

Anxiety and cognitive efficiency: Differential modulation of transient and sustained neural activity during a working memory task

C. L. Fales; D. M. Barch; G. C. Burgess; A. Schaefer; D. S. Mennin; J. R. Gray;
T. S. Braver

September 2008

Cognitive, Affective & Behavioral Neuroscience; Sep2008, Vol. 8 Issue 3, p239

Academic Journal

Article

According to the processing-efficiency hypothesis (Eysenck, Derakshan, Santos, & Calvo, 2007), anxious individuals are thought to require greater activation of brain systems supporting cognitive control (e.g., dorsolateral prefrontal cortex; DLPFC) in order to maintain equivalent performance to nonanxious subjects. A recent theory of cognitive control (Braver, Gray, & Burgess, 2007) has proposed that reduced cognitive efficiency might occur as a result of changes in the temporal dynamics of DLPFC recruitment. In this study, we used a mixed blocked/event-related fMRI design to track transient and sustained activity in DLPFC while high- and low-anxious participants performed a working memory task. The task was performed after the participants viewed videos designed to induce neutral or anxiety-related moods. After the neutral video, the high-anxious participants had reduced sustained but increased transient activation in working memory areas, in comparison with low-anxious participants. The high-anxious group also showed extensive reductions in sustained activation of "default-network" areas (possible deactivation). After the negative video, the low-anxiety group shifted their activation dynamics in cognitive control regions to resemble those of the high-anxious group. These results suggest that reduced cognitive control in anxiety might be due to a transient, rather than sustained, pattern of working memory recruitment. Supplementary information for this study may be found at www.psychonomic.org/archive.