

Temporal Dynamics of Memorability: An Intrinsic Brain Signal Distinct from Memory

Seyed-Mahdi Khaligh-Razavi (1,2), Wilma A. Bainbridge (3), Dimitrios Pantazis (2), Aude Oliva (1)

1 – Computer Science and Artificial Intelligence Laboratory, MIT

2 – McGovern Institute for Brain Research, MIT

3 – Department of Brain and Cognitive Science, MIT

Can we predict what people will remember, as they are perceiving an image? Recent work has identified that images carry the attribute of *memorability*, a predictive value of whether a novel image will be later remembered or forgotten (Isola et al . 2011, 2014; Bainbridge et al . 2013) . Despite the separate subjective experiences people have, certain faces and scenes are consistently remembered and others forgotten, independent of observer . Whereas many studies have concentrated on an observer-centric predictor of memory (e .g . Kuhl et al . 2012), memorability is a complementary, stimulus-centric predictor, generalizable across observers and context. How is memorability manifested in the brain, and how does it differ from pure memory encoding? In this study we characterized temporal dynamics of memorability, and showed that magnetoencephalography (MEG) brain signals are predictive of memorability . We further showed that the neural signature of memorability exists for both faces and scenes; however each of them has its own specific temporal dynamics. Faces showed a persistent memorability signal whereas scenes had more transient characteristics . We also found that neural signatures of memorability across time are different from that of memory encoding, as measured by a post-MEG memory recognition task. This work is the first to measure memorability, as an innate property of images, from electrophysiological brain signals and characterize its temporal dynamics .

We would like to thank the ‘McGovern Institute Neurotechnology’ (MINT) award.