



# Whom will Granny thank? Thinking about what could have been informs children's inferences about relative helpfulness

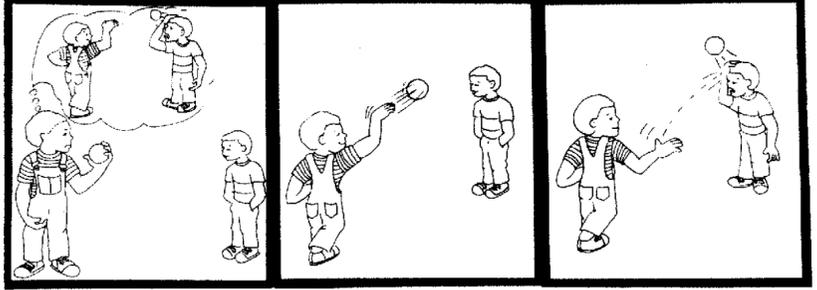
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## Background

### Social evaluation of others' actions

involves reasoning about...

**intention** and **outcome**<sup>1-3</sup>



But also... **prevented outcomes**  
what could have been if agent hadn't acted  
(counterfactual outcomes)

### Research Question

**Can young children reason about prevented outcomes to determine relative helpfulness of others' actions?**

- 3- to 7-year-olds reason about future hypothetical outcomes to determine how to help<sup>4,5</sup>
- Evidence for counterfactual reasoning is mixed<sup>7,8</sup>

### Motivation

**Potential window into early counterfactual reasoning.**

- Simple question with low linguistic demand
- Solving the problem requires counterfactual thought but we do not directly ask a counterfactual question

## Methods

3-, 4-, & 5-year-olds  
Within-subjects  
Order Counterbalanced

### Apples Condition

Oh no!  
The apples are rolling off the table!



Susie and Annie catch the apples!

What happens next?

Does Granny thank Susie?

OR

Does Granny thank Annie?



### Cans Condition

Identical to Apples condition but with empty, crushed cans

Oh no!  
The cans are rolling off the table!



Susie and Annie catch the cans!

### Predictions

**Apples:** Granny thanks Susie (saved apple from trash)  
**Cans:** Granny thanks Annie (saved can from fruit basket)

### Experiment 1

Evaluating helpfulness of actions

N = 42; M(SD) = 58(7) months



Physics training trial (balls roll off table & fall into trash and basket)

### Experiment 2 OSF

Preregistered (Ongoing) Replication

Current n = 42; M(SD) = 52(7) months

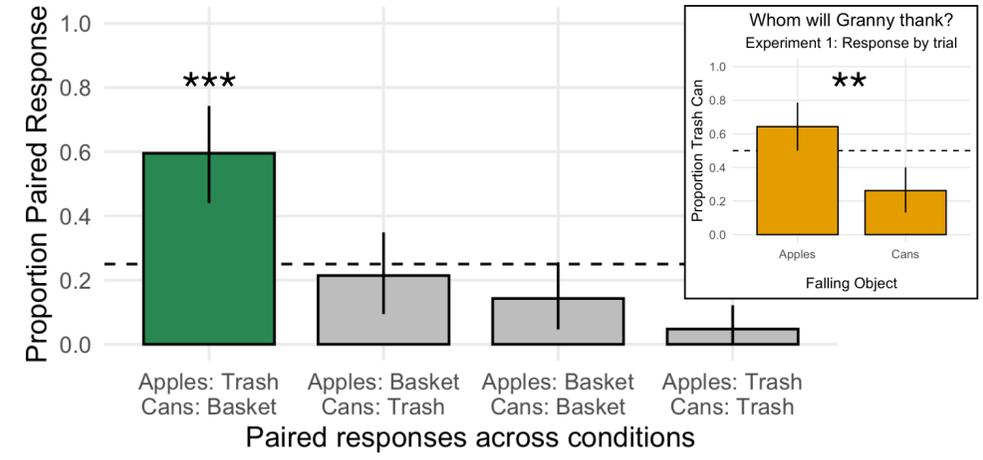
(Planned N = 96)

Physics training trial from Exp. 1 + Training trials to practice pointing at scene that comes next in the story.

## Results

Whom will Granny thank?  
Experiment 1: Paired Responses

Error bars:  
95% bootstrapped CI's  
\*\*  $p < .001$   
\*\*\*  $p < .0001$



- Experiment 1:** 60% predict Granny will thank agent who prevented worse outcome in both conditions ( $p < .0001$ )
- More likely to thank Susie in Apples than Cans ( $p < .001$ )
  - Apples: 64% predict Susie ( $p = .034$ )
  - Cans: 74% predict Annie ( $p = .002$ )

- Experiment 2:** 43% correct in both conditions ( $p = .011$ )
- Apples: 60% predict Susie
  - Cans: 52% predict Annie

## Discussion

- 3- to 5-year-olds evaluate relative helpfulness of two actions based on severity of *prevented* outcomes
- Evidence for early counterfactual reasoning using a simple question (low linguistic demand)

## Future Directions



- More intuitive physical scenarios
  - ▶ Minimize need for training
  - ▶ Reasoning about unexpected outcomes requires counterfactual thinking
- Increased severity of worse prevented outcome

References: 1. Nelson (1980). *Child Dev.* 2. Baird & Moses (2004). *New Dir Child Adolesc Dev.* 3. Cushman, Shekettov, Wharton, & Carey (2013). *Cognition.* 4. Martin & Olson (2013). *Dev Psych.* 5. Bridgers, Jara-Ettinger, & Gweon (2020). *Nat Hum Behav.* 6. Beck, Robinson, Carroll, & Apperly (2006). *Child Dev.* 7. Nyhout & Ganea (2019). *Cognition.* 8. Kominsky et al. (2019). *CogSci Proc.*