Task Demands Modulate Sustained and Transient Neural Activity During Visual Matching Tasks

Supplemental Online Materials

Simulation of Sustained and Transient Activity

Method

Simulated datasets based on the parameters used in the present experiment were created using the Bay Zero simulation software (Buckner *et al.,* 1998; Burock *et al.,* 1998; Kelly *et al.*, 2002; see also, Burgund *et al.,* 2002; Visscher *et al.,* 2003). Two types of datasets were created—one in which the direction of sustained and transient signals was the same (*e.g.,* increased sustained responses paired with increased transient responses), and another in which the direction of sustained and transient signals was opposing (*e.g.,* increased sustained responses paired with decreased transient responses). For each type of dataset, "noise" and "no-noise" versions were generated. Noise was applied to the data using the parameters described for the "high noise" condition by Visscher and colleagues (2003). The no-noise datasets reflect the ideal values inputted to Bay Zero. Thus, four different datasets were analyzed: (1) same direction-no noise, (2) same direction-noise, (3) opposing direction-no noise, and (4) opposing direction-noise. Simulated data were processed using procedures identical to those used for the human data described in the article. Analyses comparing noise and no-noise conditions were conducted separately for sustained and transient signals in the same and opposing-direction conditions.

Results

Results from the analyses of the simulated data are displayed in the Supplemental Figure. Paired *t* tests comparing sustained activity in the noise and no-noise conditions did not differ in either the same or the opposing-direction condition, $t(1, 17) < 1.5$, $p > .20$. Similarly, paired *t* tests comparing transient activity at the third time point in the noise and no-noise conditions did not differ in either the same or the opposing-direction condition, $t(1, 17) < 1.6$, $p > .15$. Moreover, two-way ANOVAs assessing the interactions of noise-level and time (at the seven time points) in the transient activity did not reveal an effect of noise in either the same or the opposing-direction condition, $F_{noise}(1, 17) < 1.5$, $p > .20$, $F_{noise \times time}(1, 17) < 1.1$, $p > .40$. Thus, sustained and transient signals were measured accurately in the present study.

References

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Supplemental Figure