

Prefrontal Involvement in Switching Between Speed and Accuracy: An fMRI Study

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Strategically switching between rapid and accurate decision-making requires a top-down regulation of the response criteria. However, the brain mechanisms important to smoothly change the speed-accuracy strategy trial-by-trial remain mostly unclear. This issue was addressed here by testing 12 right-handed volunteers (6 females, age: 19-39 years) using fMRI. On each trial, participants had to stress speed or accuracy in performing a color discrimination task on a target stimulus according to the instructions given by an initial cue. As the behavioral data showed, participants were capable of trading speed for accuracy and vice versa. Standard GLM whole-brain analyses on cue-related activations revealed a significant recruitment of left middle frontal gyrus (Talairach coordinates = x: -32, y: 32, z: 26) and right cerebellum (32, -42, -30) when switching from speed to accuracy (vs. from accuracy to speed). Analysis of target-related activations suggested that the anterior cingulate cortex (-4, 24, 15) was more recruited during speeded (vs. accuracy) trials, especially when those were preceded by another speeded trial. The present results extend previous findings on the role of left lateral prefrontal cortex in initial task-setting and anterior cingulate in subsequent energization of the relevant processes to the control of speed-accuracy trade-off.

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