## Children use an agent's goals to determine event culmination

Some theorists argue that the perfective aspect in English semantically indicates event culmination ("She peeled the orange" = the orange is completely peeled).[1,2] One problem with this approach is that both adults and children often accept perfective descriptions for incomplete events.[3-5] Other theorists suggest that pragmatic considerations contribute to culmination.[4-6] Indeed, recent research suggests that, in adults, pragmatic context, specifically knowledge of an agent's goals, influences event culmination judgments beyond considerations of whether the event has reached its natural endpoint.[7] Here, we ask whether children's understanding of event culmination also integrates linguistic and contextual-pragmatic cues, specifically intentionality.

**Exp. 1.** 42 English-speaking adults and 39 4–5-year-old children viewed an image of an object (e.g., a partly peeled orange) before answering a Yes/No question with telic-perfective predicates (e.g., "Did she peel the orange?"). Target images (n=15) were normed to represent an object in a state of partial change that corresponded to an incomplete event (mean action completion, M=25.64%). Each target image was preceded by one of three goal contexts: High Goal (requiring full event culmination), Low Goal (satisfied without culmination), or Neutral Goal (matching the test question; Fig. 1A). We predicted that Yes responses for target items should be low (these were partly complete; see norming) unless context introduced a Low Goal that could be easily satisfied. (We also included clearly complete or incomplete fillers without biasing contexts.) For target items, a multilevel mixed effects logistic regression using a fixed effect of Context confirmed that, in adults, Low Goal contexts elicited Yes responses more often than Neutral Goal contexts but Neutral Goal and High Goal contexts did not differ (Fig. 2, Table 1). However, in children, there was no effect of Context.

**Exp. 2.** Children's failure to use goal information in Exp. 1 could be due to the inability to integrate context with an event inferred from a still image. In Exp. 2, 40 English-speaking adults and 40 4–5-year-olds viewed 8 short target videos in which two girls interacted in everyday scenes (and 4 filler videos). The target videos were preceded by information about one girl's goal, half with a Low Goal (e.g., "One girl needs to set her small book on the table") and half with a High Goal ("One girl needs to set her large box on the table"; distributed across participants). Then people watched the video (see Fig. 1B), where the second girl performed an action (e.g., cleaned a small part of the table). After the video, participants were asked a Yes/No question (e.g., "Did the other girl clean the table for her?"). A multilevel mixed effects logistic regression showed that Low Goal contexts elicited Yes responses more often than High Goal contexts in both adults and children (Fig. 2, Table 2).

We conclude that both children and adults are sensitive to goal information when interpreting perfectives. Both the video presentation and inclusion of beneficiary ("for her")[8] in the test question in Exp.2 might have influenced children's interpretation of the event by shifting their focus from the physical completion of the event to the fulfillment of a social goal. Nevertheless, the differences between Exp. 1 and Exp. 2 suggest that children are still developing the ability to fully integrate goal information with event completion judgments, highlighting a developmental trajectory in using contextual cues to infer event outcomes.

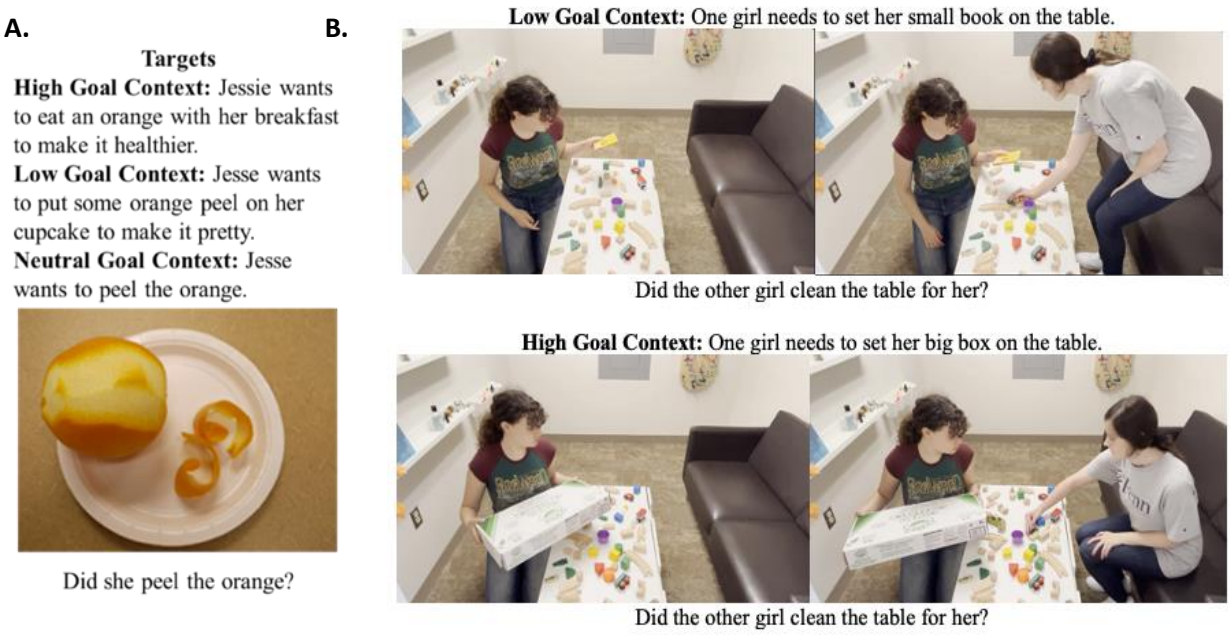


*Figure 1*. **A.** Sample image and contexts for Experiment 1. **B.** Sample clips of videos and contexts for Experiment 2.

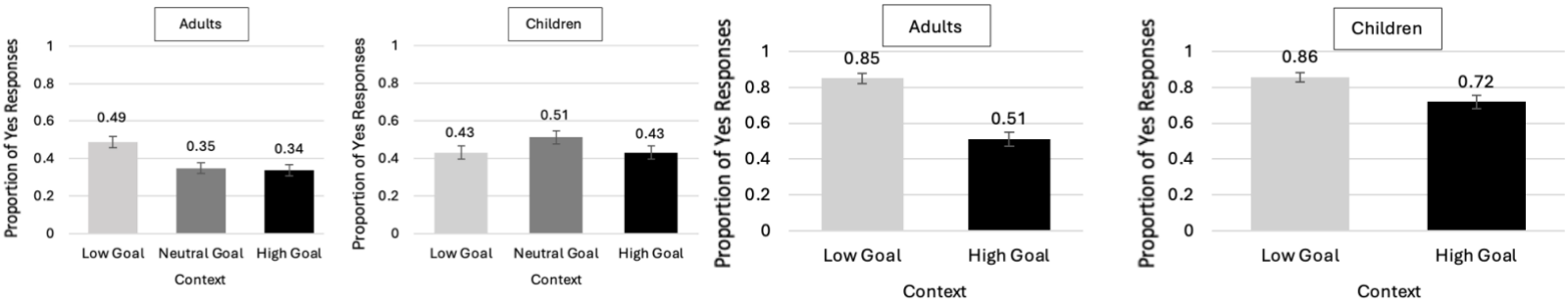


*Figure 2.* Results for target items in Experiment 1 (left) and Experiment 2 (right).

Table 1. *Odds ratios for Experiment 1 (Adults and Children). * p < .05, ** p < .01, *** p < .001*

| | Effect | Odds Ratio | SE | z value |
|---|---|---|---|---|
| Adults | (Intercept) | 0.39 | 0.18 | -2.01* |
| | Low Goal | 2.46 | 0.65 | 3.43** |
| | Neutral Goal | 1.00 | | |
| | High Goal | 0.78 | 0.21 | -0.95 |
| Children | (Intercept) | 1.04 | 0.38 | 0.10 |
| | Low Goal | 0.65 | 0.15 | -1.83 |
| | Neutral Goal | 1.00 | | |
| | High Goal | 0.63 | 0.15 | -1.96 |

Table 2. *Odds ratios for Experiment 2 (Adults and Children). * p < .05, ** p < .01, *** p < .001*

| | Effect | Odds Ratio | SE | z value |
|---|---|---|---|---|
| Adults | (Intercept) | 7.44 | 1.88 | 3.95*** |
| | Low Goal | 1.00 | | |
| | High Goal | 0.15 | 0.05 | -2.79** |
| Children | (Intercept) | 14.0 | 2.93 | 4.77*** |
| | Low Goal | 1.00 | | |
| | High Goal | 0.30 | 0.15 | -1.99* |

**References:** [1]Singh (1998). *Natural Language Semantics*, 6(2). [2]Zucchi (1999). *Natural Language Semantics*, 7. [3]Wagner (2010). *WIRES: Cognitive Science*, 1(4). [4]Van Hout (2018). *Handbook of Developmental Linguistics*. [5]Arunachalam & Kothari (2011). *Journal of South Asian Linguistics,* 4(1). [6]Filip (2017). *Italian Journal of Linguistics,* 29(1). [7]Mathis & Papafragou (2022). *Journal of Memory and Language*, 127. [8]Zhang et al. (2023). *JECP*, 228.