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Cognitive and Affective Neuroscience

We seek to understand the organization of memory, thought, and emotion in the human brain. We want to discover how the healthy brain supports human capacities, such as hippocampal support for declarative memory, amygdala support for emotional memory, and prefrontal cortical support for working memory. We also study how experience alters functional brain organization (brain plasticity). We aim to understand principles of brain organization that are consistent across individuals, and those that vary across people due to age, personality, and other dimensions of individuality. Therefore, we examine brain-behavior relations across the life span, from children through the elderly. We are also interested in learning how disadvantageous variations in brain structure and function underlie diseases and disorders, and have studied developmental disorders (dyslexia, ADHD, autism), age-related disorders (Alzheimer's disease, Parkinson's disease), and psychiatric disorders (depression, social phobia, schizophrenia). Further, we want to understand how potential behavioral or pharmacologic treatments alter brain function when they are therapeutically effective.

Our primary methods are brain imaging (functional and structural), and the experimental behavioral study of patients with brain injuries. The majority of our studies involve functional magnetic resonance imaging (fMRI), but we also employ other brain measures as needed to address scientific questions, including diffusion tensor imaging (DTI), MRI structural volumes, and voxel-based morphometry (VBM).

Much of our research occurs in the Martinos Imaging Center at the McGovern Institute, MIT, which is affiliated with the Athinoula A. Martinos Center for Biomedical Imaging . The Martinos centers are a collaboration among the Harvard-MIT Division of Health Sciences and Technology (HST), the McGovern Institute for Brain Research, Massachusetts General Hospital , and Harvard

Medical School . Our affiliations with these outstanding research institutions promote the opportunity for cutting-edge basic cognitive neuroscience research and translation from basic science to clinical application.

Aron A, Ketay S, Hedden T, Aron EN, Rose Markus H, Gabrieli JD. Temperament trait of sensory processing sensitivity moderates cultural differences in neural response. *Soc Cogn Affect Neurosci*. 2010 Apr 13. [Epub ahead of print]

Chai XJ, Ofen N, Jacobs LF, Gabrieli JD. Scene complexity: influence on perception, memory, and development in the medial temporal lobe. *Front Hum Neurosci*. 2010 Mar 5;4:21.

Gutchess AH, Hedden T, Ketay S, Aron A, Gabrieli JD. Neural differences in the processing of semantic relationships across cultures. *Soc Cogn Affect Neurosci*. 2010 Feb 4. [Epub ahead of print]

Hedden T, Gabrieli JD. Shared and selective neural correlates of inhibition, facilitation, and shifting processes during executive control. *Neuroimage*. 2010 May 15;51(1):421-31. Epub 2010 Feb 1.

[Additional Publications](#)



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