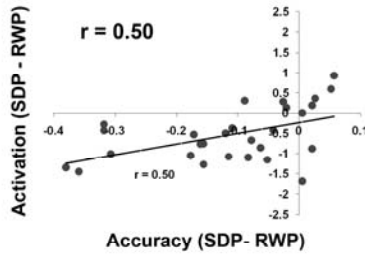
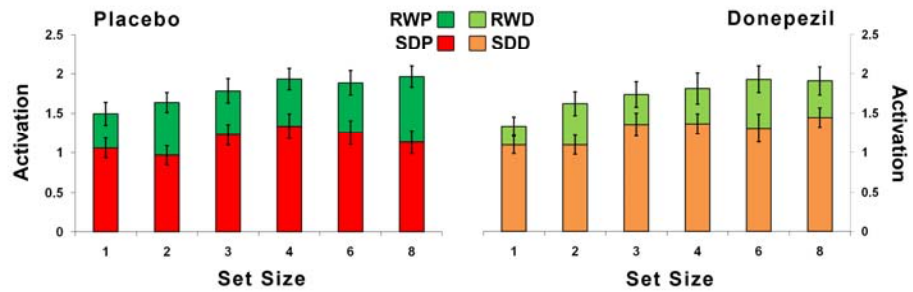
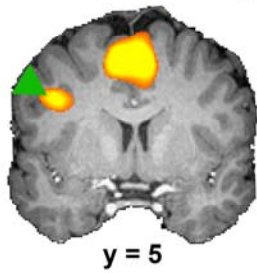
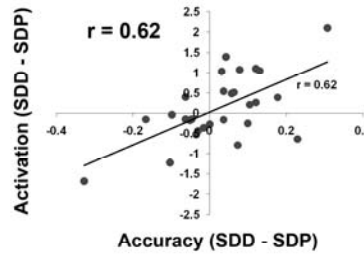


Supplementary Fig. 1. Visual short-term memory (VSTM), behavioral performance (K) and intraparietal sulcus (IPS) activation in the VSTM and visual perceptual control (VPC) tasks plotted as a function of set size and imaging session. IPS activation paralleled K in the VSTM condition; activation/performance increased to set size 4 before reaching an asymptote. In contrast, for the VPC task, IPS activation did not vary with set size. With sleep deprivation, behavioral performance and magnitude of activation declined in both tasks and at all set sizes. Error bars represent ± 1 SEM.

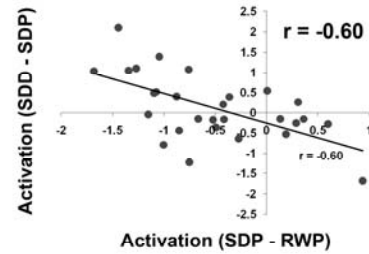
Left Inferior Frontal Gyrus



Changes in performance and activation with sleep deprivation (placebo)



Effect of donepezil on performance and activation following sleep deprivation



Effect of donepezil on activation (SD) vs. state-related change in activation

Supplementary Fig. 2. Mean activation (± 1 SEM) in the left inferior frontal gyrus associated with the visual short-term memory task as a function of state (RW: rested wakefulness, SD: sleep deprivation), drug (P: placebo, D: donepezil) and set size (upper panel). Lower panel (L-R): The left-most panel shows the positive correlation between behavioral change elicited by sleep deprivation in the placebo condition and the corresponding change in activation. The middle panel shows the correlation between how donepezil modulates performance and activation in the context of sleep deprivation. The right-most panel shows the correlation between donepezil induced changes in activation in the context of sleep deprivation with sleep deprivation-induced changes in activation when volunteers were on placebo. All correlations were significant at $p < 0.05$.