Agents' goals affect placement of event endpoints

Theories of event cognition have hypothesized that the boundaries of events are determined both by perceptual features (e.g., an object's change of state) and by higher-level features (e.g., an agent's goals),[1] but there has been little experimental evidence for the role of higher-order goal information on the placement of event boundaries. Within semantic theory, event boundaries have been discussed in terms of the interpretation of perfective aspect[2,3,4]. For English, some theorists argue that the perfective semantically indicates event culmination ("She peeled the orange" means that the orange is completely peeled)[5]. Others, however, propose that extralinguistic information (including goals) can determine culmination readings, especially when visual input is ambiguous[6]. Here we connect these strands of literature by asking whether knowledge of an agent's goals can affect how viewers determine event endpoints (i.e., event culmination) *from the same visual input*. We test this by asking whether answers to the same perfective question about an event ("Did she peel the orange?") given the same visual input (an incompletely peeled orange) shift depending on prior linguistic context stating the agent's goals.

Exp. 1 (Partly complete event outcomes). Forty-three native English speakers read a context sentence about an agent's goals (Fig.1) and then saw a visual stimulus (e.g., a partly peeled orange). After 500ms a question in perfective aspect appeared underneath ("Did she peel the orange?"). Participants gave a Yes/No answer by button press. Visual stimuli were normed for "percentage of the event that was completed" when presented alone: target items (n=18) were partly complete (M=27.02%) and filler items (n=18) were either complete (M=92.78%) or incomplete (M=7.91%). Each of the target images was paired with one of three context sentences: these introduced a superordinate goal that placed a high standard on whether the event in the question needed to have culminated (i.e., the orange needed to be fully peeled; High Goal); a superordinate goal that could be fulfilled even without culmination of the specific event in the question (Low Goal); or a goal that was identical to the test question (Neutral Goal).Target items were split into three lists by context type, with each participant receiving 6 Low Goal, 6 High Goal, and 6 Neutral Goal target trials. We predicted that Yes responses for target items should be low (since visually these items were incomplete) unless context introduced a goal that could be easily satisfied (Low Goal). Indeed, for target items, a logit model using a fixed effect of Context (implemented as two separate contrasts) revealed that Low Goal contexts elicited Yes responses more often than Neutral Goal contexts but Neutral Goal and High Goal contexts did not differ; Table 1 and Fig.1). The fillers had no Context manipulation (Fig. 1); unsurprisingly, Yes responses for them reflected visual degree of completion (M=0.05 for complete and M=0.85 for incomplete).

Exp. 2 (Mostly complete event outcomes). Does the effect of goals persist at a later point along the event timeline? Exp.2 used the same materials and procedure as Exp.1 with 40 new native English speakers except that (a) target images were replaced by images from the same 18 events but taken later in the event timeline ("percentage complete" in the norming study, M = 69.84%), (b) new High Goal contexts placed very strict demands on the culmination of the event in the test question (Fig.1). We predicted that participants should give overall Yes responses for target items on the basis of visual evidence unless full culmination was necessary for the agent's goals (High Goal). Indeed, for target items, a logit model similar to Exp.1 revealed a significant effect of Context: participants responded Yes more often when the context imposed no additional standard (Neutral Goal) than when the context imposed a strict standard for culmination (High Goal). The contrast for Neutral Goal vs Low Goal contexts was not significant (Table 2 and Fig.2). Filler items yielded similar results to Exp.1.

Our results offer the first direct evidence in support of the conclusion that higher-order goal information (in addition to perceptual evidence) affects the way events are conceptualized. Furthermore, they support linguistic theories of aspect that recognize the role of contextual factors in deriving event culmination interpretations of perfectives.
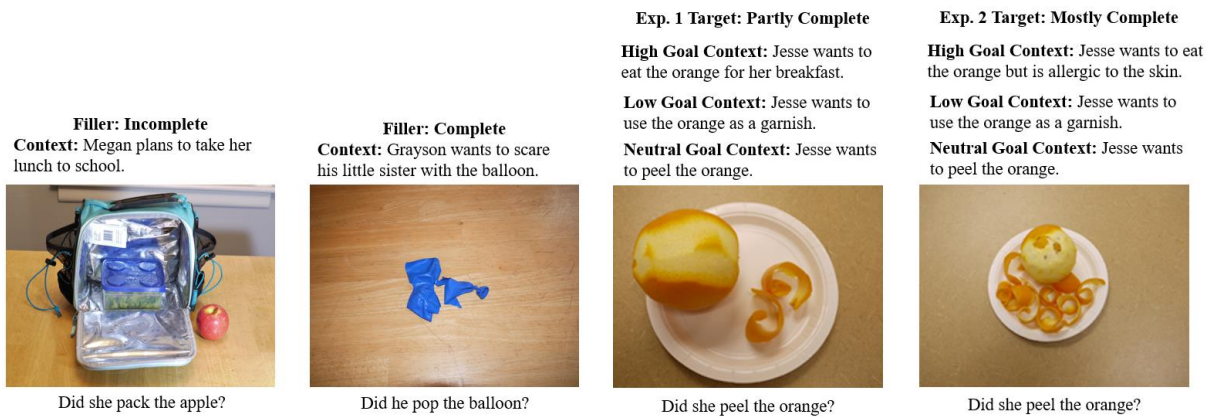
Filler: Incomplete
Context: Megan plans to take her lunch to school.

Did she pack the apple?

Filler: Complete
Context: Grayson wants to scare his little sister with the balloon.

Did he pop the balloon?

Exp. 1 Target: Partly Complete
High Goal Context: Jesse wants to eat the orange for her breakfast.
Low Goal Context: Jesse wants to use the orange as a garnish.
Neutral Goal Context: Jesse wants to peel the orange.

Did she peel the orange?

Exp. 2 Target: Mostly Complete
High Goal Context: Jesse wants to eat the orange but is allergic to the skin.
Low Goal Context: Jesse wants to use the orange as a garnish.
Neutral Goal Context: Jesse wants to peel the orange.

Did she peel the orange?

Figure 1. Example images and Context sentences for Experiments 1 and 2. Filler items were identical in the two experiments.
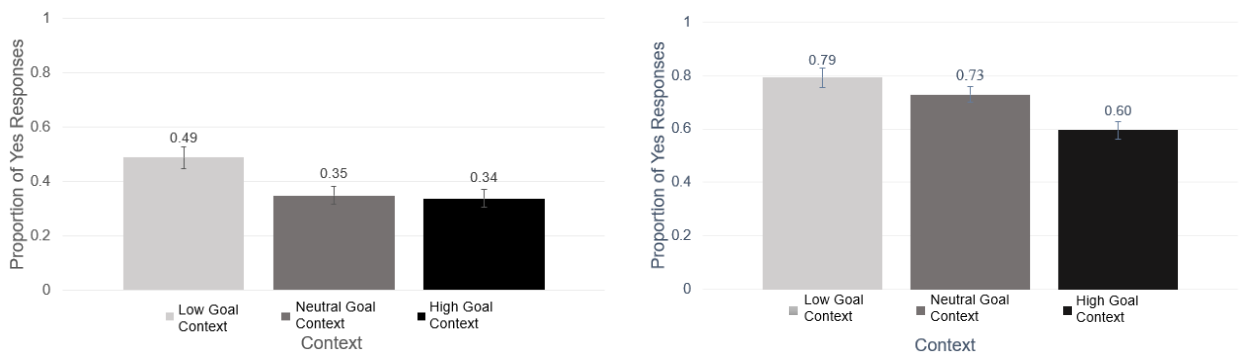

Figure 2. Proportion of Yes responses by Context for target items in Experiment 1 (left) and Experiment 2 (right).

Table 1. *Fixed effect estimates for Experiment 1. * $p < .05$, ** $p < .01$, *** $p < .001$*

Effect	Estimate	SE	z value
(Intercept)	-0.63	0.34	-1.85
Context (Neutral Goal vs. Low Goal)	0.86	0.22	3.93***
Context (Neutral Goal vs. High Goal)	-0.05	0.22	-0.21

Table 2. *Fixed effect estimates for Experiment 2. * $p < .05$, ** $p < .01$, *** $p < .001$*

Effect	Estimate	SE	z value
(Intercept)	1.32	0.37	3.61***
Context (Neutral Goal vs. Low Goal)	0.45	0.25	1.79
Context (Neutral Goal vs. High Goal)	-0.88	0.24	-3.72***

References: [1] Zacks et al. (2007). *Psychological Bulletin,* 133(2). [2]Arunachalam & Kothari (2011). *Journal of South Asian Linguistics,* 4(1). [3]Koenig & Muansuwan (2000). *Journal of Semantics,* 17(2).[4]Singh (1991). *Annual Meeting of the Berkeley Linguistic Society,* 17(1).[5]Zucchi (1999). *Natural Language Semantics, 7.* [6]Filip (2017). *Italian Journal of Linguistics, 29*(1).