

The Effect of Building Materials on Families' Spatial Conversations During a Playful Construction Activity

Evan Vlahandreas, Claire Mason, Naomi Polinsky, David H. Uttal, Catherine A. Haden
Northwestern University & Loyola University Chicago

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Introduction

- Children's and parents' spatial language use (e.g., talk about shapes, sizes and locations) supports children's spatial skill development (Pruden et al. 2011)
- Families use spatial language during playful construction activities (Ferrara et al., 2011)
- Spatial language use varies with construction activity design characteristics, such as the activity's play goals (Ferrara et al., 2011)
- **Research Question:** What is the connection between the building materials used and the spatial conversations families have during a construction activity?

Participants & Methods

- 22 children (Age: $M = 8.0$ years, $SD = 1.8$; Demographics: 52% white, 12% Black, 12% Asian, 8% Latine, 16% multiracial) and their parents participated from their homes in Chicago Children's Museum's [Here to There](#) Program
- **Here To There:** Construction activity in which families build a ramp that will bring "something important" six feet without letting it touch the ground.
- Families received a video invitation with instructions
- Families could use any materials & were recorded over Zoom
- *Recordings were coded for:*
 1. Spatial conversations
 2. Materials used to build the ramp, not including tape or glue
 - **Low Materials:** used 1-2 materials ($n = 11$)
 - **High Materials:** used 3+ materials ($n = 11$)



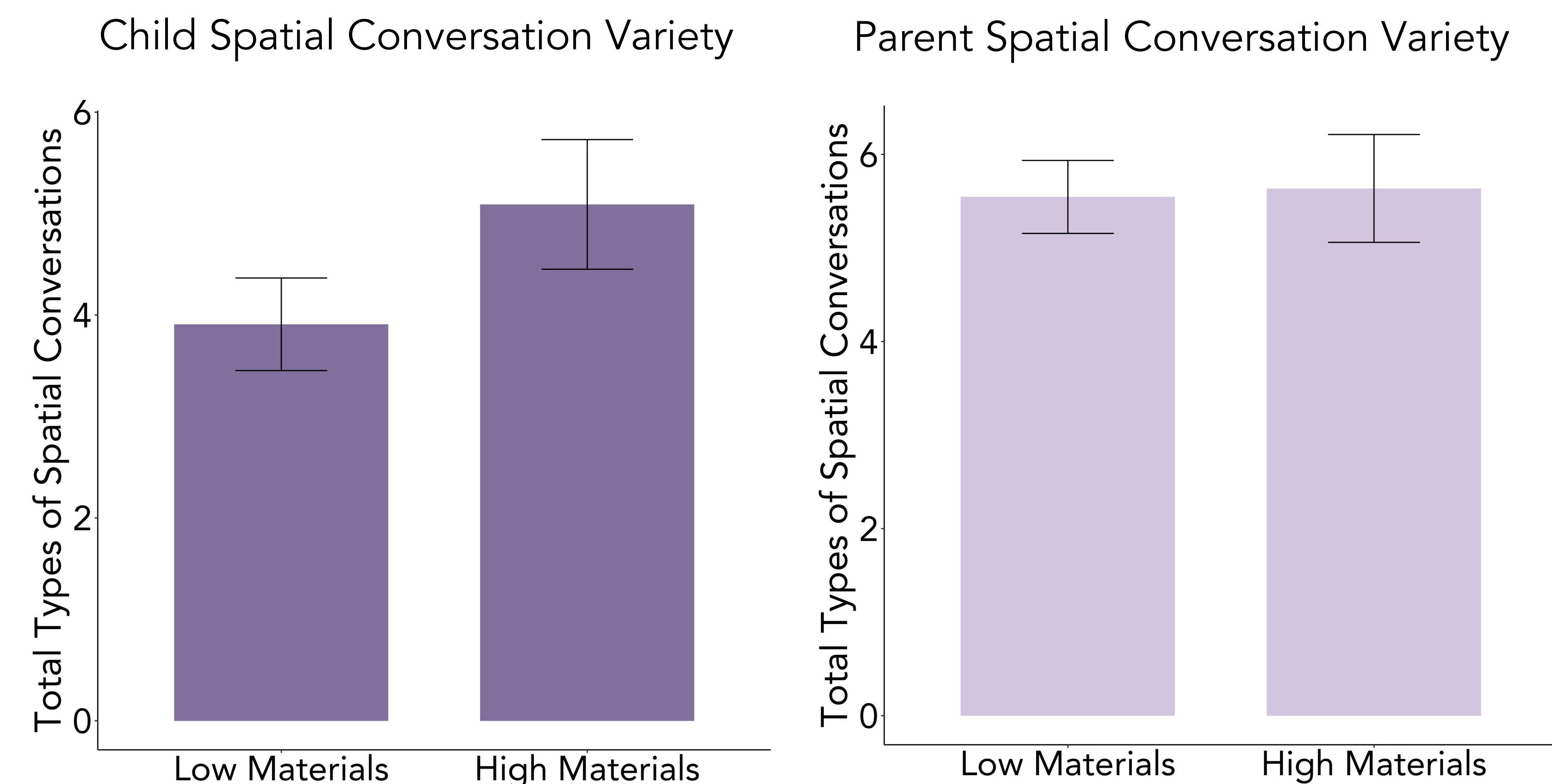
Spatial Conversation Coding

- Recordings were split into 15-second intervals
- Intervals were coded for presence/absence of each type of spatial conversation for parents and children
- **Dependent variables:** number of types of spatial conversations for parents & children, proportion of intervals in which a spatial conversation occurred for parents & children

Spatial Conversation Type	Definition	Example
Size & Measurement	Describing the size of objects	"How long those tubes?"
Spatial Features of Objects	Describing spatial properties, such as shape	"Grab the curvy piece."
Arrangement of Objects	Describing the locations of building materials relative to each other	"Let's put the supports on the sides [of the ramp]."
Object Manipulation	Describing the action of changing an object's spatial features	"Try cutting the box down the middle."
Locations in Space	Discussing where objects should be placed in space	"Put the box over here."
Spatial Comparisons	Comparing two or more objects' spatial features	"This tube is skinnier than this one."
Object Attachment	Discussing how objects & materials can fit together	"How can we connect these tubes to make a tunnel?"
Part-Whole Relations	Discussing the sum of two or more parts	"Two of Mommy's fingers is one inch."
Spatial Effects	Discussing how change in one spatial feature will impact the function or spatial features of the same object	"If you wanna make it fast, you have to make it steep"

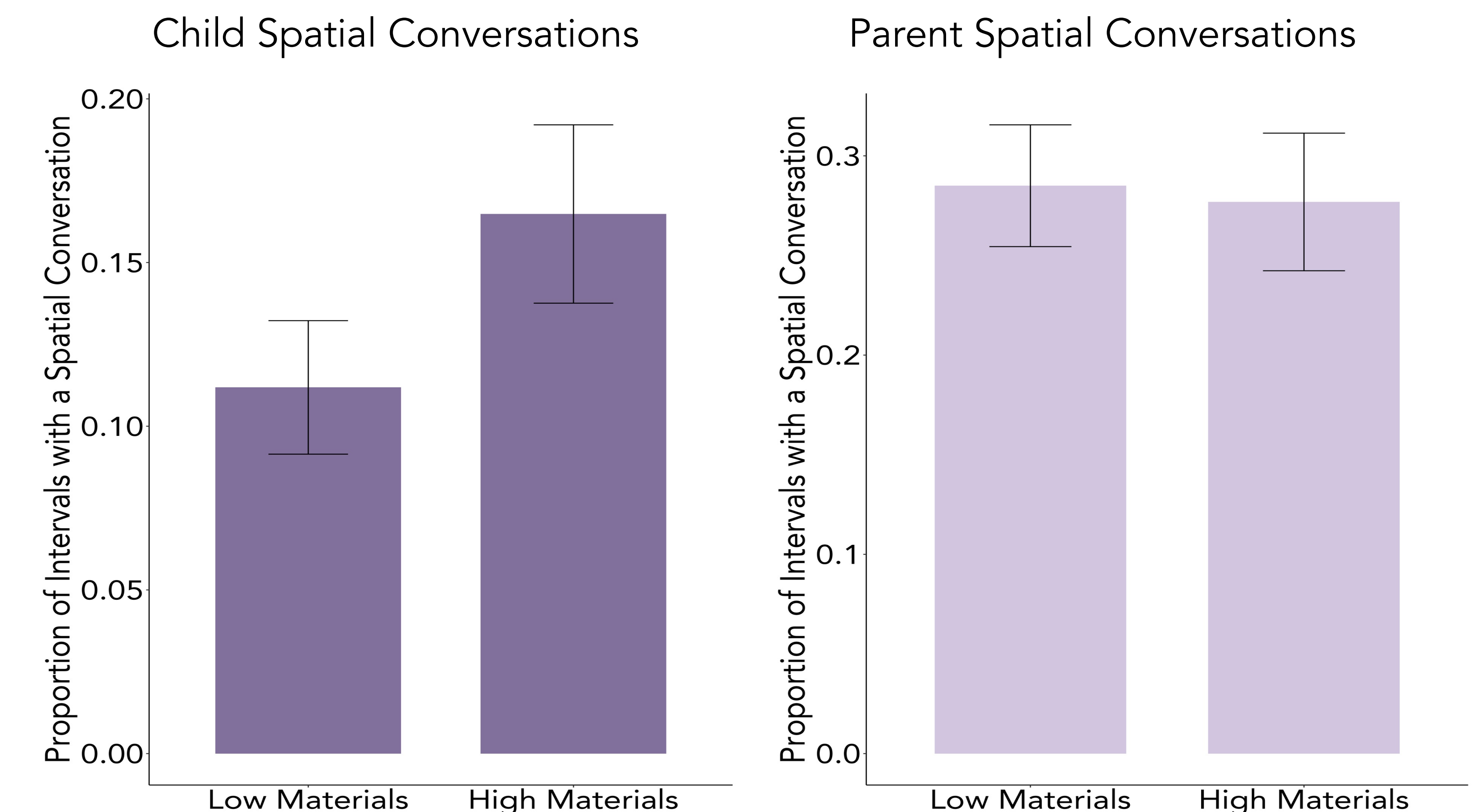
Results

Differences in the variety of spatial conversations based on the quantity of building materials



- Parents and children who used high and low numbers of building materials did not differ in the number of types of spatial conversations they had during the construction activity, $p's > .14$

Differences in the proportion of intervals with spatial conversations based on the quantity of building materials



- Parents and children who used high and low numbers of building materials did not differ in the proportion of intervals in which spatial conversations occurred during the construction activity, $p's > .13$

Discussion & Implications

- Spatial conversations are not associated with the number of materials families use
- As spatial conversations are not associated with materials, at-home construction activities could be an equitable way to support spatial learning
- Future research could examine the role of specific spatial features of the materials on spatial conversations

