

Motivationally-Based Modulation of Cognitive Control during Task-Switching

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It is becoming increasingly appreciated that the mechanisms by which humans exert control over thoughts and actions will need to be understood in terms of motivational as well as cognitive processes. Motivation may facilitate adaptive mobilization of cognitive control, such that in tasks with higher motivational priority cognitive resources will be more effectively deployed to regulate behavioral performance. The current study tested this hypothesis within the domain of cued task-switching. Participants performed face and word classification tasks in either single-task or mixed-task blocks. In half of the trials (randomly intermixed) in each block an advance incentive cue signaled the potential for a monetary bonus for good performance (with performance criteria set individually from a baseline task block). On non-incentive trials the classic task-switching behavioral performance signatures of switch cost and mixing cost were observed. However, on trials with incentive cues, these costs were significantly attenuated, demonstrating that motivational priority information conveyed by incentive cues is of greater strength or of a different type than the priority information provided by neutral task cues. Neuroimaging data of this paradigm provide additional information regarding the neural correlates of incentive effects on cognitive control. Results are presented regarding incentive cue effects on preparatory lateral prefrontal cortex (PFC) activation, and on PFC and anterior cingulate cortex (ACC) responses in trials subsequent to ones in which reward was not obtained.