Working memory capacity for continuous events: the impact of event duration

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Introduction

Remembering the unfolding of a past episode usually takes less time than its actual duration, an effect that is referred to as the **temporal compression** of events in episodic memory (Jeunehomme et al., 2018).

In this study, we evaluated whether such temporal compression also occurs for **continuous events held in working memory** and to what extent it depends on their duration.

We hypothesized that the time taken by participants to mentally replay a just seen event would be shorter than its original duration when it last 12 seconds or longer (Wittmann, 2016).

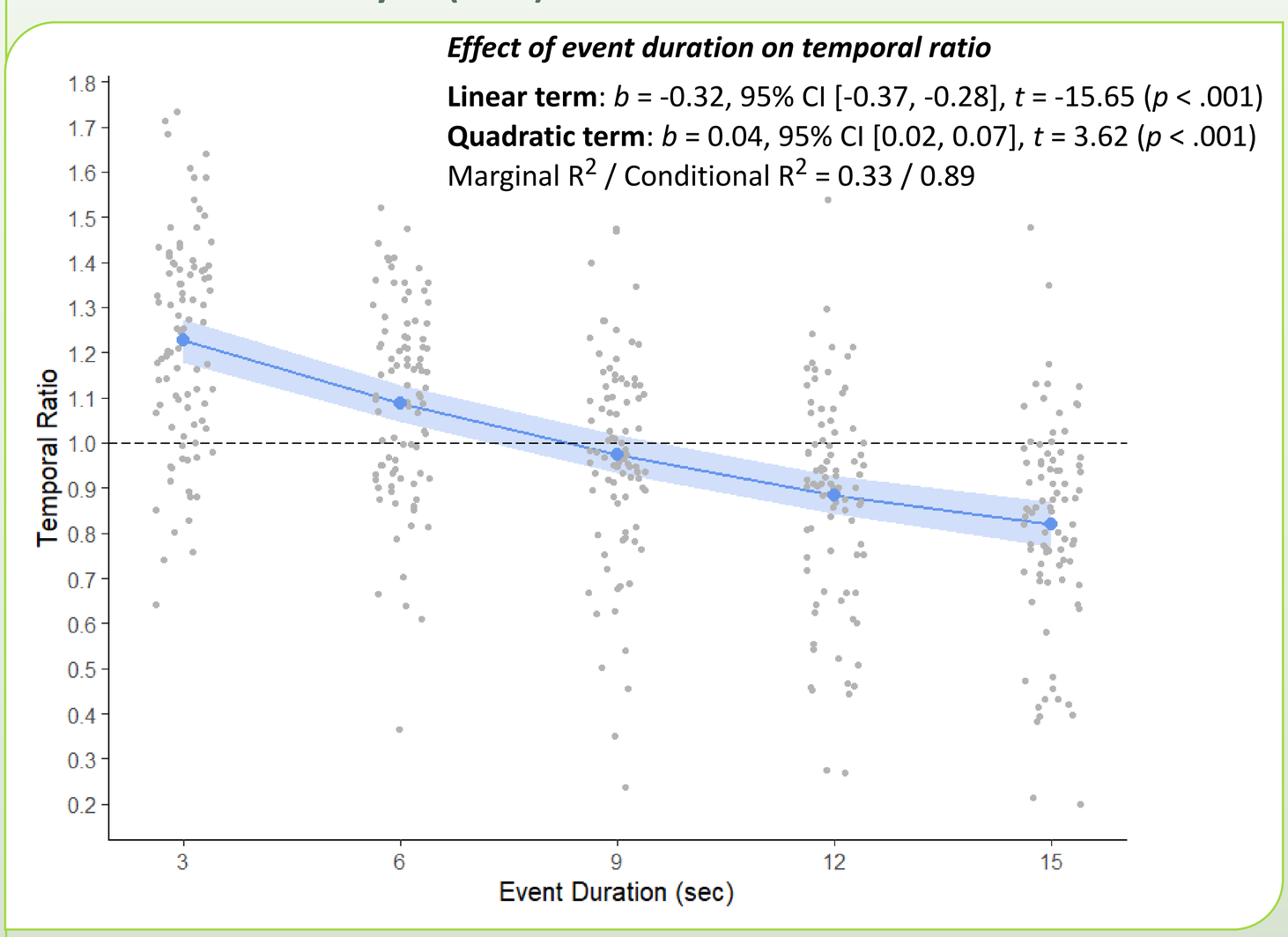
Here we focused on the **temporal ratio** (TR): the ratio between the time needed to remember an event (RD) and its original duration.

Method

90 young adults (49 women, 2 unknown; mean age = 22.3 years, SD = 3.05) had to carefully watch and mentally replay **25 video clips** of everyday activities. Each clip lasted **3, 6, 9, 12, or 15 seconds** and showed one (or several) person(s) performing a continuous action (e.g., turning a car jack, without interruption).

Results

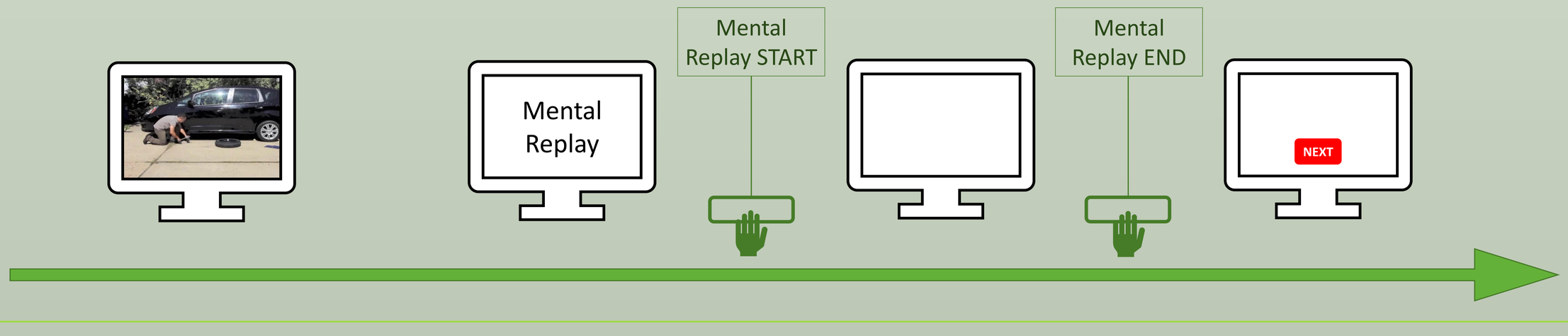
Growth Curve Analysis (GCA)



TR (Temporal Ratio) = $\frac{RD}{Event\ Duration}$ (values < 1 indicate memory compression).

- RD increased with stimuli duration but not proportionally: RD appeared to be close to the actual stimuli duration for short events (3 to 9 s), but smaller for longer ones (12 and 15 s).
- Between 9 and 12 seconds, event starts to exceed working memory temporal capacity (RD becomes significantly shorter than video duration, TR falls below 1).

Paradigm



Conclusions

- From a theorical point of view, this pattern of results suggests that when the capacity limit of working memory is attained, the maintained event model no longer represents the entire unfolding of the current episode and thus temporal compression emerges.
- The temporal compression of events in episodic memory could result (at least in part) from the incomplete encoding of events which duration exceed working memory capacity (the temporal limit of working memory).

→ **Temporal compression could be a by-product of the limit of working memory capacity in representing continuous events.**

References

Jeunehomme, O., Folville, A., Stawarczyk, D., Van der Linden, M., & D'Argembeau, A. (2018). Temporal compression in episodic memory for real-life events. *Memory, 26*(6), 759-770. https://doi.org/10.1080/09658211.2017.1406120

Wittmann, M. (2016). *Felt time: The psychology of how we perceive time*. (E. Butler, Trans.). MIT Press.