

## **NEURAL MECHANISMS UNDERLYING SUBLIMINAL WORKING-MEMORY**

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**Background:** Previous studies have found neurophysiological evidence for common neural mechanisms of serial dependence (Barbosa et al, bioRxiv 2019) and subconscious working memory (Trübutschek et al eLife 2017, PNAS 2019). On the one hand, previously stored, currently irrelevant memories leave an “activity-silent” (Stokes, Trends Cogn Sci 2015) trace that biases upcoming memories (Barbosa et al, bioRxiv 2019). These traces decay with a time constant of seconds, so long inter-trial-intervals lead to weaker serial dependence (Bliss et al, Sci Rep 2017). Moreover, serial dependence is known to increase with memory period durations (delay durations, Bliss et al, Sci Rep 2017). This is because active memories rely on persistent neural activity, thus drift (Wimmer et al Nat Neurosci 2014) instead of decaying like previous memories traces. Active memories tend to drift towards previous memories’ traces, leading to serial dependence.

On the other hand, recent empirical and theoretical work suggest that subconscious memories are also stored in ‘activity-silent’ traces (Trübutschek et al eLife 2017, PNAS 2019). Serial dependence has not yet been characterized during subconscious working memory trials. Given the proposed mechanism for subconscious memories (i.e. ‘activity-silent’), we predict that serial dependence for subconscious trials should decrease with longer delay periods, similarly to the known effect of inter-trial-intervals on conscious working memory.

**Aims & Methods:** With this aim, we will change the delay duration (1 or 3 s) and focus exclusively on the correct trials. We will then group those trials based on their reported visibility (seen or unseen). We predict that correct trials that were reported to be invisible (subconscious working memory) will have weaker serial dependence with long (3 s) than with short (1 s) delay duration. In contrast, correct trials that were reported to be visible will have stronger serial dependence for the longer delay duration condition (as previously reported, e.g. Bliss et al, Sci Rep 2017)

**Keywords:** Subconscious perception, Working memory, Serial dependence

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