fMRI response. Salsburg (1986), Conover and Salsburg (1988) and Rosenbaum (2007b) consider rank tests that are particularly effective when only a subset of experimental units respond to treatment. These rank tests score the ranks in such a way that little weight is given to lower ranks. In the current paper, a similar approach is taken in studies with interference between units.

When a region of the brain is stimulated to activity, the change in blood oxygenation measured by fMRI is not immediate. There is a brief delay, perhaps a dip, for about 2 seconds, followed by a sharp rise, a sharp fall to slightly below baseline, followed by a gradual return to baseline; see Lindquist (2008, Figure 3). This curve is known as the hemodynamic response function (HRF). We use the form developed by Friston et al. (1998), specifically a weighted difference of two gamma densities, $\gamma(x;\omega,\vartheta) = \vartheta^{\omega}x^{\omega-1}\exp(-\vartheta x)/\Gamma(\omega)$, both with parameter $\vartheta = 1/16$, and with shape parameters $\omega_1 = 6$ and $\omega_2 = 16$, specifically the function $\text{hrf}(x) = \gamma(16x;6,1/16) - \gamma(16x;16,1/16)/6$ where x is in seconds. Although we do not report these results, we tried a second form for the HRF with a similar shape but built from inverse logit functions (Lindquist and Wager 2007), obtaining qualitatively similar results in a table parallel to Table 2.

Recall that the measurements in Figure 1 occur at two second intervals. Evaluating the hemodynamic response function, $\text{hrf}(x)$, at two-second intervals, we computed 17 weights for 17 two-second intervals that follow each trial, that is, for the $2 \times 17 = 34$ seconds that follow a trial. These weights sum to one. The first weight is zero, the third and fourth weights are the largest (.375 and .385), and beginning at the eighth the weights turn slightly negative (weight eight is -0.031) gradually returning to zero (weight 17 is -0.0001). At the end of a session, if fewer than 17 two-second intervals remained, we used the remaining intervals and renormalized the weights so that they again summed to one. For a region such as STN in Figure 1, after each trial, we computed the sum of the HRF