Biography

Dr. Jody Culham is a Professor in the Department of Psychology and Brain and Mind Institute at the University of Western Ontario. Her research investigates how vision is used for perception and to guide actions in human adults. She uses a combination of cognitive neuroscience techniques -- including functional magnetic resonance imaging (fMRI), behavioral psychophysics and kinematics, neuropsychology, and neurostimulation -- to investigate hand actions such as grasping, reaching and tool use. One theme of her work is bringing cognitive neuroscience closer to everyday life by investigating real actions upon real objects. Dr. Culham received a Bachelor's degree from the University of Calgary and a PhD from Harvard University before becoming a postdoctoral fellow and then professor at the University of Western Ontario.

Neural coding of real actions and real objects in the human brain

Abstract:
Although functional magnetic resonance imaging (fMRI) has enabled researchers to study neural processing within specific regions of the human brain with relatively high spatial resolution, much of this research has relied on artificial actions, such as pantomimed actions, and artificial stimuli, such as two-dimensional images. I will provide an overview of recent work from my lab that shows how fMRI can be used to investigate *real actions* upon *real objects*. In the interests of time, I will focus on the findings from the anterior intraparietal sulcus (aIPS), a key area in sensorimotor transformations for grasping. I will emphasize recent work using neural decoding (multivoxel pattern analysis, MVPA), which can reveal the types of information available for applications such as brain-machine interfaces. Taken together, our results suggest that aIPS (along with other brain regions) is activated most strongly and most distinctively by real actions toward real objects. Moreover, they highlight the value of using more ecological paradigms to reveal neural activation and coding within the human sensorimotor system.