

Investigating the Impact of Head Start Family Interactions on Children's STEM Process Skills during Family Events at Two Science Centers



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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.

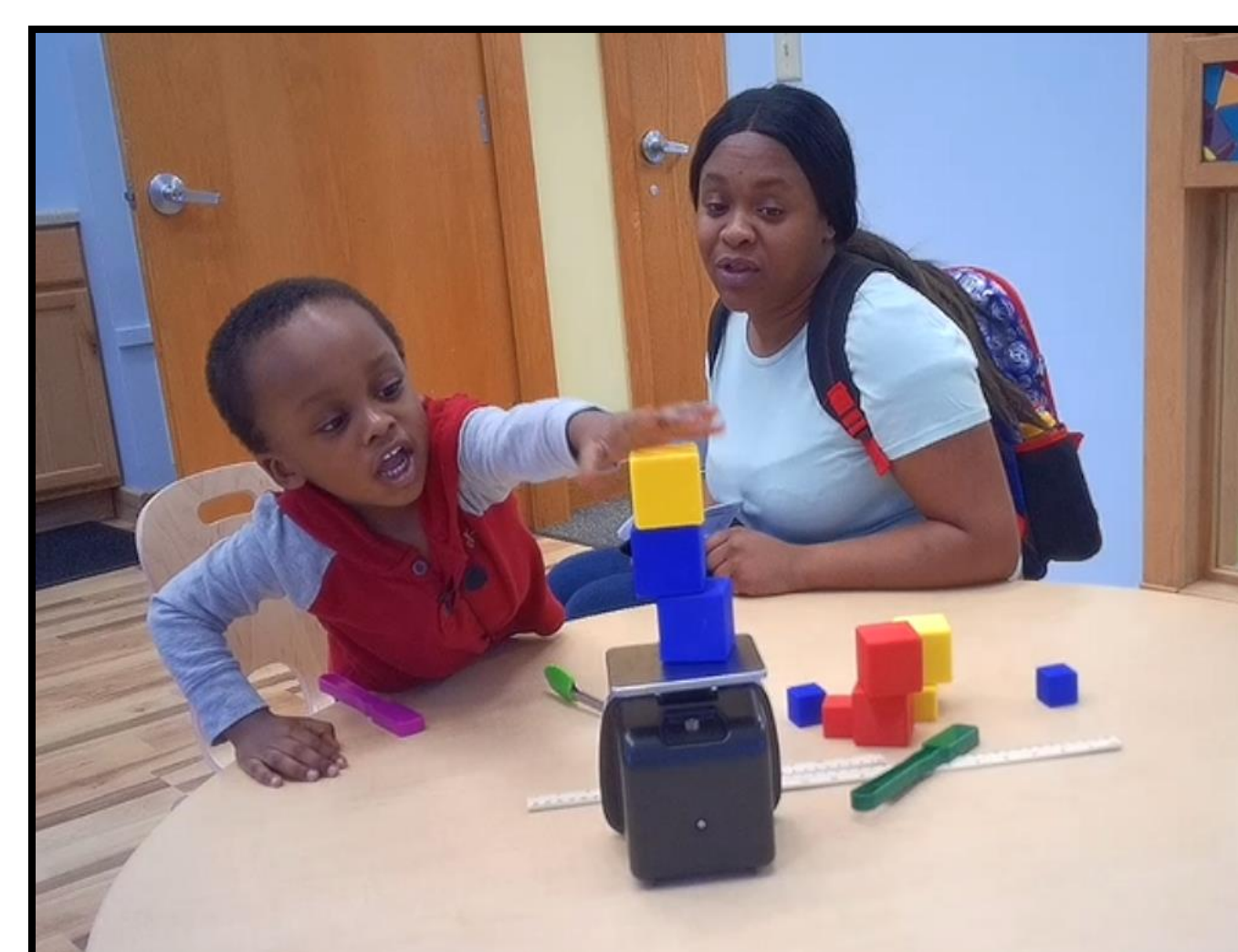
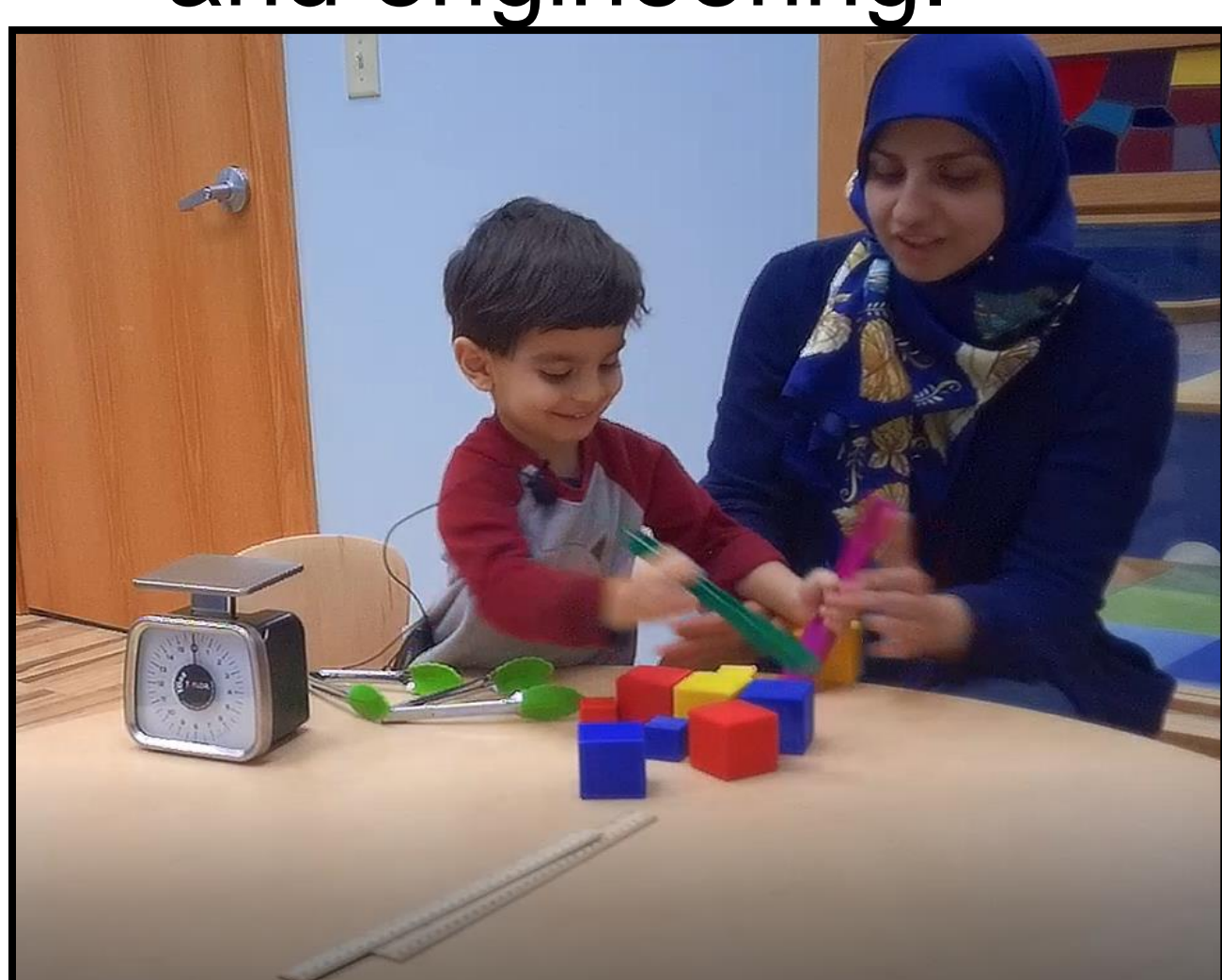
Participants

- Children: n = 240 families
- Age range: 4-5 years old

	Ithaca Head Start		Baltimore Head Start	
	Non-Hispanic	Hispanic	Non-Hispanic	Hispanic
White	57.6	2.7	7.1	2.6
African American	11.8	2.4	70	0.3
Multiracial	12.9	1.6	4.0	13
Asian	6.7	NA	0.33	NA
American Indian/Alaskan Native	2.0	0.4	0.06	0.06

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. Families receive a free hot meal.
- The activities incorporate science-process skills through several content areas that are accessible to young children such as, biology, chemistry, physics, and engineering.



Method

Site 1 (Ithaca)

- Parent-child dyads in the will be randomly assigned to 1 of 4 pre-visit encouragement groups during Year 1 data collection.
- Families will be given a lapel microphone recorder to wear throughout the visit and video recorded at 2 science activities during the visit.

Site 2 (Baltimore)

- We will be initiating the Family Engagement program at Maryland Science Center during Year 2.
- Data will be collected via lapel microphone recorders during family visits and video at 2 science activities.

Both Sites

- Children will participate in immediate free and cued recall at the end of each museum visit (2 visits recorded).
- Recorders will be sent home with families to record conversations in the weeks that follow the visit
- STEM Interest Survey and Play Questionnaire will be given to parents in Year 1 and Year 2 (follow up with year 1 participants).
- School Readiness Scores
 - Child Observation Record (COR-Advantage Highscope Educational Research Foundation).
 - COR assessments are done at the beginning, middle, and end of the academic year

Pre-Visit Encouragement Prompts

Group	Encouragement Prompts
1 (Questions)	Families are prompted to use open-ended questions, given examples, and given the opportunity to immediately practice this using a rock and magnifying glass
2 (Associations)	Families are prompted to use associations, given examples, and given the opportunity to immediately practice this using a rock and magnifying glass
3 (Combined)	Families get the prompt combining open-ended questions and associations
4 (Baseline/Control)	Families are given a brief introduction to the science center exhibits and given the rock and magnifying glass to explore prior to museum entry

Coding

- Audio/Video data will be transcribed and coded for frequency of occurrence and duration of talk that is **open-ended questions, responses, yes/no questions, and statements**. Specific instances of **associations** will be scored. All talk will be evaluated for the following categories:

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?).
Exploration and Tools	References to engaging with exhibit features and activities (We can use the magnifying glass to get a closer look. What can we use to pick up this small piece? What is the next step?)

Project Deliverables

- Build knowledge about how best to support Museum-Head Start partnerships to effectively implement and sustain STEM programming for early childhood that advances equitable early STEM learning for underserved families.
- Apply knowledge toward museum-based programming and family engagement that is critical for fostering STEM-rich play that builds STEM process-skills.
- Follow up Pilot and Feasibility research with a Research in the Service to Practice or Broad Implementation proposal.



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