

The Cognitive and Neural Bases of Face Memorability

Wilma Bainbridge (1) & Aude Oliva (2)

- 1- Department of Brain and Cognitive Sciences, MIT
- 2- Computer Science and Artificial Intelligence Laboratory, MIT

We encounter a constant stream of faces in our lives, and while we forever remember faces we have seen for only a minute, we also forget faces we see everyday. These faces differ in their *memorability*, a predictive value of whether a novel stimulus will be later remembered or forgotten. Memorability is often equated to the conceptual or perceptual *atypicality* of faces. We conducted a large-scale study to examine how an exhaustive set of 20 face attributes, including typicality, is predictive of memorability. Memorability scores (hit rate and false alarm rate from an online memory game) and attribute ratings were collected for 2,222 faces from a new publicly-available dataset (10k US Adult Faces Database). Using multiple linear regression models, we find that a subset of these attributes (e.g., irresponsible, kind) significantly predict memorability scores ($p < 10^{-115}$), that atypicality is not the sole predictor of memorability, and that there is still a large amount (54%) of unexplained yet consistent variance in memorability. In addition, we conducted an fMRI block-design study (N=14) using a perceptual paradigm and find several significant perceptual (e.g., occipital face area, parahippocampal place area) and memory regions (e.g., perirhinal cortex) in the brain with preferential activity for novel memorable versus forgettable images of faces and scenes, even with only single exposures. These results suggest that memorability can be used as a singular attribute to examine signatures of memory during the perception of an image.