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Children's Understanding of Robots: A New Ontological Category or Just Pretend?

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Children's Understanding of Robots: A New Ontological Category or Just Pretend?

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Introduction

Children attribute a unique constellation of animate and inanimate characteristics to personified robots [1-5], e.g. judging them to:
- Have emotions
- Have thoughts
- Be capable of being a friend
- While also being a piece of technology.

Do children truly believe robots have animate characteristics or are they just engaging in pretend play? The latter is certainly plausible as children readily endow objects with personas [5].

The present study sought to address this question by investigating children's judgments and behavioral interactions with a **robot** compared to a **stuffed animal** (a classic object of pretense).

Method

Participants (*N*=90)
- 5 years (*N*=30, *M*=5.5 *SD*=.28; 50% girls)
- 7 years (*N*=30, *M*=7.4 *SD*=.32; 50% girls)
- 9 years (*N*=30, *M*=9.4 *SD*=.24; 50% girls)

(A)   (B)

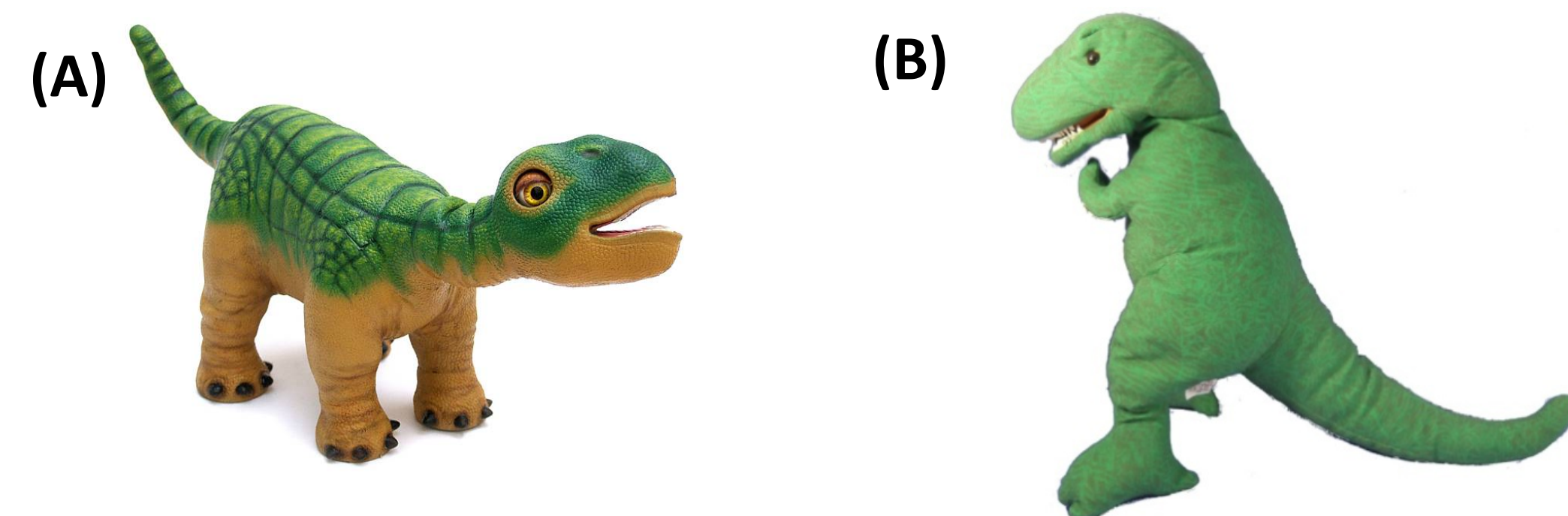**Figure 1.** *Robot (A) and Puppet (B).*

Procedure
Participants were presented with an autonomous robot ("Pleo"; www.pleoworld.com) and a stuffed animal puppet ("Kasey") in a counterbalanced order (Figure 1). The procedure included, in order:
- **Familiarization Period.** Five introductory activities with the entity (e.g., feeding with a leaf, petting, playing tug-o-war).
- **Free Play.** Participants played on their own with the entity for up to 5 minutes.
- **Attribution Interview.** Assessed participant's attributions to the entity (17 randomly-ordered questions).
The procedure was then repeated for the other entity.

Measures
- **Attributions.** We coded children's judgments during the interview.
- **Behavioral Interactions.** We coded children's behavioral interactions with the entity (e.g., endowing animation, attempts at reciprocity, engagement).
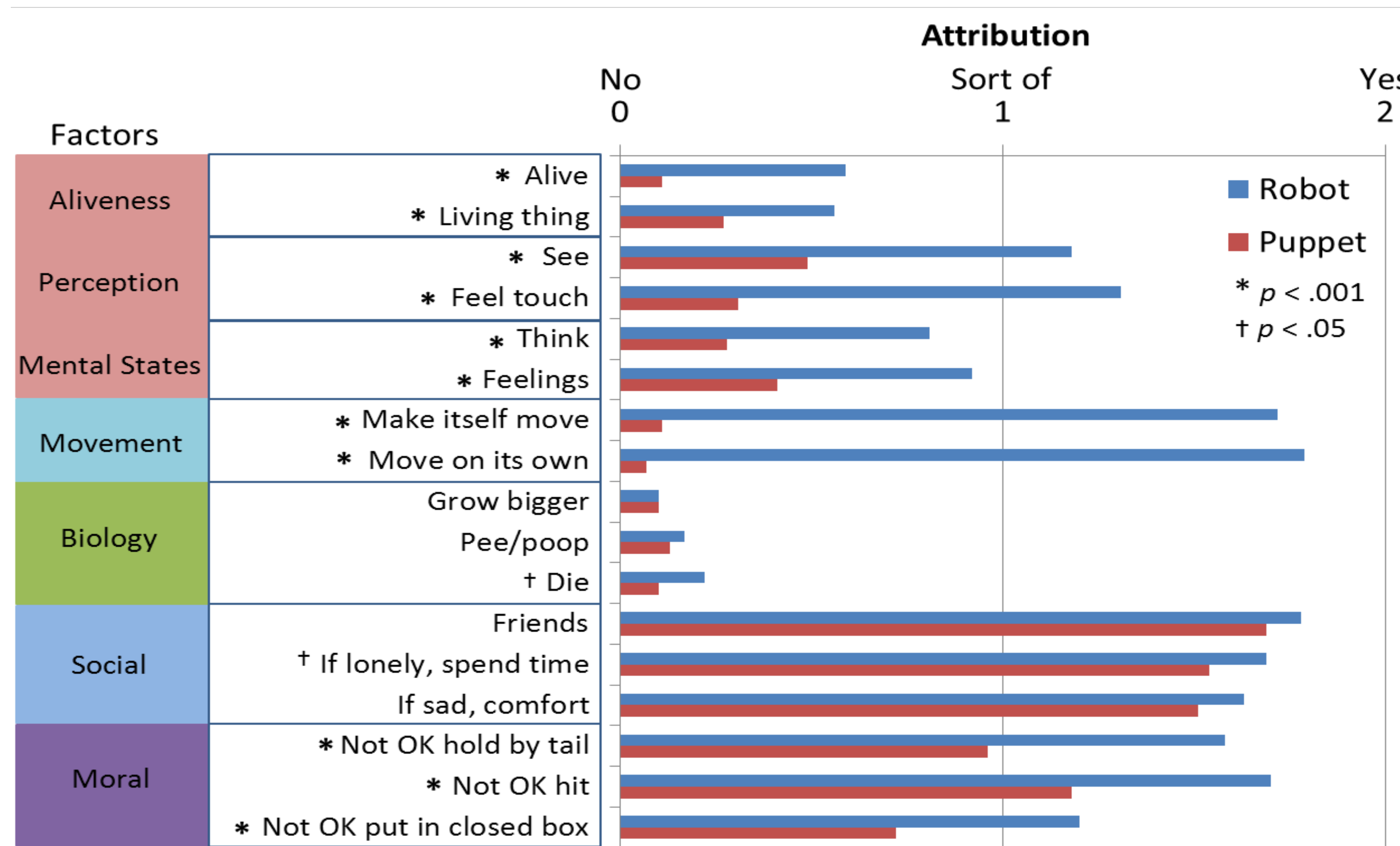
Results

Figure 2. *Mean Attributions of Characteristics to Robot & Puppet.*

Key Attribution Findings (Figure 2):

- Children attribute **higher levels of aliveness, perceptual capabilities, and mental states** to the robot compared to the puppet.

- Children **do not attribute biological characteristics** to the robot or puppet.

- Children attribute **high levels of social standing** to both the robot and puppet.

- Children attribute **more moral standing to the robot**, but still fairly highly levels of moral standing to the puppet.

- **Question:** When children make attributions of animate characteristics are they simply pretending?
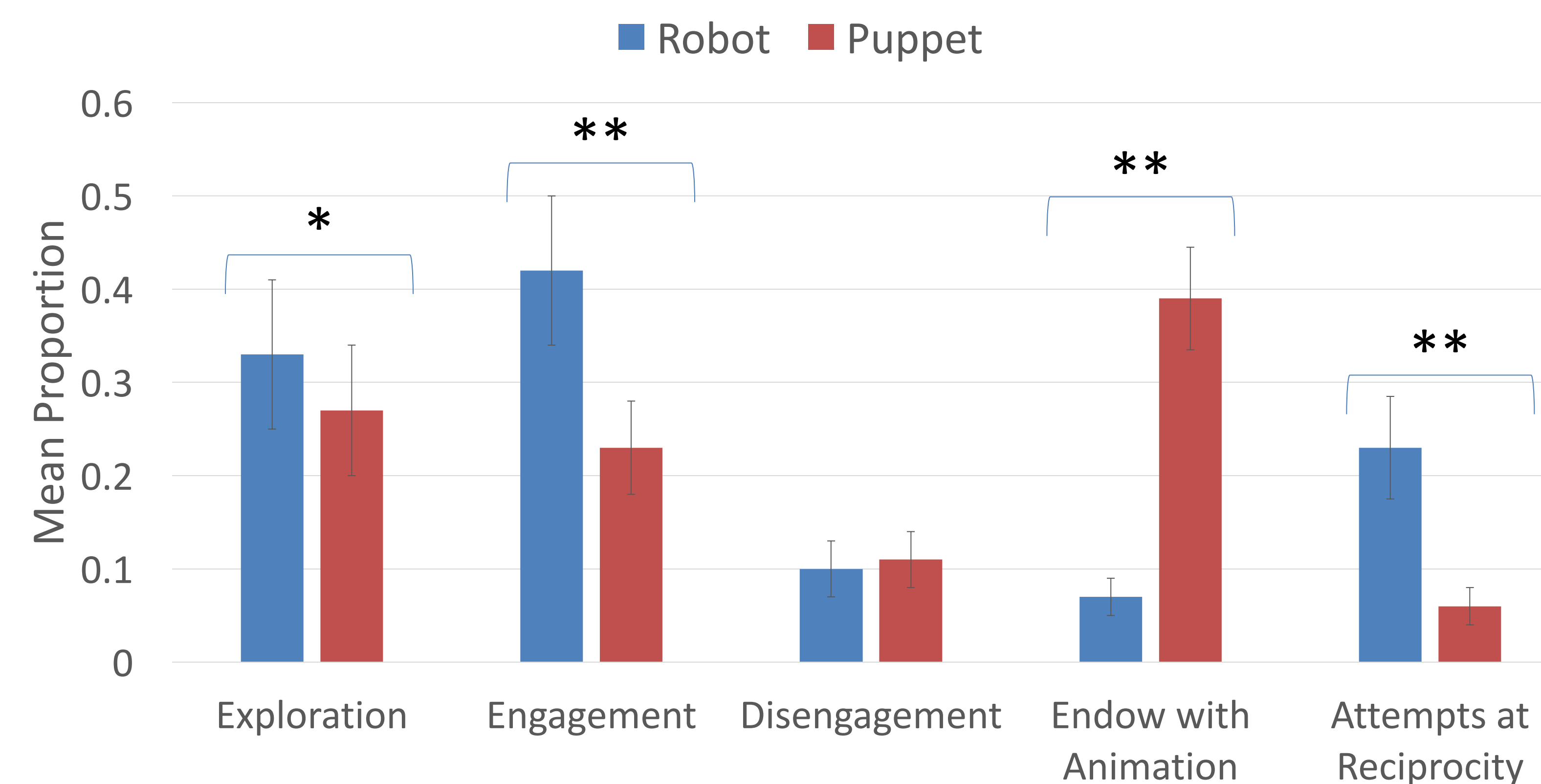

Figure 3. *Mean Proportion of Behavioral Interactions with Robot & Puppet.*
* p=.003, ** *p*<.001 (paired samples *t*-test)

Key Behavioral Interaction Findings (Figure 3):

- **Puppet:** As expected, on average children spent the **largest proportion of their time (39%) engaging in pretend play** (Endow with Animation).

- **Robot:** By contrast, children spent an average of 7% of their time engaged in pretense with the robot. Instead, **children engaged in reciprocal interactions with the robot** (23% of time).

- These results suggest that children were not simply pretending with the robot, but rather were treating it as an autonomous agent.

Conclusion and Implications

Taken together the results of this study suggest:
- Children's attributions and behavioral interactions with the robot indicate that robots represent a new ontological category (i.e., straddling the boundary between animates and inanimates).
- On the other hand, children's attributions and behavioral interactions with the puppet suggest they are engaging in pretense.

These results inform on the potential implications of increasingly pervasive personified technologies:
- Robots are not ideal candidates for pretense [5], and may decrease opportunities for pretend play.
- Children who come of age with personified robots may understand them as a unique category of being that has not previously existed.

References

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