Children's sensitivity to abstract event structure

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Humans extract and form representations of events, broadly defined as temporal segments with a beginning and an ending[1]. Bounded events include an inherent endpoint; unbounded events do not[2]. In language, event boundedness is captured by the VP telicity: telic VPs denote bounded events and atelic VPs denote unbounded events. Telicity of the VPs is determined by the type of verb (e.g., *fold a handkerchief* is telic, *wave a handkerchief* atelic) as well as the quantification of the object NP (e.g., *eat a pretzel* is telic but *eat cheerios* atelic)[3,4]. Developmental studies reveal that children attend to action endpoints from infancy[5], and connect linguistic cues such as the appearance of object NPs to bounded events[6,7]. However, little research has explored whether children are sensitive to the abstract property of boundedness in event perception, or how language and cognition connect in representing event boundedness. Here we ask whether 4-to-5-year-old children are aware of the distinction between bounded and unbounded events in a category learning task and investigate how they encode the bounded-unbounded contrast in the telicity of the VPs used in event descriptions.

In Experiment 1a, 40 4-to-5-year-olds (M_{age}=4.8) and 40 adults (M_{age}=19.5) watched 8 pairs of videos of bounded and unbounded events during a learning phase. The contrast in boundedness derived either from the nature of action (Fig.1a) or from quantification of the affected object (Fig.1b). After each pair played, a star appeared under one of the videos (see Figs.1a-1b). Participants were randomly assigned to either the Bounded or the Unbounded condition depending on which event category got a star. At test, participants watched 8 new (unpaired) videos and decided whether the videos could get a star. Both children and adults were better at forming the category of bounded events than that of unbounded events ($F(1,76)=44.438$, $p<.0001$, Fig.2a). To explore whether viewers' conjectures involved boundedness as opposed to completion (i.e., actual achievement of the inherent event endpoint), Experiment 1b showed only the first 25% of each test video such that the events in the bounded version were incomplete. Both children and adults still responded better for bounded than unbounded events ($F(1,76)=40.487$, $p<.0001$, Fig.2b); overall, responses did not differ from Experiment 1a ($F(1,152)=1.029$, $p=.312$). Thus boundedness, not completion, shaped viewers' categories.

In Experiment 2, 20 4-to-5-year-olds (M_{age}=4.7) and 20 adult native speakers of English (M_{age}=19.6) described the 8 pairs of videos from the learning phase of Experiment 1a. Descriptions were coded for verb types and quantification of NPs that defined the telicity of VPs. We measured the proportion of target descriptions (i.e., telic VPs for bounded events and atelic VPs for unbounded events). Both children and adults gave more target descriptions for bounded than for unbounded events ($F(1,38)=17.857$, $p<.0001$).

In sum, in both cognition and language, bounded events are encoded more precisely compared to unbounded events by both children and adults. Our results reveal a parallel between language and cognition in representing abstract event structure. Furthermore, they suggest that unboundedness is asymmetrically dependent on boundedness in both language and thought.

Figures

Figure 1. Examples of paired videos in Experiment 1a. In (1a), the events are 'fold a handkerchief' vs. 'wave a handkerchief'. In (1b), the events are 'eat a pretzel' vs. 'eat cheerios'. Star placement corresponds to the Bounded condition.

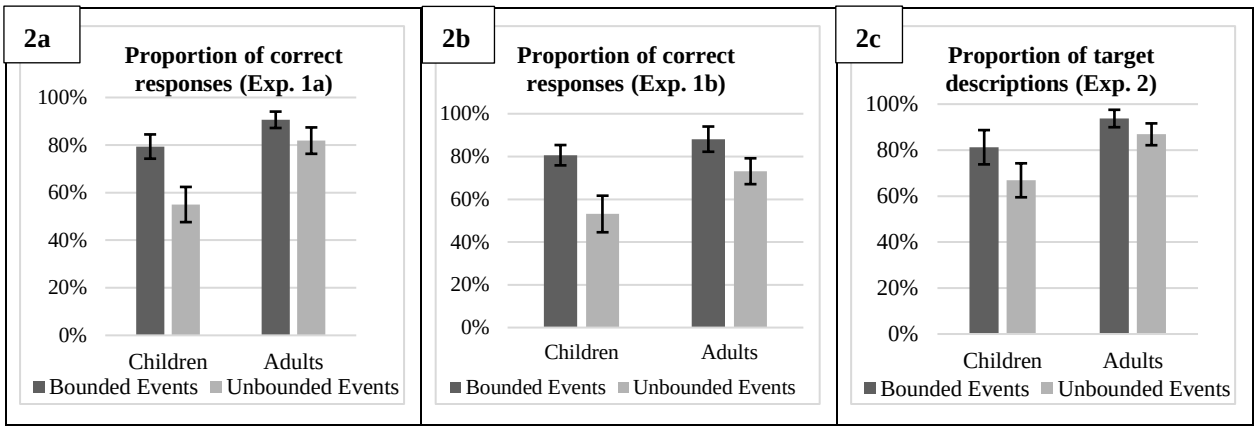

Figure 2. a) Proportion of correct responses in Experiment 1a. b) Proportion of correct responses in Experiment 1b. c) Proportion of target descriptions in Experiment 2. Error bars represent standard error.

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