

Neural dissociation of stimulus memorability and subjective recognition during episodic retrieval

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While much of memory research takes a subject-centric focus, recent work has also pinpointed important item-centric effects on memory, driven by how intrinsically memorable or forgettable a stimulus is. Specifically, recent neuroimaging research finds that perceptual and memory-related regions of the brain show sensitivity to the memorability of a stimulus early on during encoding. However, no research has investigated the neural correlates of memorability during memory retrieval, as well as how such correlates may relate to subjective ratings of memory strength. In the current study, stimuli and neuroimaging results from a fMRI experiment (N=16) on retrieval of studied faces images (Rissman et al., 2010) were reanalyzed using a framework based on memorability. Memorability scores were obtained through a memory test on Amazon Mechanical Turk (N=872) for 400 face images from the fMRI study. We conducted representational similarity analyses (RSAs) across the brain to identify which regions showed higher neural pattern similarity for more memorable images, as well as which regions showed higher pattern similarity for images that were successfully remembered by each participant. We find two largely non-overlapping sets of regions, with memorability-related information existing predominantly within ventral and medial temporal lobe regions and memory retrieval outcome-related information existing predominantly in fronto-parietal regions. Memorability-based effects persisted regardless of whether studied faces were correctly recognized (hits) or unstudied faces were correctly rejected. These results were confirmed using support vector regressions, which identified regions able to predict memorability score as a continuous variable. In sum, we find strong stimulus memorability effects during the retrieval of an image, which seem to differ from those activation patterns associated subjective memory strength.