



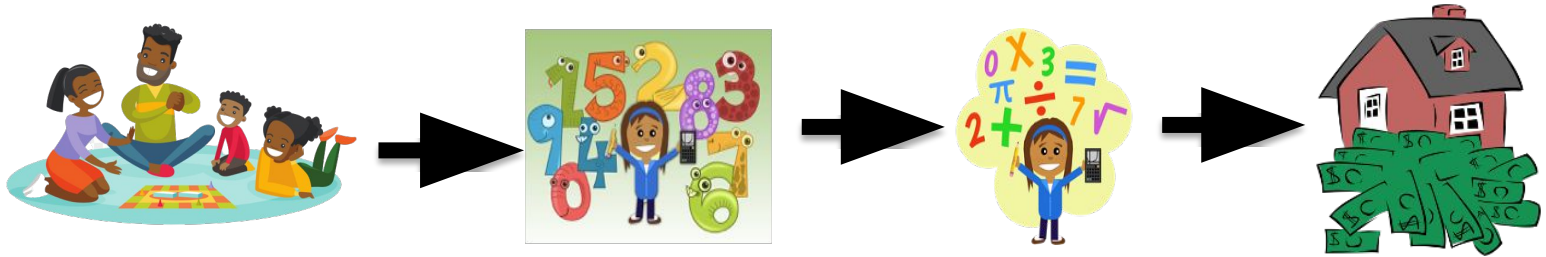
The Influence of Being a Teacher on Parents' Home Math Support, Beliefs, and Knowledge

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Background

Math knowledge during early childhood is one of the strongest predictors of later academic **SUCCESS** (e.g., Duncan et al., 2007).



Children's math knowledge often positively relates to and is influenced by their parents' math support (see Mutaf-Yıldız et al., 2020 for a systematic review).

Background

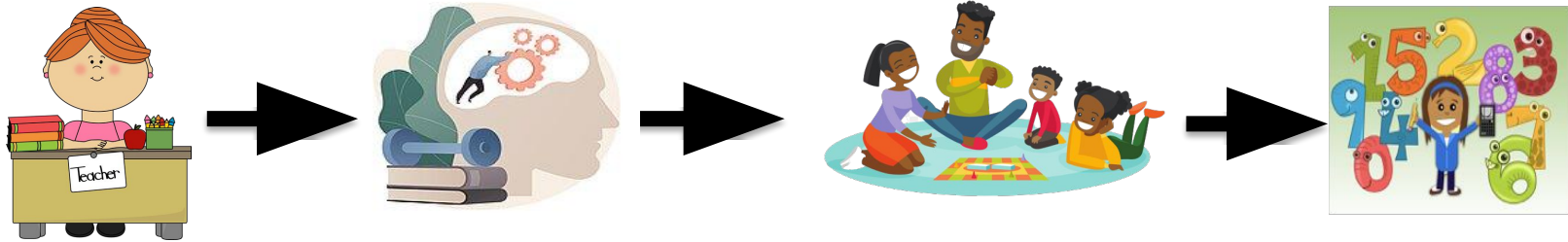
Parents' numeracy beliefs relate to and potentially shape their numeracy support (Douglas et al., 2021; Zippert & Rittle-Johnson, 2020), but little is known about the sources of existing variability.



Little is known about sources of variability in parents' knowledge about early math development (i.e., which skills children can learn before kindergarten) despite growing evidence that this is an important variable (Douglas, 2022; Cannon & Ginsburg, 2008; Deflorio & Beliakoff, 2015).

Background

Parents desire and potentially benefit from communication with their child's preschool teacher about math (Lin et al., 2019; Sonnenschein et al., 2021).



However, there is wide variability in preschool teachers' math support in the classroom (Braham, 2020; Klibanoff et al., 2006) and a need for improved teacher knowledge about early math (Tirosh et al., 2019; Li, 2021).

Study Aims

Are there differences in math beliefs, knowledge, and support among parents who are preschool teachers and parents who are not?

We hypothesized that parents who are preschool teachers would report more:

1. accurate knowledge about early mathematical development
2. positive math beliefs
3. frequently supporting their children's early math development

Measures

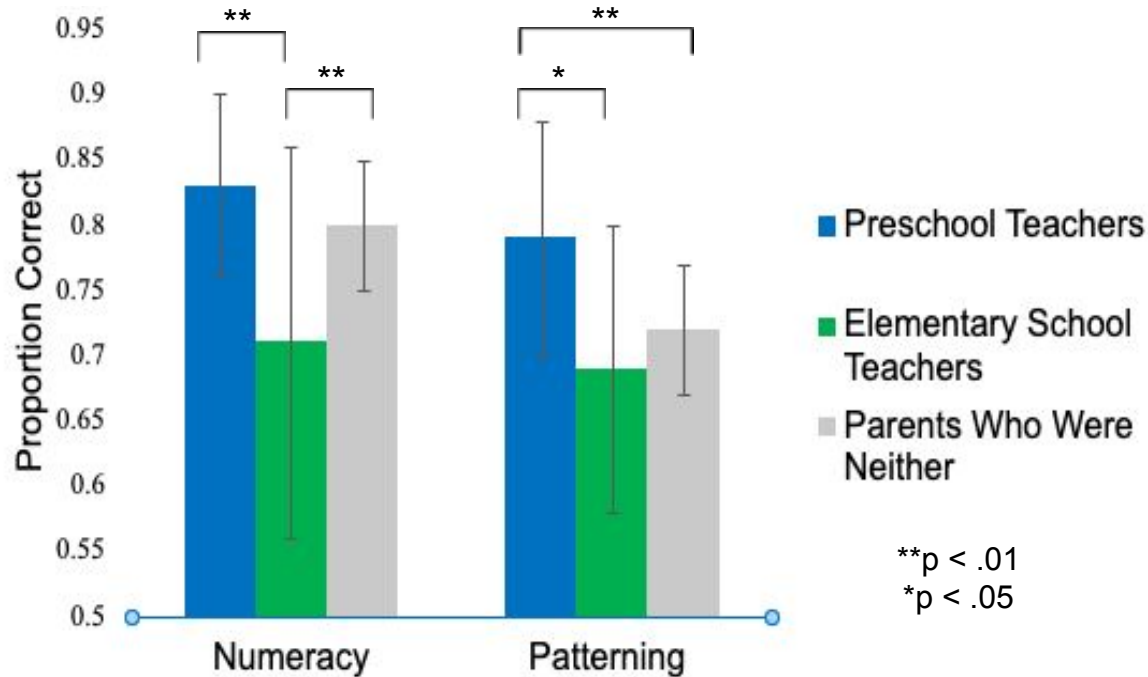
Parents of preschoolers completed an online survey through Amazon MTurk which measured:

- Knowledge about early math development (adapted from Deflorio & Beliakoff, 2015)
- Math beliefs (adapted from LeFevre et al., 2009; Zippert & Rittle-Johnson, 2020)
 - Expectation of child's math development
 - Value of child's math development
 - Interest
 - Ability
- Home Math Engagement (Zippert & Rittle-Johnson, 2020)

Participants

- N = 344 parents who were:
 - Preschool teachers (n=84)
 - Elementary school teachers (n=39)
 - Neither preschool nor elementary school teachers (n=221)
- Parents reported on their 3-year-olds (52%) or 4-year-olds (48%).
- Most identified as their child's primary caregiver (95%).
- Most were employed full-time (79%) or part-time (11%).
- Almost half were fathers (43%).
- The majority were White (77%) and did not identify as Hispanic or Latine (80%).
- Over half had a bachelor's degree (55%), 21% had some college education or less, and 24% of parents had some graduate education or degree.

Findings: Parents' Early Math Knowledge



Numeracy: $F(2,341)=4.50$, $p=.012$

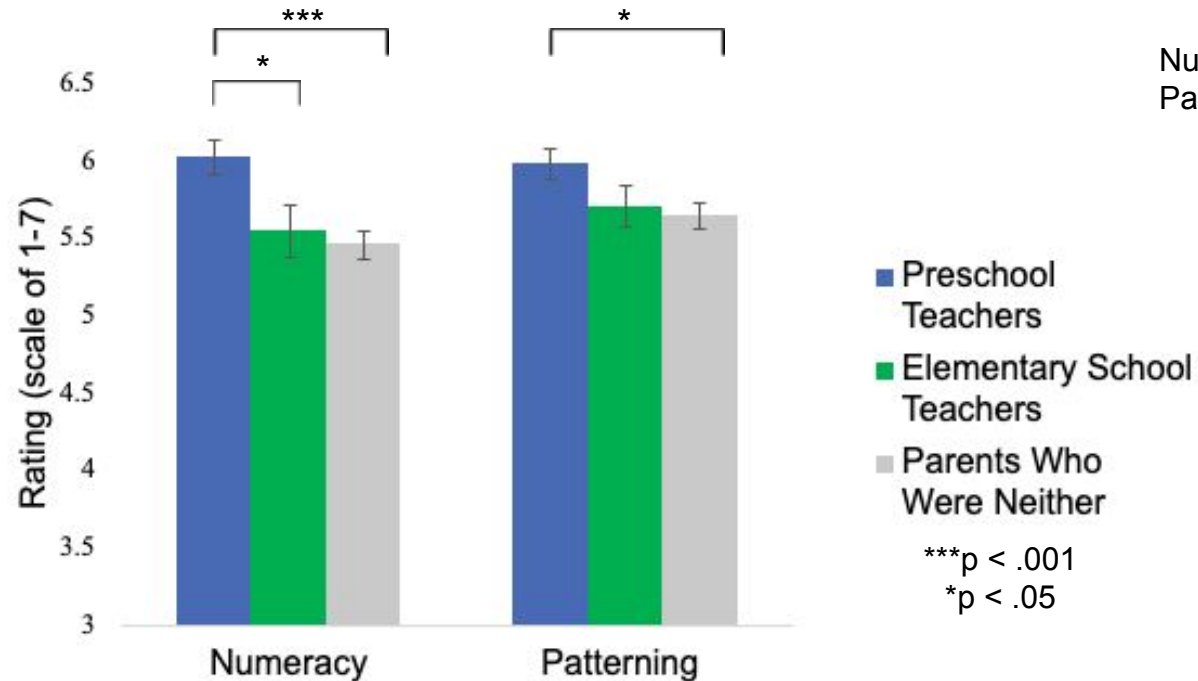
Patterning: $F(2,341)=4.67$, $p=.010$

** $p < .01$

* $p < .05$

Which of these academic skills are appropriate to work on with typically developing 4-year-old children in the United States?

Findings: Parents' Expectations

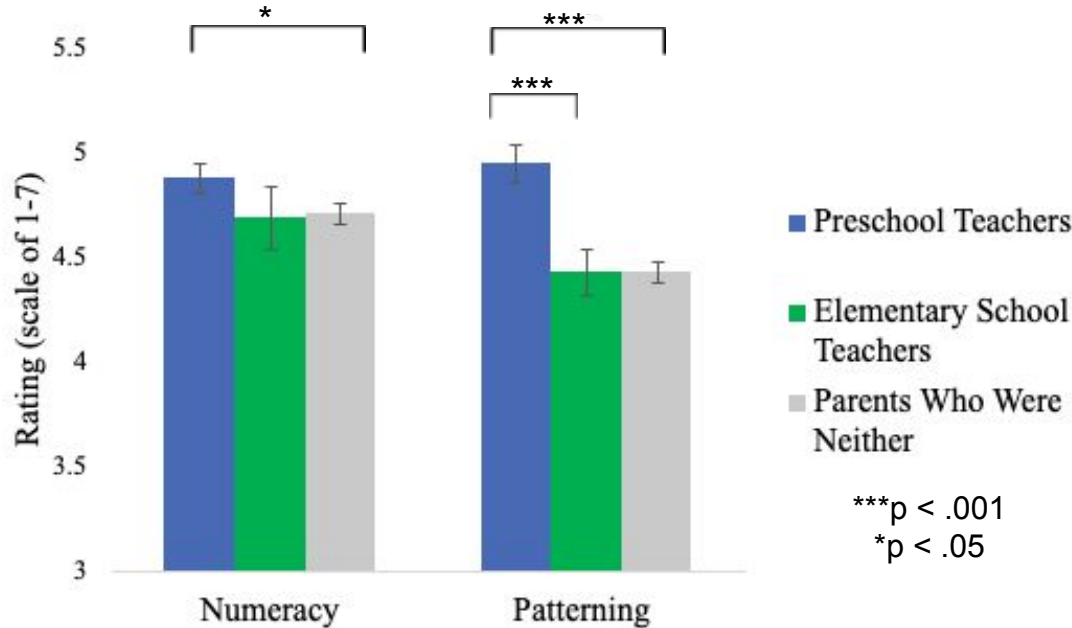


Numeracy: $F(2,341)= 6.86, p<.001$
Patterning: $F(2,341)= 2.86, p=.059$

*** $p < .001$
* $p < .05$

How well do you think your child will do in each of these areas in Kindergarten?

Findings: Belief About the Value of Math

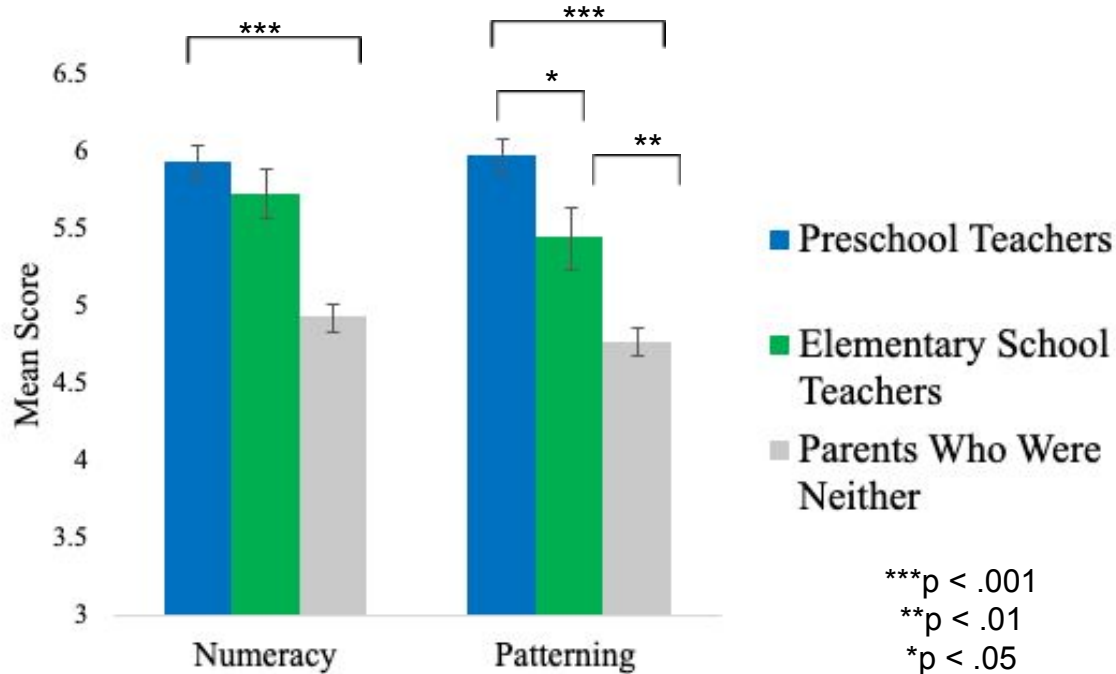


Numeracy: $F(2,341)=2.31, p=.101$
Patterning: $F(2,341)=13.38, p<.001$

*** $p < .001$
* $p < .05$

How important is it for your child to achieve each of the following benchmarks before first grade?
How useful do you think each of these kinds of skills will be to your child in the future?

Findings: Belief about Child's Abilities in Math

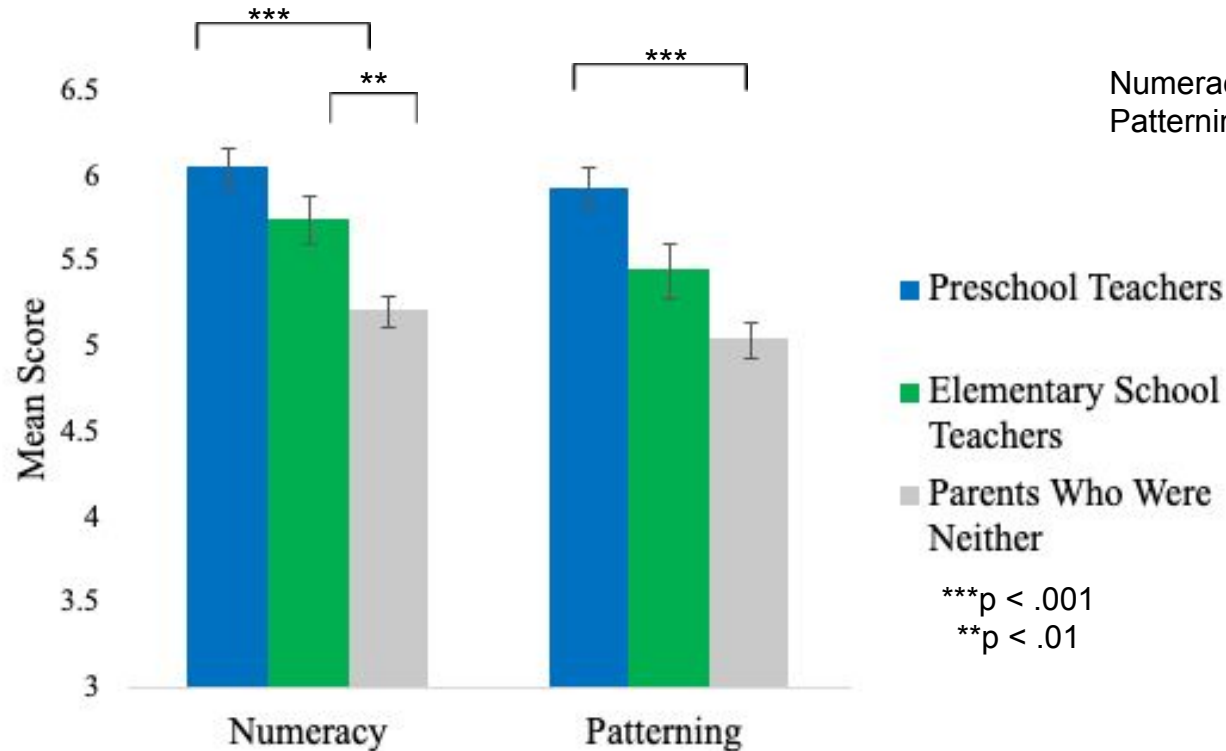


Numeracy: $F(2,341)=23.88, p<.001$
Patterning: $F(2,341)=28.26, p<.001$

*** $p < .001$
** $p < .01$
* $p < .05$

How good is your child currently in each area listed below?
Compared to other children, how much innate ability or talent does your child have in each of these areas?

Findings: Belief about Child's Interest in Math

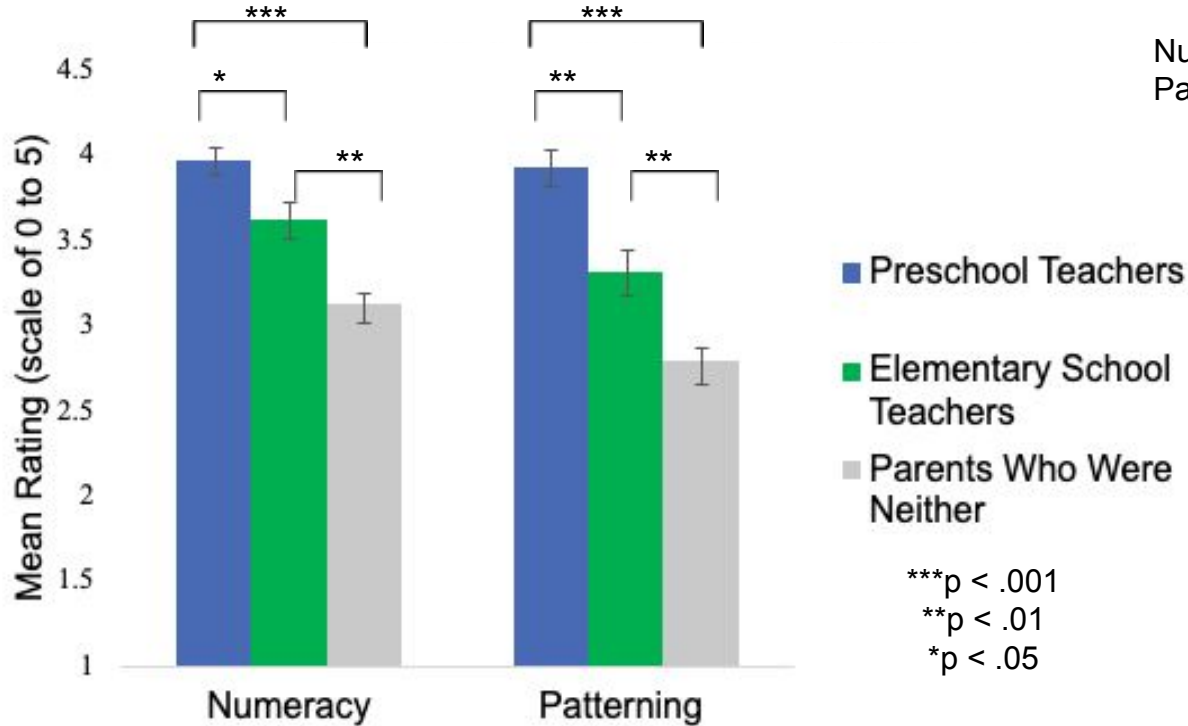


Numeracy $F(2,341)=16.82, p<.001$
Patterning: $F(2,341)=13.69, p<.001$

*** $p < .001$
** $p < .01$

How much does your child like each of the following activities?

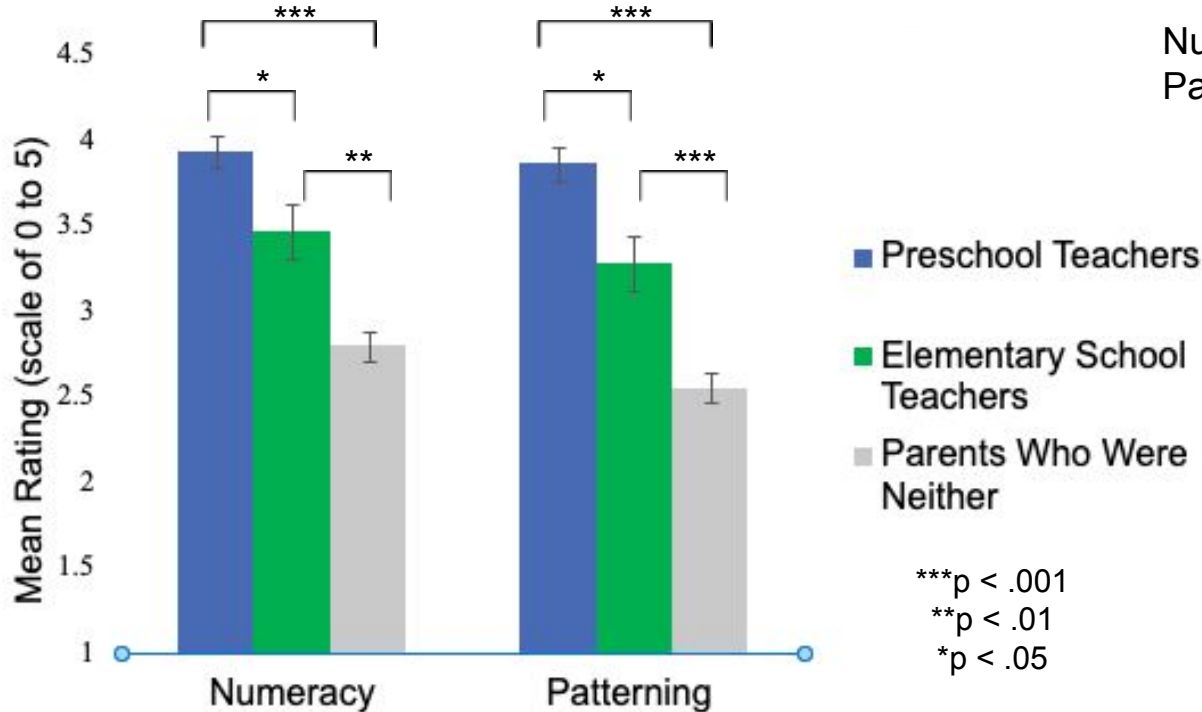
Findings: Frequency of Home Math Engagement



Numeracy: $F(2,341) = 30.76, p < .001$
Patterning: $F(2,341) = 37.02, P < .001$

How often do you do the following activities with your child? [mean rating across all items]

Findings: Complexity of Home Math Engagement



Numeracy: $F(2,341)=28.86, p<.001$
Patterning: $F(2,341)= 35.53, p<.001$

How often do you do the following activities with your child? [mean frequency of symbolic magnitude comparison and simple arithmetic for numeracy; mean frequency of extending patterns, abstracting patterns, and identifying pattern units]

Summary of Findings: Comparing parents who are preschool teachers to other groups of parents

| Variable | Numeracy | | Patterning | |
|-----------------------------------------------|----------------------------|---------------|----------------------------|---------------|
| | Elementary School Teachers | Other Parents | Elementary School Teachers | Other Parents |
| Knowledge about Early Math Development | ✓ | - | ✓ | ✓ |
| Beliefs | | | | |
| Expectation for child's development | ✓ | ✓ | - | ✓ |
| Value of child math abilities | - | ✓ | ✓ | ✓ |
| Perception of child's current math abilities | - | ✓ | ✓ | ✓ |
| Perception of child's current math interest | - | ✓ | - | ✓ |
| Support | | | | |
| Frequency | ✓ | ✓ | ✓ | ✓ |
| Complexity | ✓ | ✓ | ✓ | ✓ |

Discussion

- Parents who were preschool teachers likely develop more accurate knowledge about early math development based on having
 - more experience teaching and observing various preschoolers as they do math
 - training and/ or professional development needed to become or remain preschool teachers.
- Likewise, their knowledge, experiences, and training likely shape their ideas about activities that can support children's math development and when and how to do these (Anders & Rossbach, 2015; Brown et al., 2008; Wilkins, 2008).
- Preschool teachers had more accurate knowledge about and higher value of early patterning than other parents
 - Relatedly, preschool teachers value and provide support for patterning (Rittle-Johnson et al., 2015, 2018) despite it not being included in the Common Core State Standards (2010) and it being less studied and less known than numeracy.

Implications

- The messaging that parents are receiving about numeracy (e.g., Education First, 2020) seems to be helping them have a good grasp on which numeracy skills children can be developing by age five.
 - Parents who are not early educators had similar knowledge about early numeracy development as parents who were preschool teachers.
- A need for parents to receive information about patterning development
 - Preschool teachers had significantly better knowledge about early patterning development than other parents.
- Preschool teachers may be able to offer resources about patterning to parents
 - wider-scale studies about their knowledge about early patterning are needed.
- Exploring the effects of increasing parent-teacher communication about mathematics development on parents' home math support, beliefs, and knowledge, and children's math skills could be a useful avenue for future work.

Thank you!

Questions or Thoughts?

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