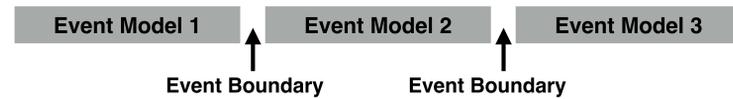# Event Models Structure Information Accessibility Less in Children than Adults

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Introduction

To make sense of ongoing experience, we segment it into meaningful events. This process is referred to as **event segmentation**[1], which continuously *generates* and *updates* **event models**:

Event Model 1	Event Model 2	Event Model 3

Event Boundary   Event Boundary

Event models are cleared at an **event boundary**, rendering information in the previous event less accessible than information in the current[2].

Generating and maintaining event models is thought to rely on *semantic knowledge* and *working memory*, two cognitive domains that are still developing in middle childhood.
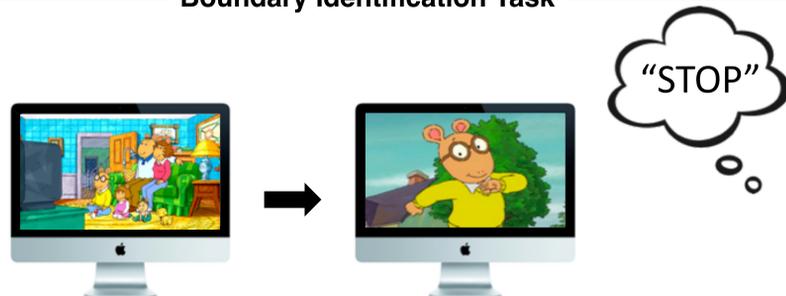
While children do segment events[3], it has never been investigated whether their *information accessibility to past experiences* is affected by event models.

Hypothesis: Event models affect children *less* than adults in their accessibility to information in their past experience.

Pilot: Event Boundary Norming

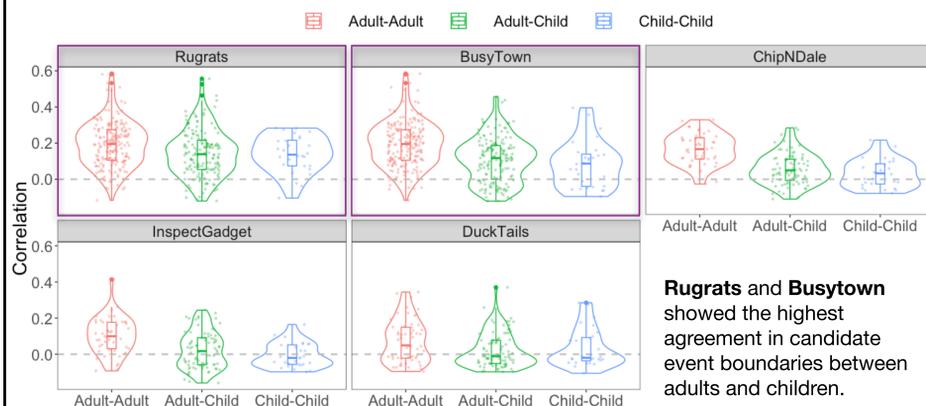**Goal**: To select two cartoons and identify event boundaries in adults and children

Boundary Identification Task

"STOP"

Task: Participants (20 adults & 8 children aged 7-9 years) watched 5 cartoons and indicated when they thought one event ended and a new event began by saying "STOP" and then explaining why they thought so.

Analyses

In each cartoon, we used a uniform moving average to tabulate event-boundary likelihood in each time window. Then, we calculated the **correlation** between each adult's and child's responses.
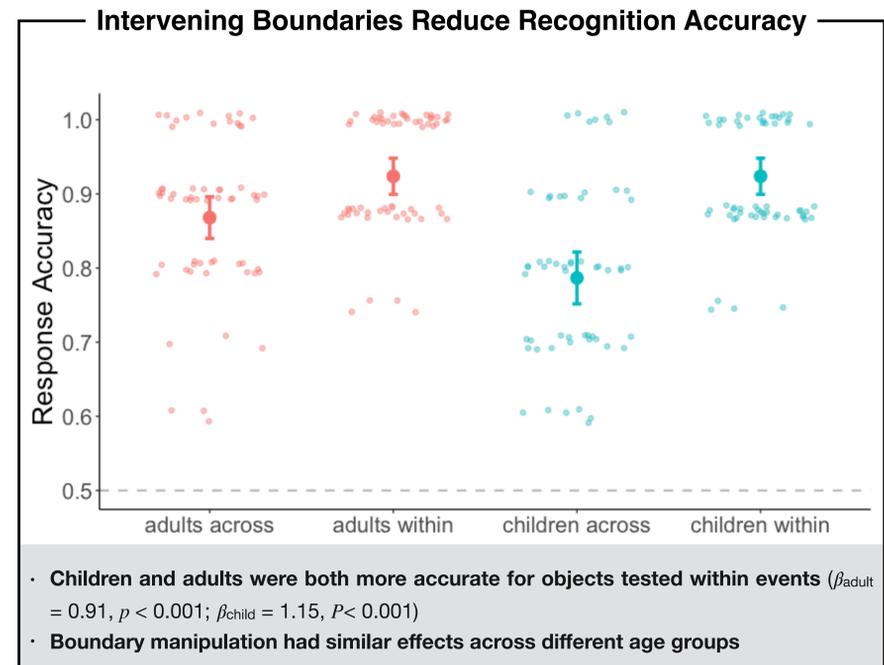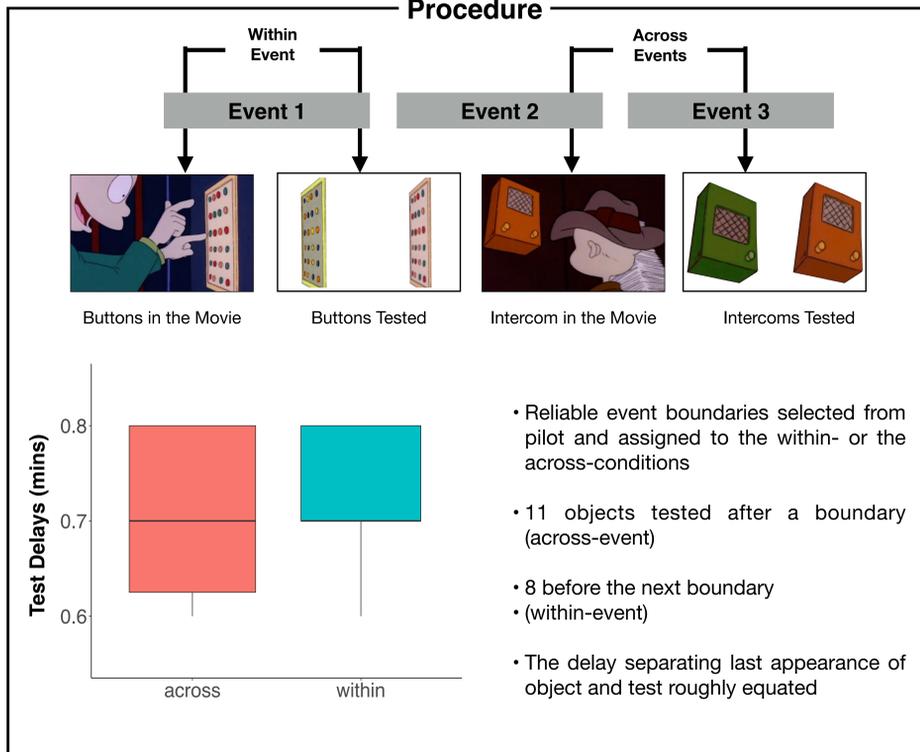

Adult-Adult   Adult-Child   Child-Child

Rugrats and **Busytown** showed the highest agreement in candidate event boundaries between adults and children.

Experiment: Information Accessibility Within vs. Across Event Boundaries

Goal: To determine if event boundaries shape children's accessibility of their past experience in similar ways as they do in adults.

Participants: 60 children (7-9 years) and 60 adults (17-38 years)

Task: Two cartoons (Rugrats & BusyTown) were interrupted by object recognition questions, testing recently seen objects. We used **reaction time** as the primary dependent measure of information accessibility.

Procedure

Within Event   Across Events

| Event 1 | Event 2 | Event 3 |

Buttons in the Movie   Buttons Tested   Intercom in the Movie   Intercoms Tested

- Reliable event boundaries selected from pilot and assigned to the within- or the across-conditions
- 11 objects tested after a boundary (across-event)
- 8 before the next boundary (within-event)
- The delay separating last appearance of object and test roughly equated

Intervening Boundaries Slow Children's Recognition Less

- **Children's and adults' recognition judgements were slower for objects tested after event boundaries** (β_{adult} = -0.19, $p < 0.001$; β_{child} = -0.10, $p < 0.001$)
- **Most importantly, intervening boundaries slowed children's recognition less than adults'** ($\beta_{event*age}$ = 0.07, $p < 0.05$)

Intervening Boundaries Reduce Recognition Accuracy

- **Children and adults were both more accurate for objects tested within events** (β_{adult} = 0.91, $p < 0.001$; β_{child} = 1.15, $P < 0.001$)
- **Boundary manipulation had similar effects across different age groups**

Conclusion

While the spontaneous segmentation of complex events emerges by middle childhood, children's accessibility to information in the past experience is less affected by event models than adults'.

Future Directions

Do children generate event models in different ways than adults?

Do children's cortical regions automatically identify event boundaries in different *time scales* in the brain[4]?

Are children's *long-term* memories of experiences also less structured by event segmentation[5]?

How are event structure representations influenced by semantic knowledge?

References

[1]Zacks J.M., Tversky B., Iyer G. (2001) Perceiving, remembering, and communicating structure in events. *Journal of Experimental Psychology: General* 130:29-58.

[2]Sargent, J. Q., Zacks, J. M., Hambrick, D. Z., Zacks, R. T., Kurby, C. A., Bailey, H. R., ... & Beck, T. M. (2013). Event segmentation ability uniquely predicts event memory. *Cognition*, *129*(2), 241-255.

[3]Zheng, Y., Zacks, J. M., & Markson, L. (2020). The development of event perception and memory. *Cognitive Development*, *54*, 100848.

[4]Baldassano, C., Chen, J., Zadbood, A., Pillow, J. W., Hasson, U., & Norman, K. A. (2017). Discovering event structure in continuous narrative perception and memory. *Neuron*, *95*(3), 709-721.

[5]Ezzyat, Y., & Davachi, L. (2011). What constitutes an episode in episodic memory?. *Psychological Science*, *22*(2), 243-252.

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