Supplemental Materials

Working memory for social cues recruits orbitofrontal cortex and amygdala: An fMRI study of

delayed matching to sample for emotional expressions

Matthew L. LoPresti[1,2], Karin Schon[1,3], Marisa D. Tricarico[1], Jascha D. Swisher[2], Kim A.

Celone[1,3], and Chantal E. Stern[1,2,3,4]

1. Center for Memory and Brain, 2. Program in Neuroscience, 3. Department of Psychology,

Boston University, Boston, MA, 02215, USA, and 4. Athinoula A. Martinos Center for

Biomedical Imaging, Department of Radiology, Massachusetts General Hospital and Harvard

Medical School, Charlestown, MA, 02129, USA

These supplemental materials include the methods and results of an additional analysis using a

16 regressor model that was performed in order to search for additional regions showing

differential EMO and ID task effects during the delay period that may not have been captured by

our original analysis using the 6 regressor model.

Data Analysis

The 6 regressor model described in the main manuscript was used to isolate significant

sustained activity related to the active maintenance of expression or identity. Limiting the

analysis to six regressors preserves statistical power, however this model does not allow for the

direct comparison of EMO and ID task conditions at a single subject level. Therefore, a

subsequent analysis was performed using a 16 regressor model that allowed for all possible

comparisons of task conditions and trial components. While this model was not as powerful as our primary model, it gave us the flexibility to directly compare EMO and ID tasks, independent of CON related activity. This model (see Postle, et al., 2000) consisted of 16 regressors, with one positive HRF-convolved stick function for each component of the task (Sample, Delay, Test, ITI) for each task condition (EMO_DMS, EMO_CON, ID_DMS, ID_CON). Delay regressors were created using the same method described in the first regression model. SPM{T} maps were generated for the contrasts of interest for each subject and included comparisons of EMO_DMS and ID_DMS trials for the Delay component (EMO_DMS_Delay > ID_DMS_Delay; ID_DMS_Delay > EMO_DMS_Delay) of the task. In addition, contrasts of EMO_DMS_Delay > EMO_CON_Delay and ID_DMS_Delay > ID_CON_Delay were generated to be used as inclusive masks for the EMO vs ID contrasts. We used the DMS > CON trial contrasts as masks to only include data for positive activations relative to our baselinefor active maintenance. Group analysis was performed by entering the SPM{T} maps from each subject into second-level random-effects one-sample t-tests on the contrasts of interest. The significance threshold was set at $p \leq 0.001$ (uncorrected) for Sample and Test, and $p \leq 0.005$ (uncorrected) for Delay, with and extent threshold of 5 contiguous voxels.

Results

The 16 regressor analysis revealed the following dissociation of delay related activity between EMO and ID tasks: When we compared EMO task delay period activity with that of the ID task, we observed greater EMO task activation in the left inferior frontal gyrus (triangularis) (peak at x=-48, y=30, z=6; T=6.32, Z=4.42, $p<0.001_{UNC}$). In contrast, for ID_Delay > EMO_Delay we observed activity in the right middle frontal gyrus (peak at x=42, y=34, z=38;

T=3.27, Z=2.82, p=0.002_{UNC}). It is important to note that although this model is not as powerful as our 6 regressor model, we were able to replicate the results of the DMS>CON active maintenance analysis from the original model using less stringent statistical thresholds (e.g. p ≤ 0.005, uncorrected). Contrasts of EMO_DMS > EMO_CON and ID_DMS > ID_CON produced the same pattern of activation as those same contrasts from the 6 regressor model, and served as inclusive masks for the EMO vs ID direct comparisonw.