Supplementary Materials for

Modeling of the Hemodynamic Responses in Block Design fMRI Studies

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Fig. S1 to S5

Figure S1. The simulated HRFs used as the ground truths for computer simulations. In Simulation 1, the HRF was generated using a physiological model, the 'balloon' model (*cyan*), with the HRF parameters: H = 1.18, T = 4.6s, W = 3.8s, O = 2.2s. In Simulation 2, a sum of four inverse logit functions (*magenta*) was used as ground truth with the HRF parameters: H = 1.43, T = 7s, W = 5.9s, O = 2.6s. A sum of three gamma functions was used in Simulation 3 (*green*) with the HRF parameters: H = 1.30, T = 6.9s, W = 6.1s, O = 2.6s.

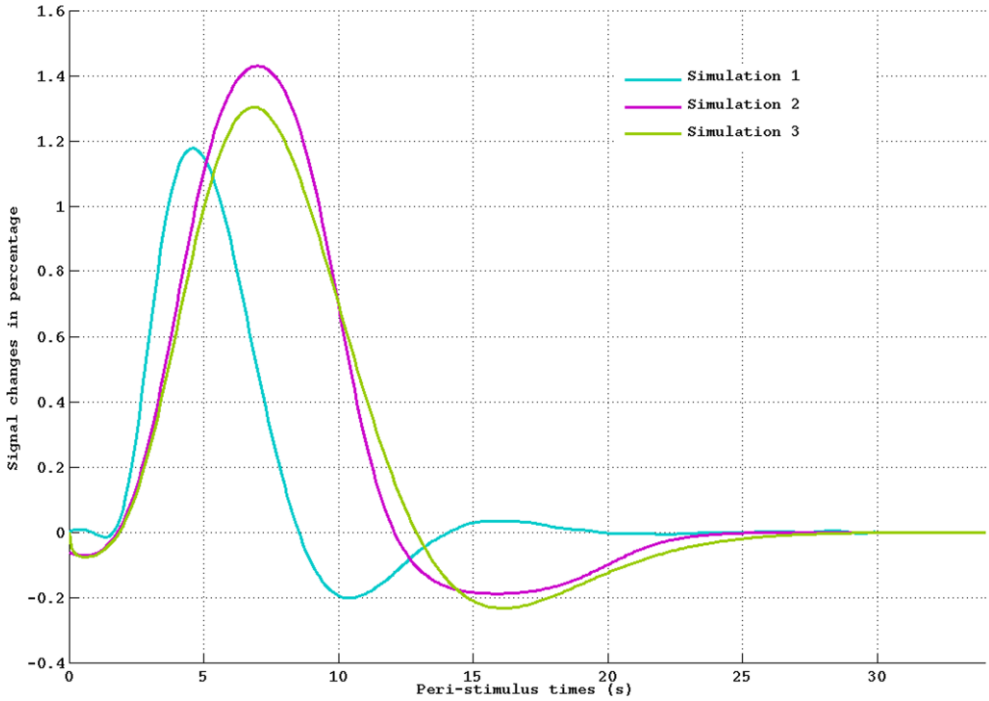

Figure S2. Assessment of parameter mis-specification with simulations. Typical simulations with 25% variation are shown. The upper, middle, and lower rows show variation in: 1) *H* only, 2) *T* and *O* only, and 3) *W*, *T* and *O*. The ground truth HRFs (a), sampled fMRI time course with noise (b), and estimated HRFs (c) are illustrated. The original HRF and fMRI time series are plotted in cyan and the HRF and fMRI time series with 25% parameter variation are plotted in magenta. Gray lines in (b) represent stimuli.

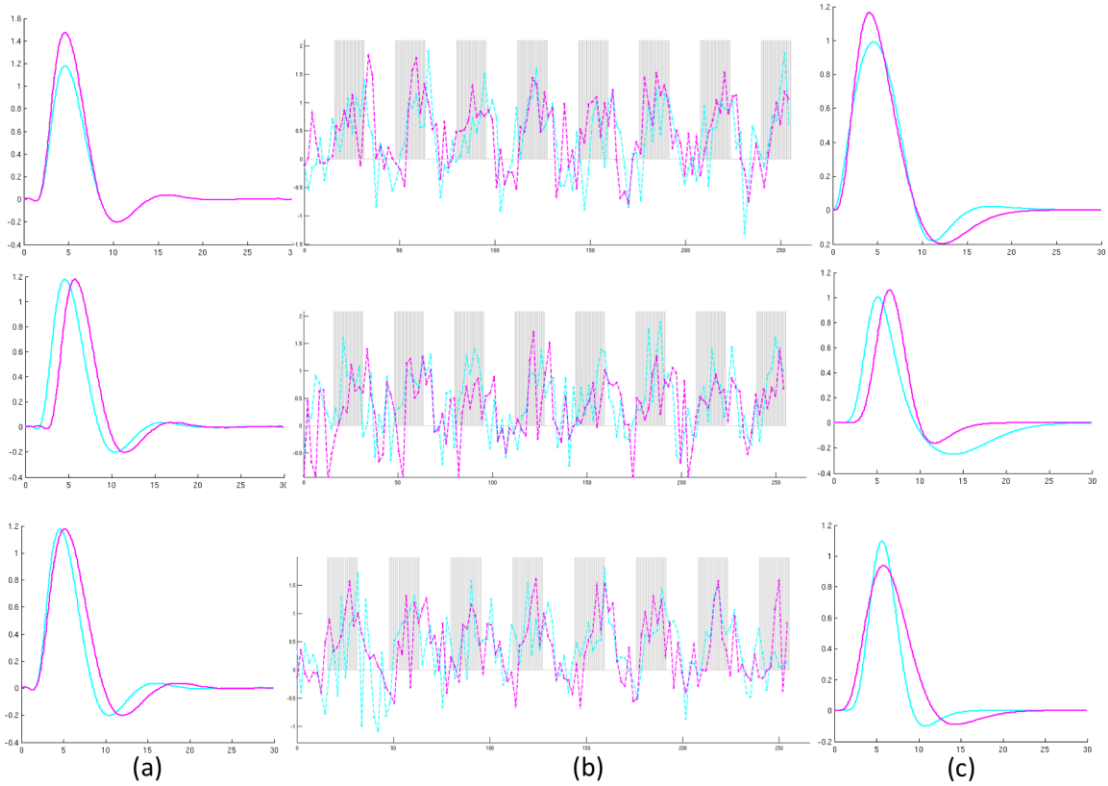

Figure S3. The group activation maps shown on a surface rendered brain. (a) The group activation map identified during experimental session 1. (b) The group activation map identified during experimental session 2 (3-4 months later). Four regions (left and right MFG and left and right AG) were consistently activated with the working memory task during the two experimental sessions.

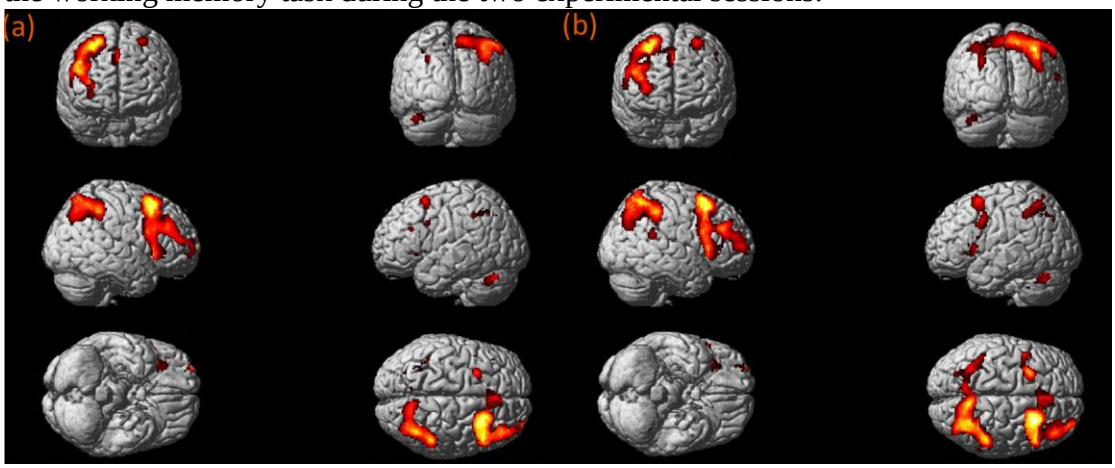

Figure S4. Illustration of HRF estimation from fMRI data. (a) Individual activation maps were determined using SPM8 using a finite impulse response basis function. (b) The fMRI signal time course was extracted by averaging 12.5% of the voxels within the anatomical region with the highest T values. (c) The stimulus function was constructed based on the experimental design. (d) The HRF was fitted as the convolution of the HRF and the stimulus function.