From Moments to Memories: Unveiling the Role of Event Boundaries in Narratives

Doruntinë Zogaj, Regine Bader, Axel Mecklinger (Saarland University)
doruntine.zogaj@uni-saarland.de

Our daily lives unfold continuously, yet when we think about the past, we tend to organize our memories into distinct and cohesive events.

An influential framework that provides an explanation of how continuous daily live activity is segmented into meaningful subunits to guide attention and memory is Event Segmentation Theory (EST). According to EST, within a continuous stream of information, people can detect transitions between events, known as event boundaries, which naturally segment the stream into discrete and meaningful events (Kurby, & Zacks, 2008). This segmentation can have wide-ranging cognitive consequences, for instance support for the encoding and retrieval of episodic memories. Research has shown that items that belong to the same events are more likely to be recalled together (Shin and DuBrow, 2021), and that recency judgments are less accurate for items from different events (DuBrow and Davachi, 2013). In addition to the mnemonic effects for items within- and between-events, recent evidence suggests that the points in time constituting event boundaries are particularly well-represented in episodic memory. It is conceivable that increased attention at these points contributes to this memory advantage for event boundaries (Heusser et al., 2018).

In the present study, ERPs were employed to investigate the online processing of event boundaries during spoken language comprehension in narratives. We extended upon previous research by exploring whether the principles of predictive processing and its mnemonic consequences are applicable to larger and more naturalistic contexts. Participants listened to short stories, each consisting of five sentences describing a common activity (e.g., going to the supermarket). In the third sentence, a critical word was introduced, referring either to a predictable action (e.g., shopping) marking no boundary or to a less predictable action (e.g., reading) marking an event boundary. The fourth and fifth sentence reinforced the activity mentioned in the third sentence. EEG was recorded while participants listened to the sentences. In a subsequent memory test, conducted after every 17 to 18 stories across eight blocks, critical words from the stories both boundary and no-boundary words, were presented together with new words. Participants were asked to indicate which words were from the sentences they heard previously, using an old/new recognition memory task.

Although our results, suggest that there is no difference in memory performance between the boundary and no-boundary conditions, the ERP findings are intriguing. Consistent with Delogu et al. (2018), there was a larger N400 for the event boundary condition compared to the no-boundary condition, replicating their N400 effect using an ecologically more valid setting. Most importantly, ERPs recorded during the encoding of critical words were compared for critical words that were subsequently remembered versus those forgotten. Interestingly, critical words in the boundary condition elicited an increased N400 if they were subsequently remembered as compared to those that were forgotten. Notably, this effect was not observed in the no-boundary condition (see Figure 1). These results suggest that detecting a shift in the narrative structure at an event boundary initiates semantic processing that supports the formation of successful memories for upcoming events. Our findings provide new insights into how event boundaries during encoding segment a continuous experience into episodic events by shaping their subsequent representation in memory.

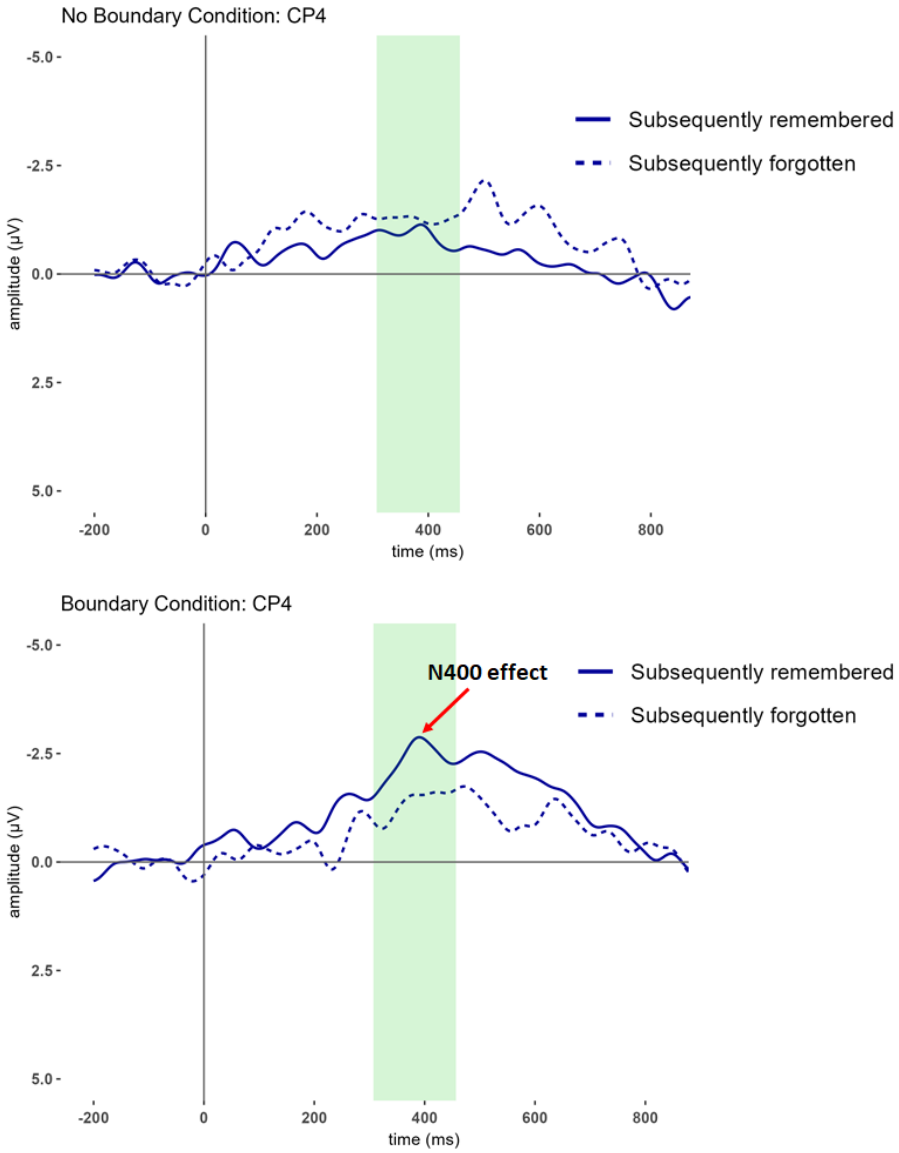

Fig 1. Grand-averaged ERP waveforms at electrode CP4 during the N400 time window, comparing the Subsequent Memory Effect (SME) between the Boundary and No-Boundary conditions. Time zero on the x-axis marks the onset of the critical words.

References

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