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Title: Executive control of gaze by the frontal lobes.

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Abstract: Executive control requires controlling the initiation of movements, judging the consequences of actions, and adjusting performance accordingly. We have investigated the role of different areas in the frontal lobe in executive control expressed by macaque monkeys performing a saccade stop signal task. Certain neurons in the frontal eye field respond to visual stimuli, and others control the production of saccadic eye movements. Neurons in the supplementary eye field do not control directly the initiation of saccades but, instead, signal the production of errors, the anticipation and delivery of reinforcement, and the presence of response conflict. Neurons in the anterior cingulate cortex signal the production of errors and the anticipation and delivery of reinforcement, but not the presence of response conflict. Intracranial local field potentials in the anterior cingulate cortex of monkeys indicate that these medial frontal signals can contribute to event-related potentials related to performance monitoring. Electrical stimulation of the supplementary eye field improves performance in the task by elevating saccade latency. An interactive race model shows how interacting units produce behavior that can be described as the outcome of a race between independent processes and how conflict between gaze-holding and gaze-shifting neurons can be used to adjust performance. (PsycINFO Database Record (c) 2010 APA, all rights reserved)

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