The effect of eventive verbs on children's online argument representation

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Spoken language comprehension is an active process causing our mental representations of scenarios or events to be continuously updated as sentences unfold. For instance, upon hearing "The boy will eat", children and adults alike orient towards an image of something edible (Borovsky & Creel, 2014; Mani & Huettig, 2012; Altmann & Kamide, 1999), suggesting that verbs help restrict the possible set of arguments. However, it is currently unclear how detailed these representations are. On the one hand, it is possible that children simply access the semantic prototypes of words. On the other hand, children's argument representations may go beyond a word's linguistic identity and include context-specific properties such that hearing "The man has eaten" causes them to expect a partially eaten (rather than intact) food item (similar to adults, Altmann & Kamide, 2007). To differentiate between these two possibilities, we here use eventive (e.g., "destroy", "spill") and stative verbs (e.g., "love", "own"), which are known to differ both in argument structure complexity (cf. Shapiro et al., 1987) and in the composition of the mental scene (Gennari & Poeppel, 2003). Should children have different argument representations for the two verb types, this would indicate that their online linguistic processing would be relatively fine-grained.

To address this question, we tested native English-speaking 32- to 36-month-olds' (N = 22 out of 32 total) mental representations of eventive verb arguments (with stative verbs being the control condition). Using the Preferential Looking Procedure, children's eye movements were tracked as they were presented with two images side-by-side on a screen. On experimental trials, these images depicted the same entities, but differed in object features (e.g., an intact bottle vs. a broken bottle). Following image onset, sentences were presented containing the entity label (e.g., "Susan dropped the bottle!" on eventive verb trials vs. "Susan noticed the bottle!" on stative verb trials, with the verbs being the only difference between the sentences). To prevent children from working out the goal of the experiment, we included filler trials in which the two images represented different objects.

If the mental representation of verb arguments is modulated by verb type, children should look more toward the images representing the eventive scenarios in eventive verbs trials than in stative verb trials. To this end, a bootstrapped cluster-based permutation analysis (based on Maris & Van Oostenveld, 2007) was employed on the proportion of looks to the eventive image. This revealed a divergence between the two conditions from 1200 to 2000 ms after verb onset (p = .02, see Figure 1), suggesting that children's mental representations of objects in a scenario change upon hearing an eventive verb.

In follow-up work, using exclusively eventive verbs, we plan to employ verb tense (e.g., "Karen has dropped the bottle" vs. "Karen will drop the bottle", c.f. Altmann & Kamide, 2007) to further assess the detail of argument representations. This would rule out any potential effects induced by differences between the eventive and stative verbs. Nonetheless, the current results tentatively show that children under three years of age possess basic verb type knowledge that they rapidly integrate in their argument representation during real-time language processing.
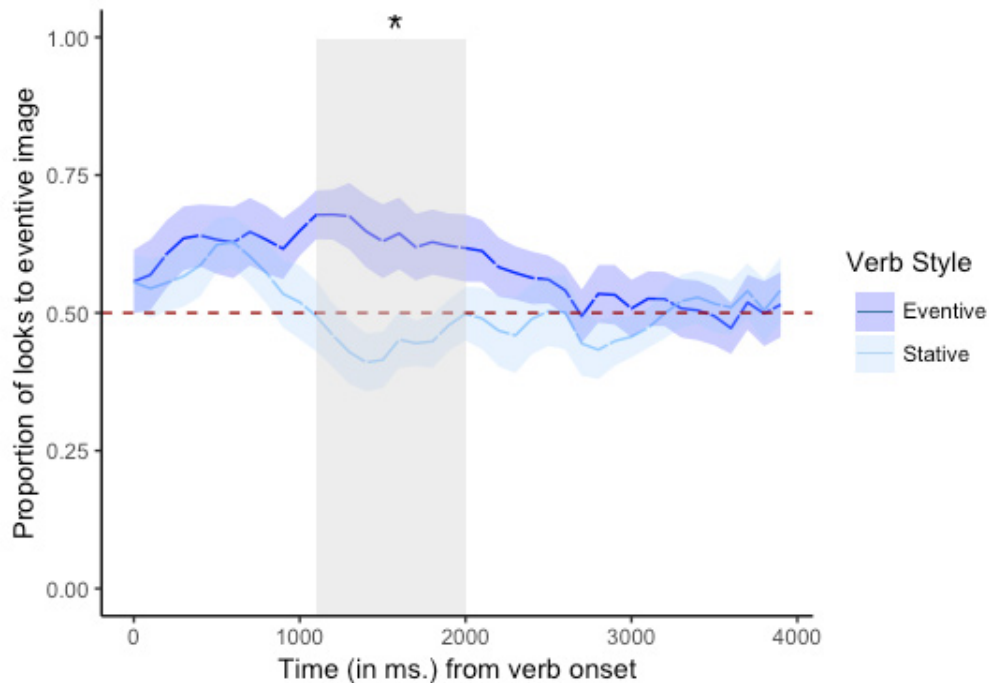
Figure 1. Proportion of looks to the eventive image following verb onset as a function of verb style.

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