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A Head Start in Science: Parent-child interactions and children's science process skills

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A Head Start in Science: Parent-child interactions and children's science process skills

Ariel Kachuro, Dennis Cregin, Arlicia Gross, Samantha Herlands, Julia Kolodny, Briana Squires, Danielle Wolfe, Kayla Yim, Samantha Ziesel, Erin Jant

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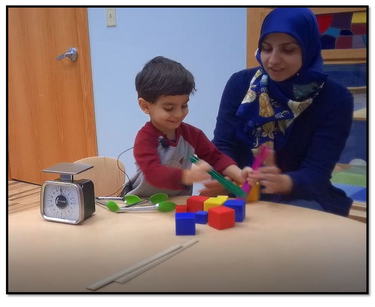
Introduction

- Conversations with parents during engagement in informal learning settings, such as museums, can play a critical role in facilitating young children's early experiences and interest in STEM (Jant et al., 2014; NRC, 2012).
- There is an acute need to support early STEM engagement for underrepresented families.
- Successful community partnerships between informal learning settings and Head Start are one way to broaden participation, interest, and success in the STEM fields for underrepresented children and families.
- This is vital, as previous work has shown, that children in Head Start tend to score lower in science and math readiness when compared to their higher SES peers (Brenneman, 2014).

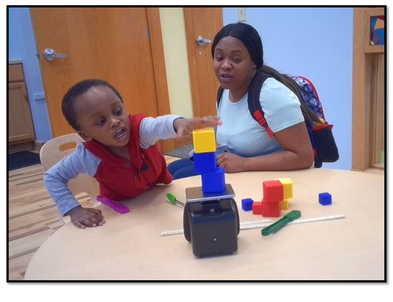
Participants

- Children: n = 23 families
- Age range: 3-5 years old, (*M* = 4 years)
- Sex: 52.2% female
- Race/ethnicity: 47.8% Caucasian, 13% African American, 13% Multiracial, 8.8% Latinx, 8.7% Asian, 4.3% Iranian

Family Engagement



- Family Engagement events are held monthly, after regular hours, and provide families with the opportunity to engage in any exhibit and the four specially designed hands-on activities related to current classroom curriculum.
- The activities incorporate science-process skills through several content areas that are accessible to young children such as, biology, chemistry, physics, and engineering.



Method

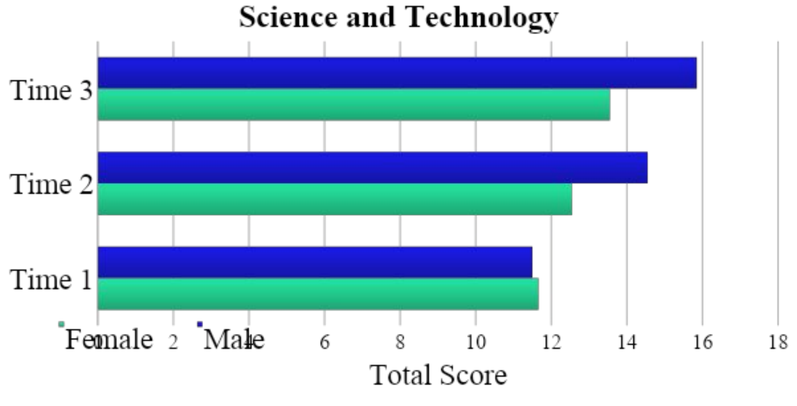
- Parent-Child Observation during Head Start Family Engagement Event

- School Readiness Scores
  - Child Observation Record (COR-Advantage Highscope Educational Research Foundation).
  - COR assessments were done at the beginning, middle, and end of the academic year
  - Items included in this study:
    - Science and Technology
    - Mathematics

Conversation Coding

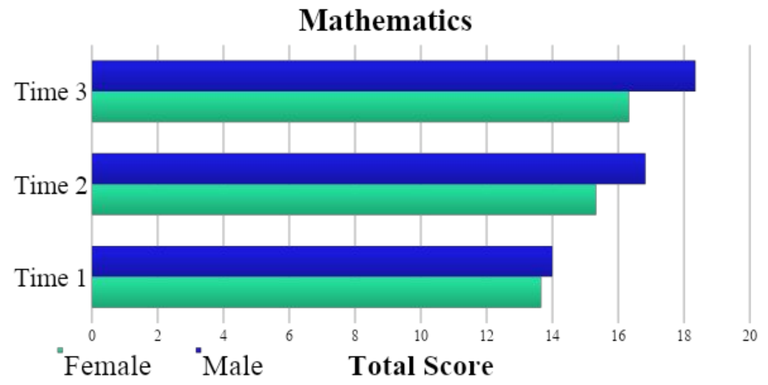
Category	Definition/Example
Observations	Descriptions of materials and tools. (This one is green. What do you see here?)
Predictions	Inferences or predictions about what might happen or object properties. (What would happen if we put this block in the water? Which one do you think is heavier?)
Categorization	Sorting by certain properties. (The red ones are big and small. Which blocks should go together?)
Math & Measurement	Counting, measurement, quantifying (How many pieces do we have? How much does this one weigh?)
Spatial	References to spatial orientation, transformation, using spatial language (up, down, here, there, under, over etc). (We can stack these up. How can we turn it to fit on the scale?).

Results

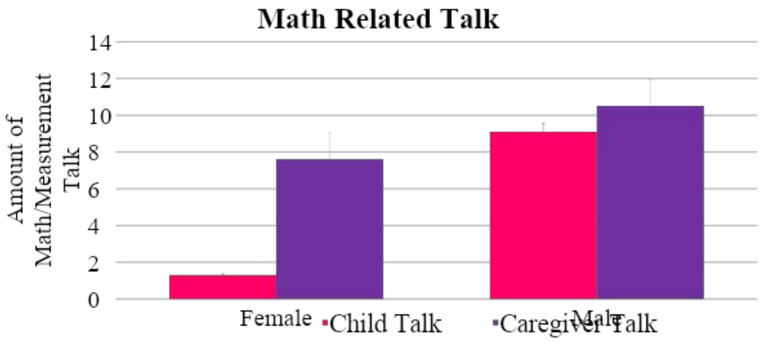


- There is an interaction of time and gender, such that boys were outperforming girls over the academic year, $F(1, 21) = 7.32$, $p < .05$, $\eta^2 = .36$.

Results



- There was an interaction of time and gender on mathematics scores, $F(1, 21) = 5.14$, $p < .05$, $\eta^2 = .29$, a similar trend as the Science & Technology scores.



- There was a difference between boys and girls in total talk about math and measurement related concepts: $F(1, 21) = 13.27$, $p < .05$, $\eta^2 = .55$ (controlling for overall talkativeness)
- Parent math talk was also significantly different for boy and girl children, $F(1,21) = 14.32$, $p < .05$, $\eta^2 = .43$.
- Overall family math talk was correlated with school readiness scores in math at times 1 and 3 but not science & technology, *rs* >.53, *ps* < .05

Discussion and Future Directions

- Taken together, results indicate a potential connection between parent-child interactions at the museum and children's school readiness scores
- Ongoing work is aimed at further identifying the critical elements of the Family Engagement Nights for boosting children's STEM skills and school readiness.
- Additional evaluation of the sex differences in school readiness in the STEM areas as well as the role of parent-child (and teacher-child) interactions in those early differences will be explored.

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