



Associations Between Teacher Math Competency and Preschool-aged Children's Math Skills

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INTRODUCTION

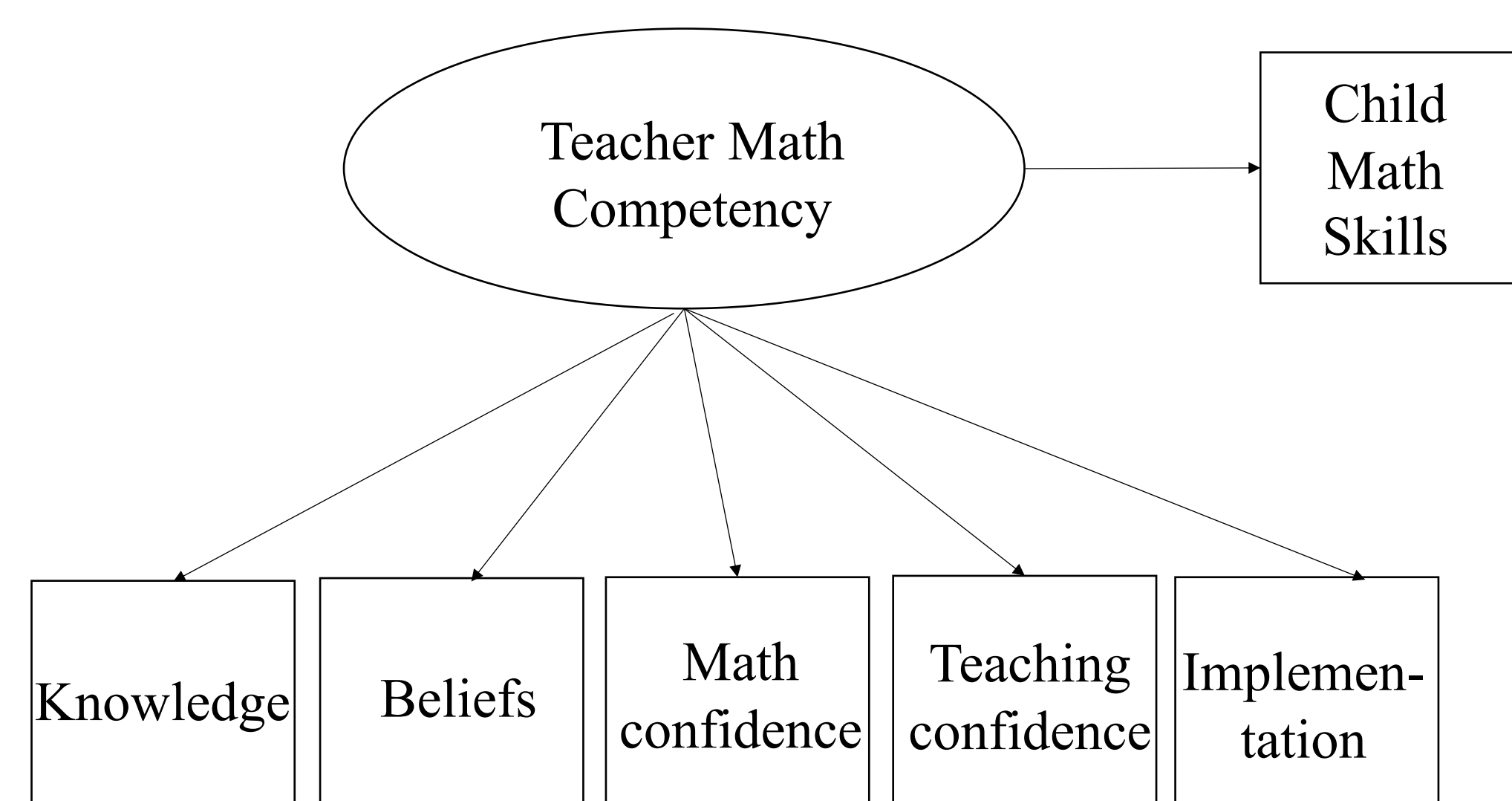
Early math skills are positively associated with children's later academic achievement (Rittle-Johnson et al., 2017), and early math environments that children are exposed to are important in facilitating their learning of math skills (Elliott & Bachman, 2018). However, there is great variability in the childcare math environments that are created by teachers with different characteristics, such as knowledge and background. It is unclear which characteristics contribute to teachers' overall math competency and how teacher math competency is related to children's math skills.

Research Questions:

1. Which teacher characteristics are indicators of teacher math competency: teachers' knowledge of children's early math skills, beliefs in early math, confidence in their own math ability, confidence in teaching early math, and the likelihood of math implementation in the childcare setting?
2. What is the association between teacher math competency and preschool-aged children's math skills?

Figure 1

Hypothesized Structural Equation Model



Note. Knowledge = teacher knowledge of children's math skills; Beliefs = teacher beliefs regarding early math; Math confidence = teacher confidence in their own math ability; Teaching confidence = teacher confidence in teaching early math; Implementation = likelihood of math implementation.

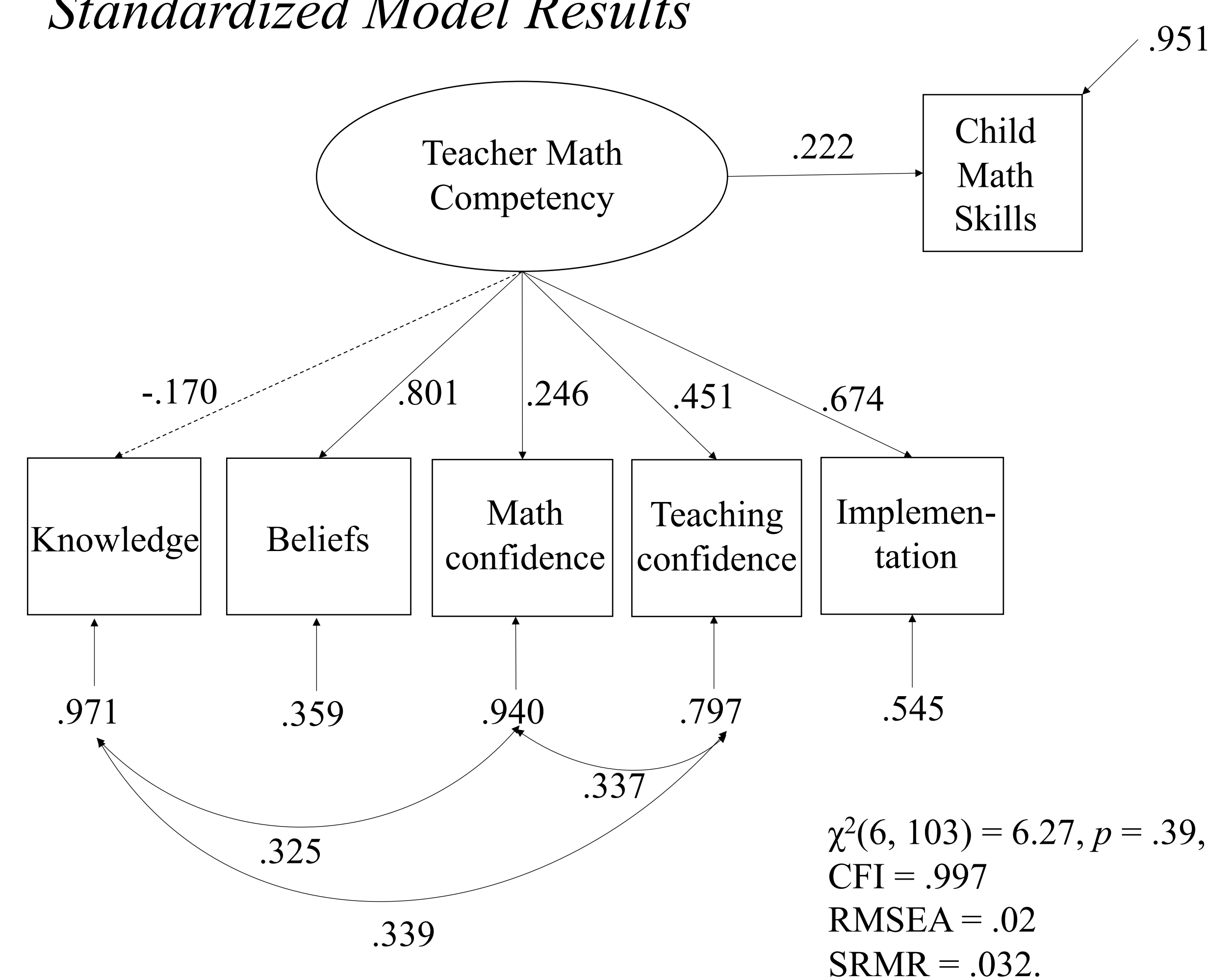
METHOD

- Participants
 - 109 children participated; 56 (51.4%) were boys. Children's age ranged from 3.08 to 5.83 years ($M = 4.53$, $SD = 0.68$).
 - All 58 participating teachers were female, 77% of teachers had a bachelor's degree, and a majority (74%) of teachers were education majors.
- Measures
 - Preschool Early Numeracy Screener (PENS; Purpura, 2021)
 - Teacher survey, including items assessing teachers' knowledge, beliefs, math confidence, teaching confidence, and implementation.

RESULTS

Figure 2

Respecified Childcare Math Environments and Standardized Model Results



Note. Results of respecified hypothesized teacher characteristics model. Standardized coefficients are reported for each path. Solid lines indicate significant paths ($p < .05$). Dashed line indicates non-significant paths. Teacher characteristics are positively associated with children's math skills.

DISCUSSION

Teachers' beliefs, math confidence, teaching confidence, and likelihood of math activities, but not teachers' knowledge of children's math skills, were significant indicators of the latent teacher math competency variable. The association between teacher math competency and children's math skills was positive (Hojnoski et al., 2016). The findings of this study indicate that several teacher characteristics are related to their overall math teaching competency, and that pre-service teacher training and in-service professional development training programs should introduce both broad and specific math concepts. Professional development opportunities should address the importance of early math education, foster teachers' confidence in teaching early math, and provide teachers with strategies for how to implement math activities in the classroom.

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