Parent directness relates to reduced engagement in STEM challenges

ECR Hub
EDU Core Research

#2300459: Fostering STEM Engagement from Parent-Child Interactions

Parent-Child Interaction + STEM Engagement

Early STEM Learning:
Learning occurs through playful interaction
(Callanan et al., 2020; Weisberg et al., 2013)

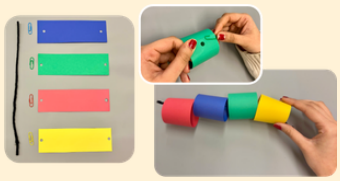
Home Environment:
Parents support STEM learning through talk, play, and exploration
(e.g., Levine et al., 2012; Melzi et al., 2022)

Interaction Style Matters:
Behaviors that reduce children's autonomy during play reduce children engagement with challenges on their own
(e.g., Gin et al., 2025; Sobel, 2023; Sobel et al., 2021)

The question that motivates this work is whether behaviors that reduce children's autonomy during parent-child interaction in the home relate to children's STEM engagement

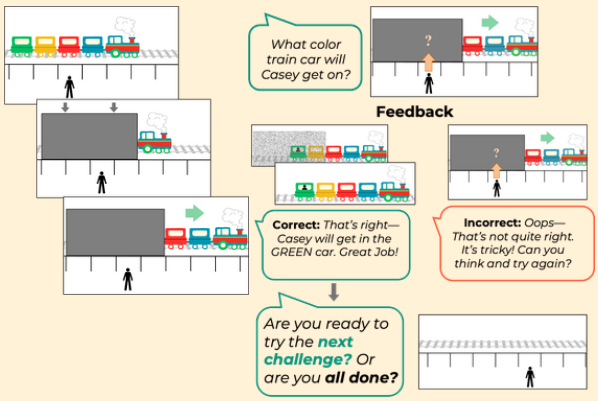
Preschoolers

Parent-Child STEM Activity "Make-a-Train"

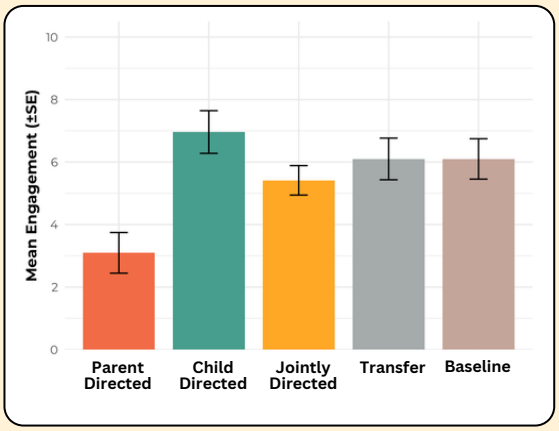


Parents and 3- to 5-year-olds built a train from a maker kit. We related parent-child interaction to engagement/performance on challenges

Spatial Reasoning Challenges



Children participated in fewer challenges when parents were directive during kit construction

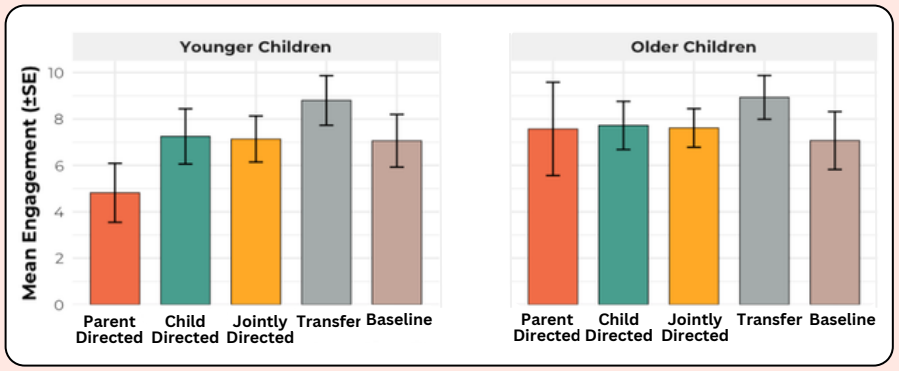


Early Elementary School

Controlling for age, cognitive, and social measures, preschoolers showed reduced engagement with STEM challenges when parents were directive during construction of the maker kit.

Extended findings to 6- to 8-year-olds, looking at PCI during kit construction and play afterwards. Significant results for construction; no relations with play.

Interaction between PCI Style during Construction and Age. Younger children (med. split) were less engaged when parent directed



Takeaway Message

- Parental directedness doing STEM activities relates to children's lower engagement with challenges (but not their performance on them)
- By age 8, children might not get as much autonomy support from parents during playful learning

Challenge Areas Overcome

- Reliability in coding
- Experimental operationalization
- Interventions to improve autonomy support

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