Adaptive Attention and Memory in Multi-Option Multi-Feature Decision Making

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Abstract

Deliberation over a set of options is sometimes needed to choose the most preferred. An example is comparison shopping, where options are products, each with a variety of features. There is evidence that both dorsal and ventral prefrontal cortex (PFC) contribute to these deliberations. We report the results of mouse-tracking experiments involving deliberative choice, constraining a computational cognitive neuroscience model of the role of PFC, and associated brain areas, in shifting attention between option features, as well as in tracking preferences over time. Options are visually displayed, but option features remain hidden until the mouse is moved to their locations. In this way, mouse movements provide a measure of attention allocation. Results reveal strategic patterns of attention shifting which adapt over the course of deliberation and over the course of practice. Observed adaptation is consistent with the reinforcement learning mechanism hypothesized to update the cognitive control states of PFC.

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