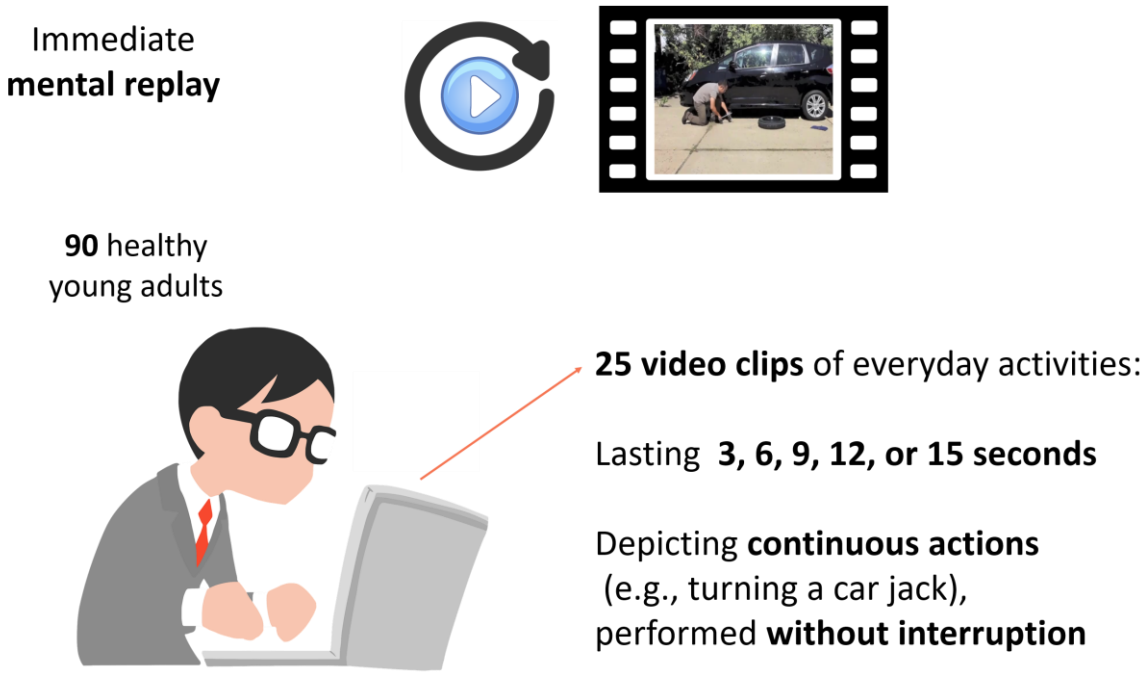
The temporal compression of daily-live events in working memory

Nathan Leroy (1,2), Steve Majerus (1,2) and Arnaud D'Argembeau (1,2)

(1) University of Liège, Psychology and Neuroscience of Cognition Unit PsyNCog
(2) Fund for Scientific Research FNRS

Our past experiences are represented in episodic memory as sequences of experience units—each representing a moment of the past experience—separated by temporal discontinuities (i.e., moments that are not remembered). Because of these temporal discontinuities, the time taken to mentally relive daily life activities is typically shorter than their actual duration (i.e., episodic memories are temporally compressed). Nevertheless, the cognitive mechanisms underlying these discontinuities remain unclear. A consistent body of work suggests that experience units are formed during perception (Zacks, 2020). In daily life, we segment the continuous flow of experience into meaningful units (i.e., events) based on the perception of event boundaries (EBs). Between EBs, working memory enables us to construct and maintain a mental model of the ongoing situation (i.e., an event model). When an EB is perceived, the current event model is updated and its previous version is integrated in a long-term memory representation of the ongoing sequence of events (Baldassano et al., 2017). We hypothesized that discontinuities within episodic memories are a by-product of working memory capacity limit in representing continuous events. When working memory capacity is exceeded before the perception of an EB, the experience unit formed at the end of the current event would be incomplete, leading to temporal discontinuities in the memory representation into which this experience unit is integrated. To test this hypothesis, we asked 90 healthy young adults to watch and mentally replay video clips depicting continuous events (without EBs) lasting from 3 to 15 s (Figure 1). We found that remembering duration was close to the actual stimuli duration for short events, but smaller for longer ones. These results support the view that temporal compression emerges when events composing daily life activities are too long to be fully held in working memory.

Figure1. Summary of the experimental paradigm.



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