

Parent-Child Narrative Reflections about Engineering Projects Made in a Children's Museum



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INTRODUCTION

- Narrative reflections can improve children's memory and learning (Haden et. al. 2016).
- This study focused on narrative reflections families recorded shortly after they visited the Tinkering Lab exhibit at Chicago Children's Museum.
- They recorded their narrative reflections in a multi-media station called Story Hub.
- Some families brought the projects they had made in Tinkering Lab with them into Story Hub.
- We asked if families who had their project with them engaged in more STEM-related talk and associations to prior and future experiences than those who did not.
- We focus on STEM talk and associations because these kinds of talk can support children's learning and STEM understanding.

PARTICIPANTS

- A total of 251 families recorded narrative reflection about their experiences in Tinkering Lab.
- Children were between the ages of 6-11 ($M = 8.2$) years old.
- 131 families had one or more male children (52%); 188 families had one or more female children (75%).
- The sample was 68% Caucasian.
- 97 families (39%) had their project with them in Story Hub, and 154 (61%) did not.

METHODS

- In Tinkering Lab (**Figure 1a**), families built projects using a variety of tools and materials.
- In Story Hub (**Figure 1b**), families chose to video-record their narrative reflections about their Tinkering Lab experience.
- Some families brought their Tinkering Lab projects into Story Hub and utilized them during their reflections (**Figure 1c**).



Figure 1a Tinkering Lab (above), **1b** Story Hub (bottom right), and **1c** Tinkering Lab project (top right).



CODING

- The Story Hub narrative reflections were coded for the presence of associations.
- The narrative reflections were also coded for the presence of talk about tools, engineering, and math. These scores were combined into a STEM composite score.

| Code | Definition | Example |
|---------------------|---|--|
| ASSOCIATIONS | Reference to prior knowledge or future plans. | "We got to wear goggles like real workers do." |
| MATH | Quantity, comparisons, length, weight, height, etc. | "I used three nails." "I cut it shorter." |
| TOOLS | Labelling specific tools, describing functions of tools. | "I used tools ... goggles, hot glue gun, and ... scissors." |
| ENGINEERING | Planning, brainstorming, figuring things out, testing, redesigning. | "I tested it on the ramp." "It didn't work the first time." |

RESULTS

- As shown in **Figure 2**, associations to prior or future experiences were made by a higher percentage of families who brought their projects with them to Story Hub, compared to those who did not, $X^2 = 10.37, p < .01$.
- As shown in **Figure 3**, the mean number of categories of STEM-related talk mentioned (math, tools, engineering, for a max score of 3) in families' reflections was higher for those with than without their project in Story Hub, $t(249) = 2.545, p = .01$.

Figure 2. Percentage of Families Making Associations

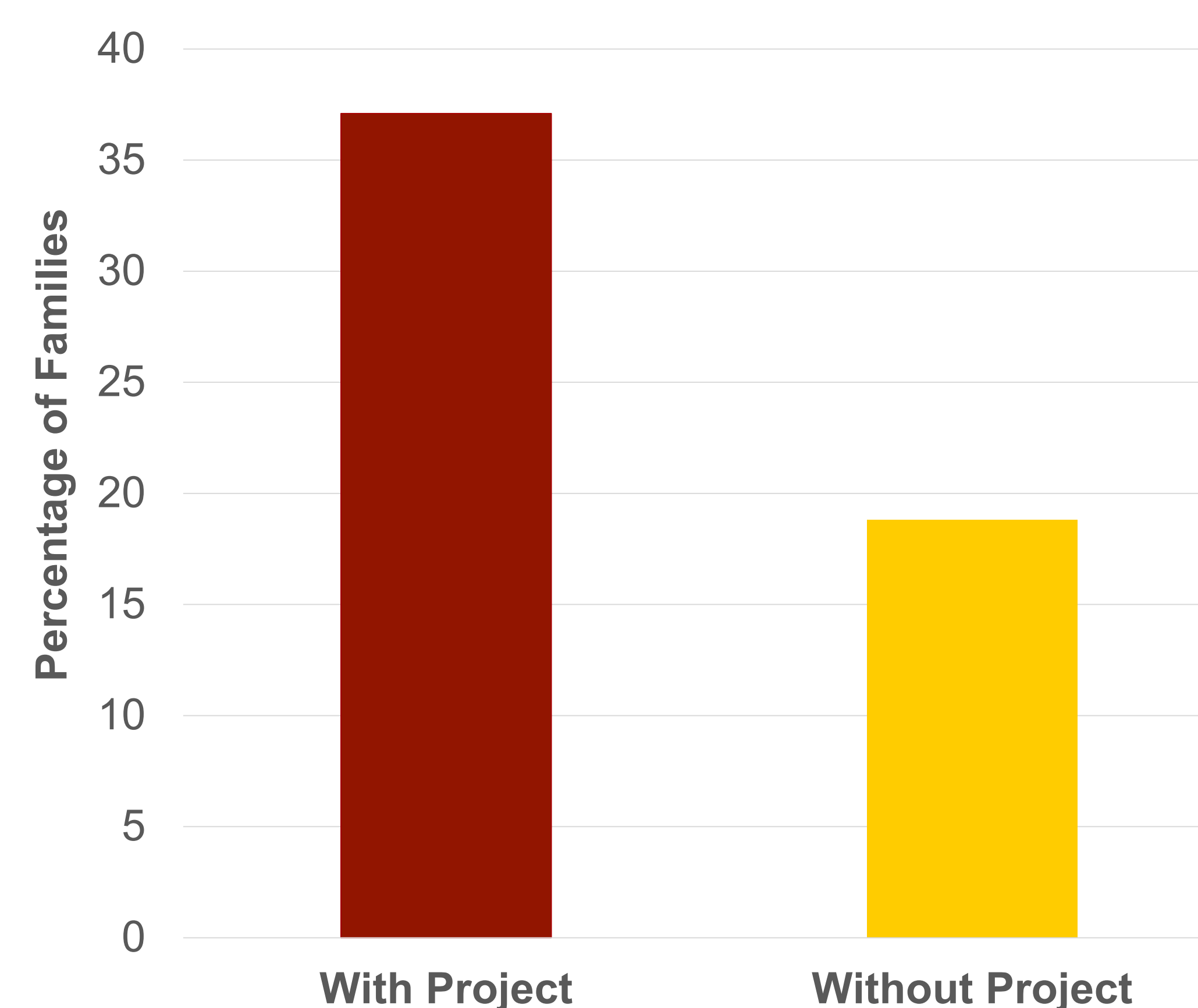
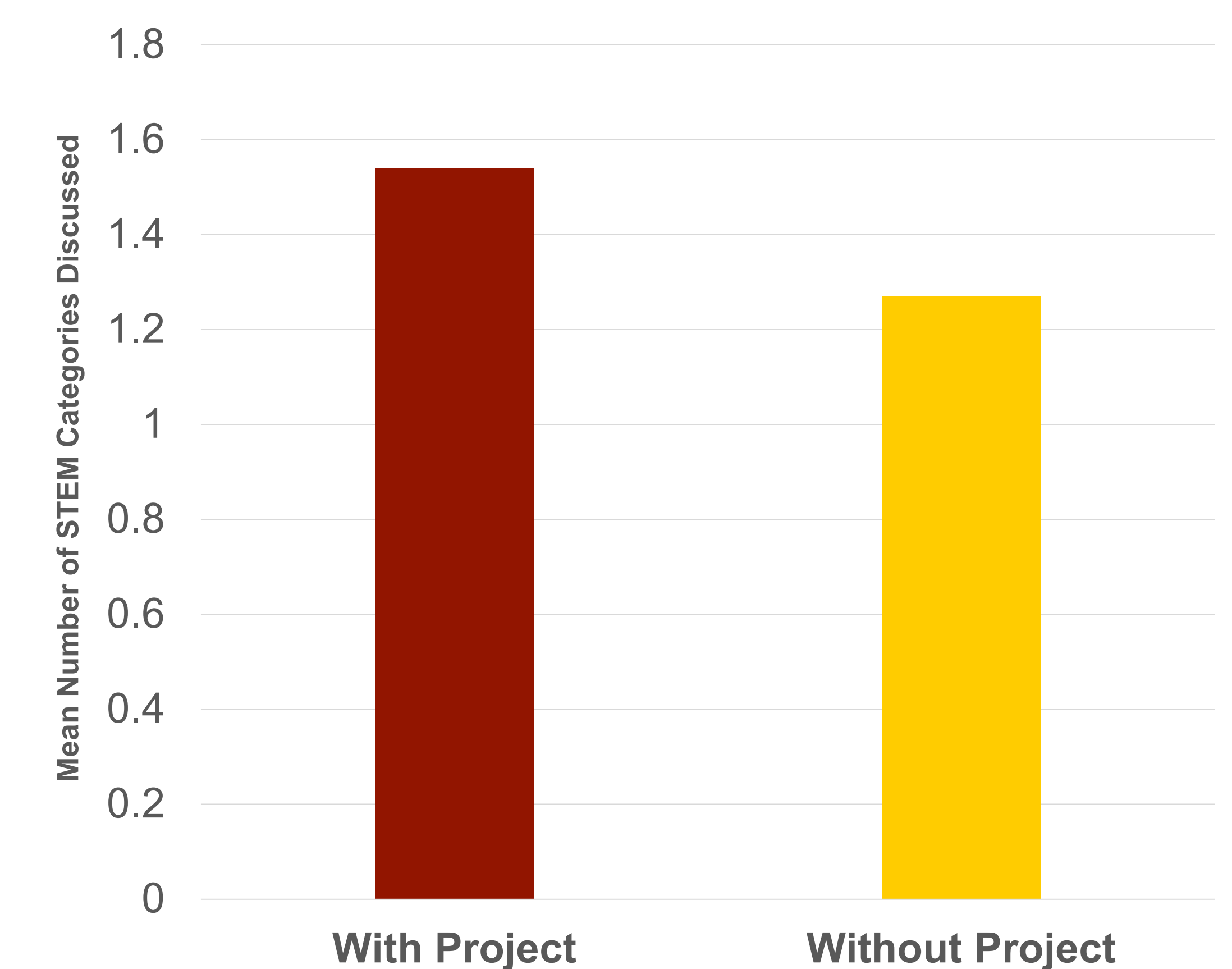


Figure 3. Mean Number of STEM Categories Discussed (max. = 3)



DISCUSSION

- Telling narrative reflections with concrete objects – in this case the projects families made in Tinkering Lab – supported STEM-related talk and association to prior and future experiences.
- It may be that the projects provided additional supports for talking about the novel activities, and making sense of the experience, including connecting it to prior knowledge (associations), and engaging in STEM-related talk.
- These findings connect with work on STEM learning and narrative reflection and suggest ways to improve learning and remembering.
- The work also suggests that encouraging families to take home projects they make in exhibits may provide valuable opportunities for talk and engagement in ways that can extend learning.