cognitive factors*: Spontaneous Focus on Numerosity (SFON) may explain variability in math talk.

Research Question

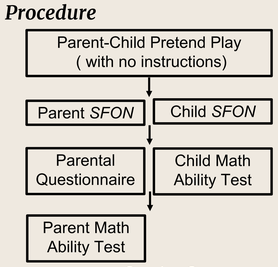
- *How do various socioeconomic, cognitive, and motivational factors impact parental math talk in different contexts (e.g., formal vs. informal)?*
- *What are the effects of the abovementioned factors on children's early math development?*

Methods

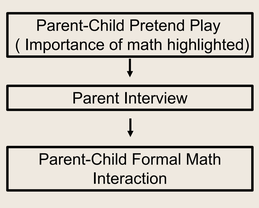
Participants

- 120 parent-child dyads (61 girls; $M_{age} = 5.25\ years$) from 7 different cities in southeast China;
- Parents (98 mothers, 25 fathers) varied in the amount of education from 3 years (less than primary school graduate) to 25 years (graduate degree)($M = 12.30\ years\ ,\ SD = 3.80$).

Procedure



Session One (25 minutes)

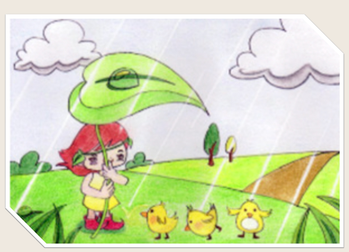


Session Two (25 minutes)

Spontaneous Focus on Numericity (SFON) Task

For parents:
"Please describe the picture as if you are describing it to your child."

For Children:
"Could you tell me what you can see in the picture?



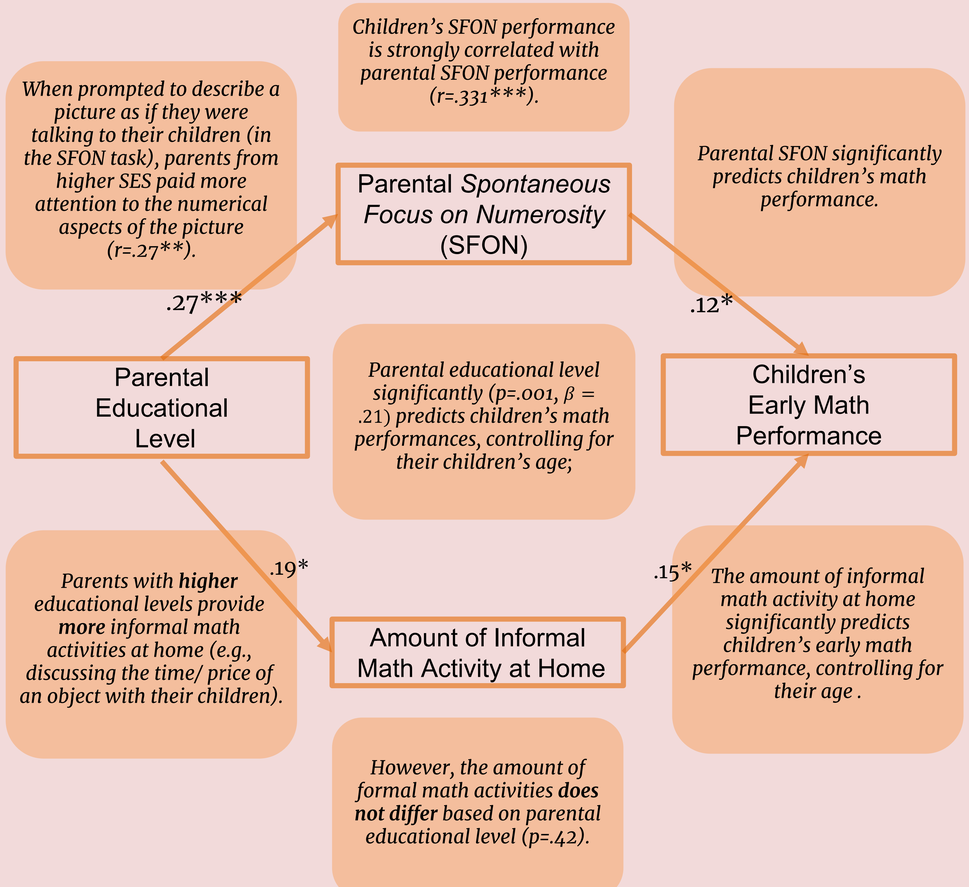
*Pretend Play Session 1: Party Preparation *(with no instructions)*

*Pretend Play Session 2: Party Preparation *(importance of math highlighted)*

*Formal Math Interaction

*Pictures were taken and used with parental & children's written consent.

Results



Summary

"Of course! Math is THE most important subject!"

When asked how they help children with math, parents from low SES backgrounds tend to choose **formal, abstract math activities**, such as practicing addition and subtraction questions daily.

However, parents from high SES backgrounds tend to **integrate math into daily interactions.** Their quantity and quality of math talk are both higher during natural pretend play.

Parents from both high and low SES groups have high math values and math interests.

Their math efficacy level, however, differs. Their math skills fully mediate such differences.

"I bought a lot of practice books for my children. We do addition and subtraction questions daily."

"It's necessary to practice math in kindergarten so my child can be prepared for Grade 1."

Most of the parents from low SES backgrounds value early math because of school readiness; whereas parents from high SES discussed "way of thinking" "future career" more often.

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