Flexible Neural Mechanisms of Cognitive Control: Influences on reward-based decision-making

Todd Braver
Professor of Psychology, Neuroscience and Radiology
Washington University, St. Louis

Research in my lab investigates the neural mechanisms that give rise to successful cognitive control: the ability to regulate thoughts and actions in an intelligent, goal-directed manner. We have argued that such mechanisms, which involve a network of brain regions centered on the lateral prefrontal cortex, are highly flexible, shifting between a proactive and reactive mode. The proactive mode of control is future-oriented, preparatory and sustained in nature, while the reactive mode is transient, stimulus-driven, and frequently engaged by the presence of interference. Thus, our theoretical framework suggests the importance of examining temporal dynamics in the neural mechanisms of cognitive control.

I will present some of our work highlighting this theoretical approach its utility for understanding individual differences and cognitive impairment in different populations. Additionally, I will discuss recent studies examining the influence of cognitive control on reward-based decision-making, focusing on: a) the effects of motivational incentives; b) decisions about delayed monetary and liquid rewards (i.e., inter-temporal choice, delay discounting); and c) decisions about the subjective value of cognitive effort.