Converging evidence supports the view that 'executive' control of complex, goal-directed behaviour encompasses distinct component processes. These processes are thought to map, in turn, to specific circuits within prefrontal cortex. This framework has influenced recent efforts to understand the brain basis of conditions that can be viewed as disorders of self-control, including addiction and ADHD. One common experimental approach is to administer a set of behavioral tasks thought to tap different prefrontal processes to such populations, and then draw inferences about dysfunction in specific prefrontal circuits based on the pattern of deficits across tasks. In many cases the evidence that a given task measures a given prefrontal process is based on reverse inference from fMRI findings. Loss-of-function methods provide a more direct test of the claim that performance on a given task measures the function of a particular prefrontal circuit. We examined the performance of patients with focal damage involving various regions of prefrontal cortex on a battery of commonly used 'selective' tasks thought to tap inhibitory control, task shifting, conflict monitoring, manipulation in working memory, and reversal learning. Performance on a subset of these tasks was selectively affected by damage to specific regions within the frontal lobes. In many cases, the choice of dependant measure was critically important, with different sites of damage affecting performance of the same task in different ways. This work has implications for designing and interpreting behavioral studies of prefrontal function in neuropsychiatric populations.

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