



# Does Object Appearance Influence 18-Month-Olds' Goal Imitation?

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## Introduction

Imitation of others' actions appears early in development and provides an overt measure of infants' understanding of intentional action. Infants preferentially reproduce others' goals, and that they can flexibly interpret goals based on the context in which the action occurs. Given contextual cues, 18-month-olds can interpret different actions as having the same goal (Meltzoff, 1995), and can interpret similar actions as having different goals (Carpenter, Akhtar, & Tomasello, 1998). Carpenter, Call, & Tomasello (2005) found 18-month-olds imitated the same action differentially, depending on the context. When infants observed an experimenter hop or slide a toy mouse into one of two houses, they subsequently put the mouse directly into the house, ignoring the means (or action). When they observed the same action take place on a mat with no houses present, they were more likely to reenact the observed action. The authors concluded in the former condition, the house was viewed as the experimenter's goal, whereas in the latter condition, the manner itself was interpreted as the goal.

Cannon, Woodward, & Durham (2007) replicated and extended this finding using a similar mouse, in a one-house paradigm. Infants were presented trials to the house and to the empty location when there was always a house available. The question was, would infants, given a more interesting context, still imitate manner on empty location trials? Or, would 18-months ignore the manner and put the mouse in the house because it is an inherently interesting act? Despite the presence of a house, infants imitated manner goals when the action was demonstrated to an empty location.

Recent work suggests goal imitation is influenced by the animate features of the object manipulated (Cicchino & Rakison, 2007). This is a striking finding since the infants are supposedly imitating the goals of the person manipulating the object, not necessarily the object's goals. Even infants as young as 7-months selectively imitate human agents, but not inanimates (Mahajan, Woodward, & Ridgeway, 2008). The current study uses the Cannon et al. (2007) paradigm to test whether 18-month-olds imitate manner goals when the manipulated object is 'inanimate' in appearance, but clearly manipulated by a human agent.

## Research Question

Will infants copy action (manner) 'goals' when the manipulated object has no animate features?

## Method

### Participants

18-month olds ( $M = 17;23, 17;2-18;29$ ),  $N = 24$  in each study

### Design

Variables of interest tested within-subjects

- 1) Endpoint Location Demonstrated: **To House, or To Empty Location**
- 2) Manner Demonstrated: **Slide or Hop**

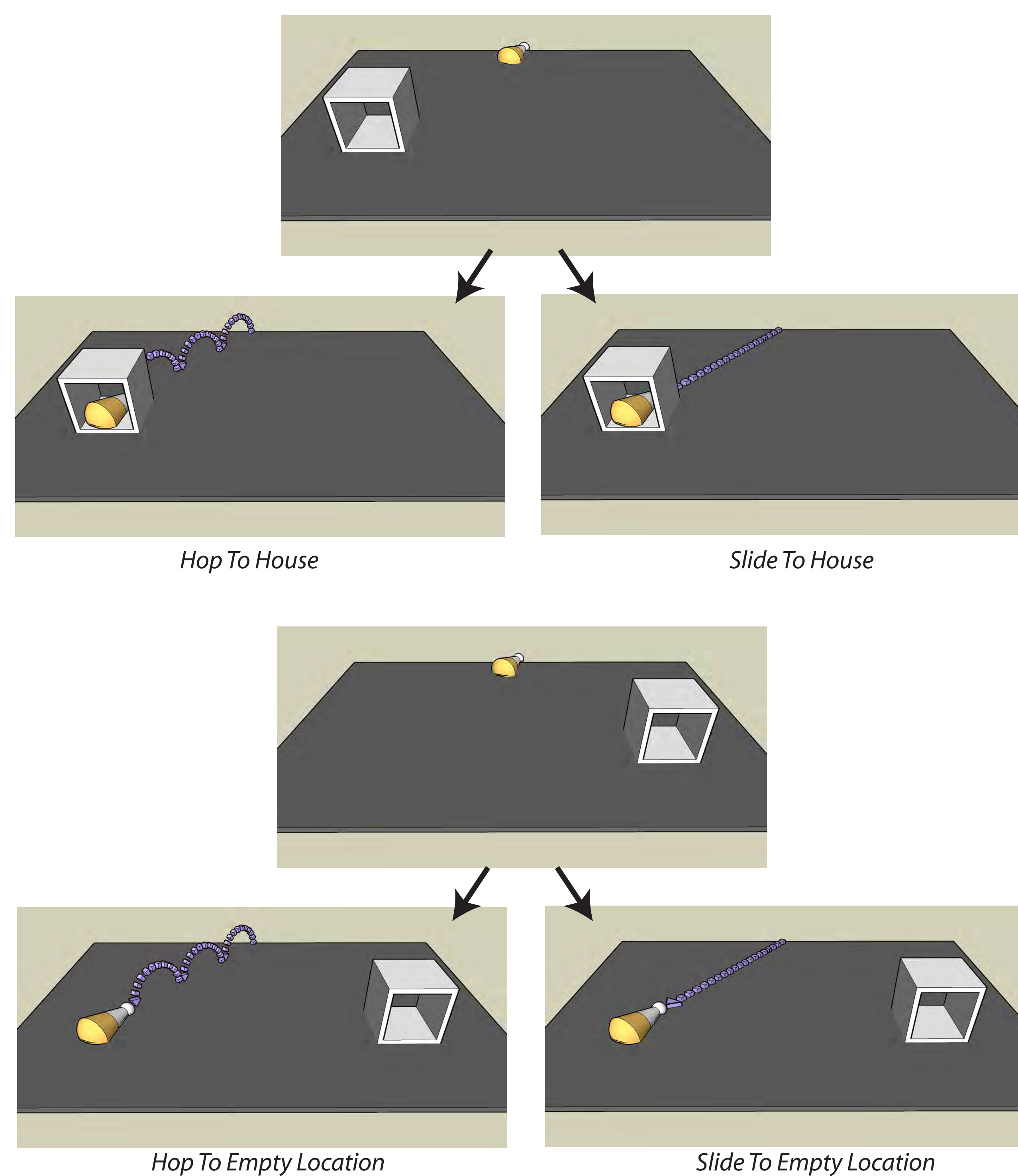
### Procedure

- 8 trials, blocked:  
4 **to house** -> 4 **to empty location** (or vice versa)
- Manner (**hop/slide**) and Direction (left/right) pairings were randomized within each block.

### Predictions

- If the ability to copy manner goals is robust, then:
- (1) Greater % Manner Matches on **to empty location** trials than **to house** trials.
  - (2) Greater % End Location Matches on **to house** trials than **to empty location** trials.

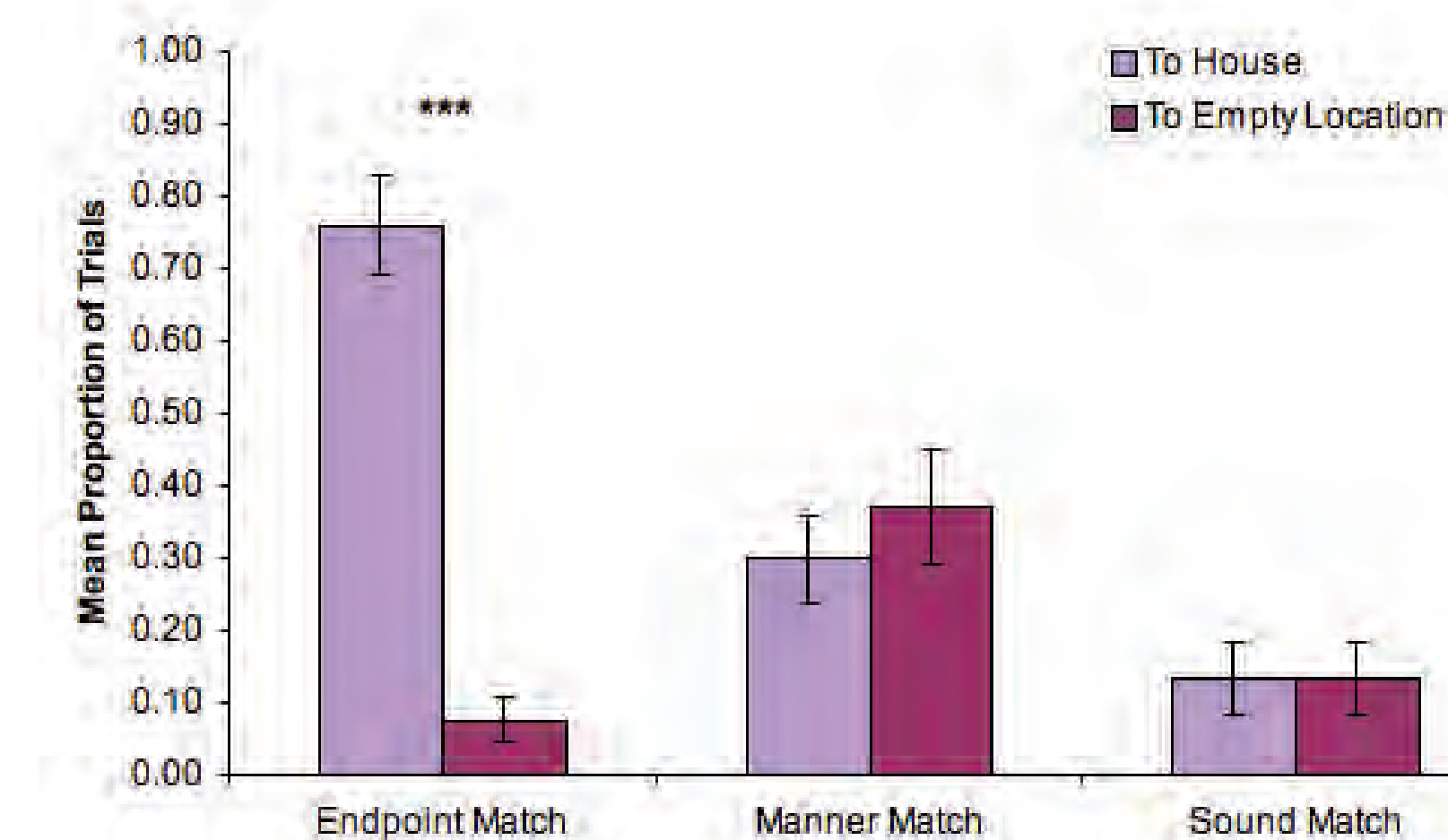
All trial types demonstrated by experimenter:



## Results



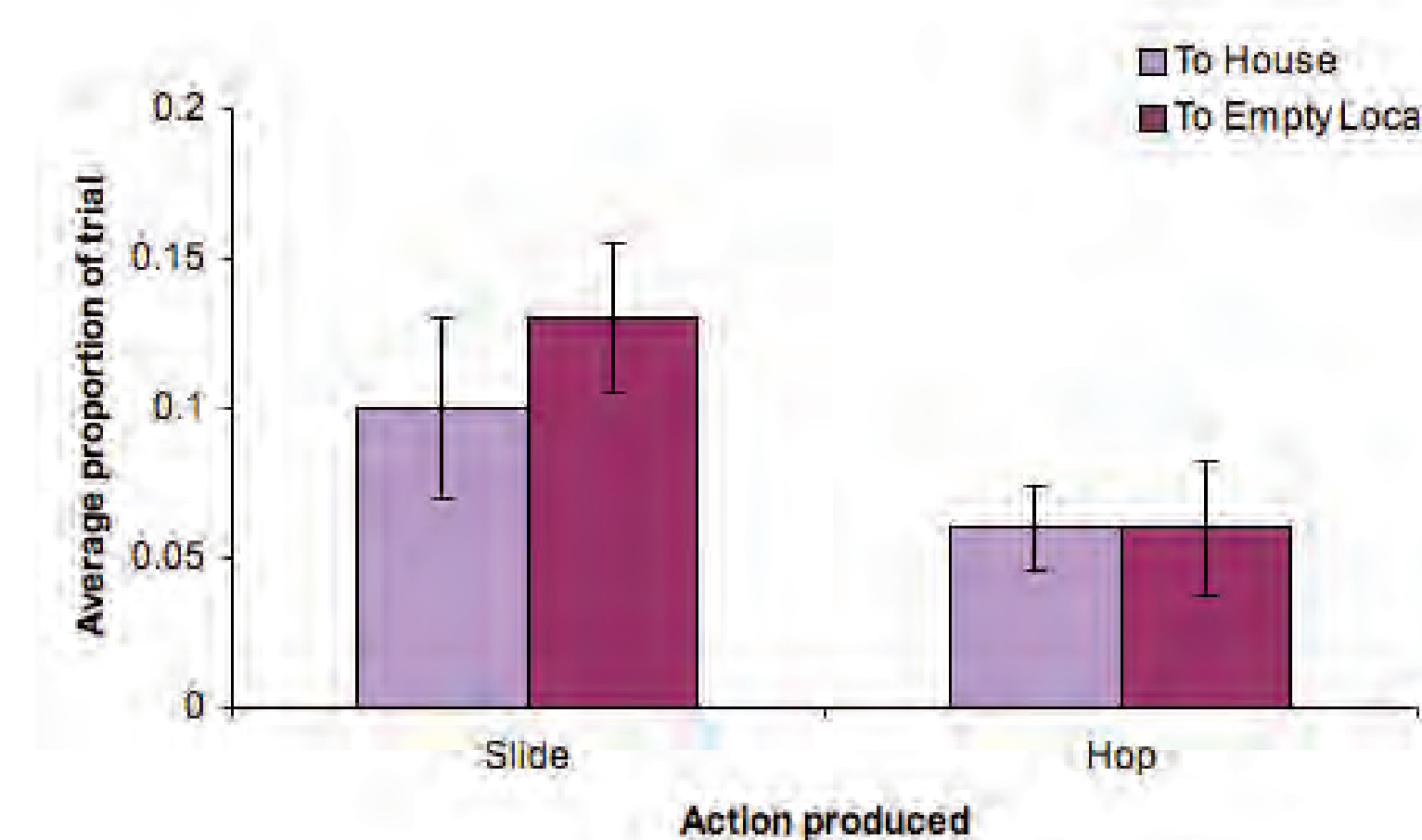
Proportion of trials infants matched demonstration.



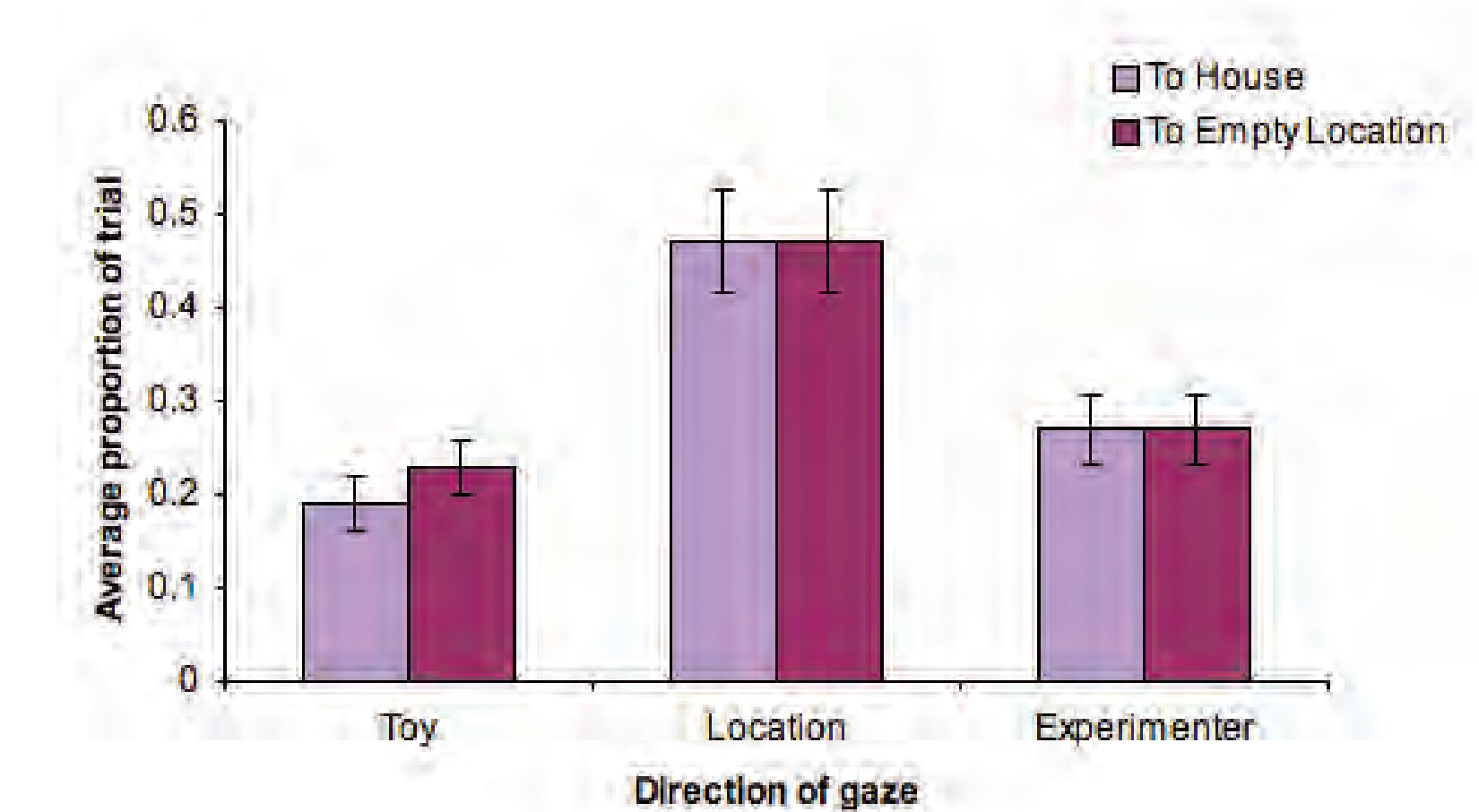
\*\*\*  $p < .001$



Proportion of response time spent producing a target action.



Allocation of attention during response.



## Discussion

In the present study, we asked whether the lack of animate features on the object manipulated would influence imitation at 18 months. Our results indicate that the ambiguity of features did not influence imitation to the end location, the house. On trials in which infants watched the demonstrator move the object to the house, infants robustly imitated the end location (house). However, on trials in which the experimenter moved the object to the empty location, infants were not more likely to imitate the manner goal. Post-hoc coding of the infants' action preferences and allocation of attention indicate no differences between the two trial types. This is in contrast to previous findings with the mouse showing distinct attentional differences as a function of trial type (Durham et al., 2008).

We believe these findings raise two interesting possibilities. First, infants' imitation is informed by the animacy of the moving object (mouse vs. inanimate), and for animates, they are more likely to consider manner of movement as a goal. Or, infants' imitation is informed by knowledge about how people typically act on animate versus inanimate toys. For animate-looking toys, people may be likely to manipulate manner. Moreover, the animate features may draw more attention to the object, and perhaps cue memory for the manner goal. Future research will investigate the role of the object, and the agent manipulating the object, to explore these issues.

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