

Attentional switch from the outside to the inner world: An early and critical, but unexplored stage of autobiographical memory retrieval processes

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Episodic autobiographical memory (AM) retrieval consists of remembering and mentally reliving memories such as last Saturday's dinner. It involves a complex cascade of cognitive operations, including the creation of a temporary internal mental space where the episode can be re-instantiated. We are re-appraising this cascade as current models appear to be missing an early step. As external and internal information compete for limited attentional resources, attention must switch between them. Memory retrieval must therefore start by an *attentional switch to memory (ASM)* to disengage from the world and focus on the inner world. Although ASM has never been studied, a new hypothetical framework emerges from pooling knowledge from different fields: AM, attention and mind-wandering. This framework suggests that ASM causes perceptual decoupling, known to be accompanied by eye movements aiming at reducing visual processing of external stimuli (Benedek et al., 2017). In case of AM retrieval, we hypothesize that *gaze aversion* (Doherty-Sneddon & Phelps, 2005) is one of these movements and could be an interesting objective marker of ASM. Although commonly observed, this behaviour has been understudied scientifically. We designed a protocol where 32 participants answered 48 autobiographical questions while eye movements were recorded using eye-tracking and videotaping. Results showed that gaze aversion occurred early (<1s) and predominantly during the access phase (30 participants, 5-91% of the questions)—i.e., at the moment when ASM is assumed to take place. Gaze aversion lasted on average 6s, pointed to different directions following individual preferences, and was critically decoupled from head movements. As this reduces visual processing, this is in favour of the role of gaze aversion in perceptual decoupling. Moreover, gaze aversion was linked to higher cognitive effort, suggesting its involvement in retrieving hard-to-access memories with similar quality and vividness by disengaging from external distractors. In conclusion, several arguments support the hypothetical relation between gaze aversion and ASM.

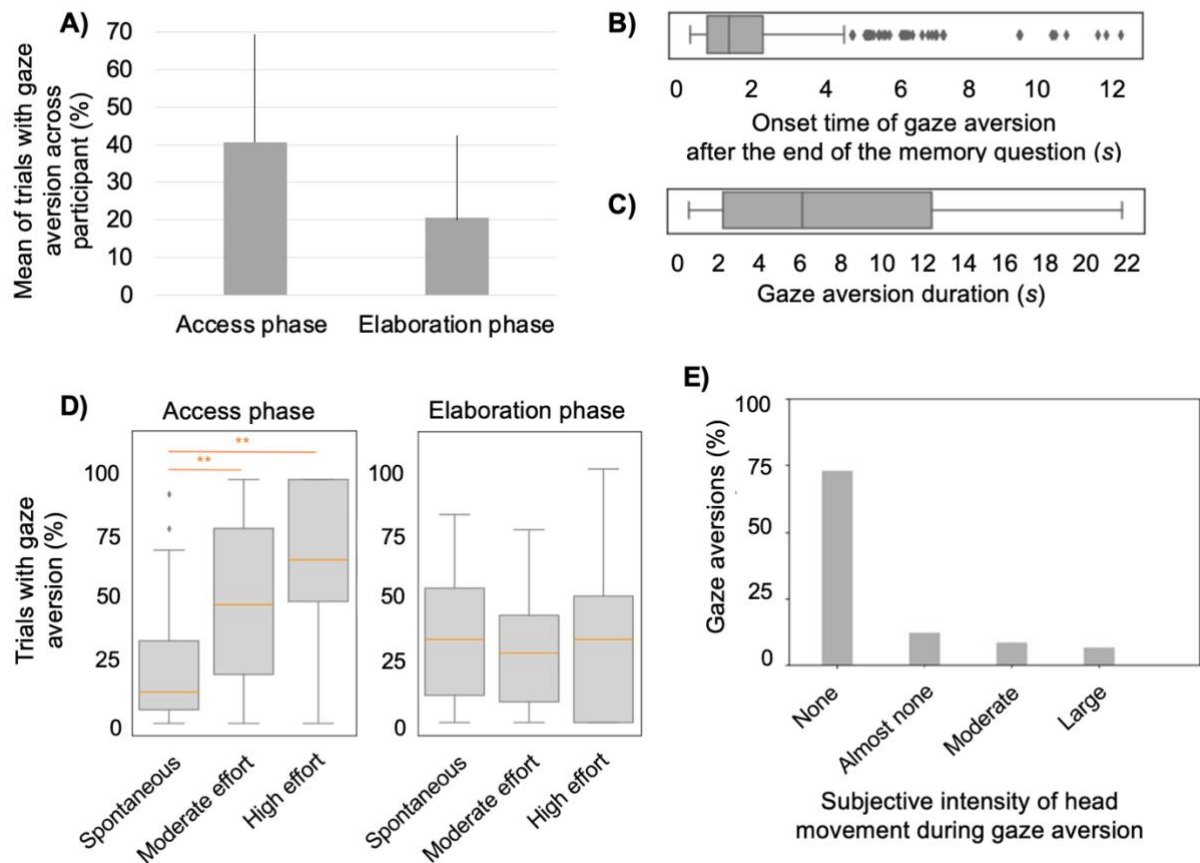


Figure 1. A) Bar graph showing the mean percentages of trials where gaze aversion is observed across participants during the access and elaboration phases. Error bars represent standard deviations; B) Box plot of the onset time of gaze aversion after the end of the memory question; C) Box plot of gaze aversion duration; D) Box plots showing the percentages of trials with gaze aversion according to the level of cognitive effort for the access and elaboration phases. ** $p < .001$ Nemenyi post hoc tests; E) Bar graph of the percentages of the subjective assessment concerning head movement during gaze aversion (none, almost none, moderate, large).

References

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