# Supplemental Materials

*Image Acquisition*

Structural and functional data were collected on a 3.0-T Siemens Trio scanner using an 8-channel head coil. High-resolution T1-weighted structural images were collected in 160 axial slices and near isotropic voxels (0.9766 mm × 0.9766 mm × 1.0000 mm; TR = 1620 ms, TE = 3 ms, TI = 950 ms). Functional, blood-oxygenation-level-dependent (BOLD), echoplanar data were acquired in 3-mm isotropic voxels (TR = 3000, TE = 30). BOLD data were acquired in 42 axial slices, in an interleaved fashion with 64 × 64 in plane resolution. The functional data were collected in 3 runs of 163 images each. The first nine seconds of each functional run consisted of "dummy" gradient and radio frequency pulses to allow for steady-state magnetization during which no stimuli were presented and no fMRI data collected.

*Neuroimaging Data Analysis*

Off-line data analysis was performed using VoxBo (www.voxbo.org) and SPM2 (http://www.fil.ion.ucl.ac.uk/) software. Anatomical data from the subject were processed using the FMRIB Software Library (FSL) toolkit (http://www.fmrib.ox.ac.uk/fsl/) to correct for spatial inhomogeneity and to perform non-linear noise reduction. Functional data were sinc interpolated in time to correct for the slice acquisition sequence, motion corrected with a six-parameter, least squares, rigid body realignment routine using the first functional image as a reference, and normalized in SPM2 to a standard template in Montreal Neurological Institute (MNI) space. Normalization maintained 3-mm isotropic voxels and used 4th degree B-spline interpolation. The fMRI data were smoothed using a 9mm full-width half-max (FWHM) Gaussian smoothing kernel. Following these preprocessing steps, the average power spectrum across voxels and across scans was obtained, and the (square root) of the power spectrum fit with a 1/frequency function (Zarahn, Aguirre, & D'Esposito, 1997). This model of intrinsic noise was used during regression analyses with the Modified General Linear Model (Worsley & Friston, 1995) to inform the estimation of intrinsic temporal autocorrelation.

A design matrix was fit to each subject's data as part of a general linear model, with each condition modeled as an event with a specified duration convolved with the standard hemodynamic response function. Covariates of non-interest (global signal intensity, session means, movement spikes) were included in the design matrix separate from task conditions. VoxBo was used to compute parameter estimates (β) and t-contrast images for each comparison at each voxel. Contrast images for all participants across all main effects were included in group-level random effects analysis.

ROI analyses were performed based on clusters of functional activity found in the picture-picture > word-word and word-word > picture-picture contrasts (Figure S1; see Results section for full description of ROI selection procedure). To test the neural correlates of visual and verbal cognitive styles during the fMRI task, signal estimates were calculated for each ROI during each separate condition versus fixation baseline. These estimates were then correlated with scores on the separate dimensions of the VVQ (Visualizer and Verbalizer; see Table S1).

Separately, several whole-brain conjunction analyses were conducted in order to explore correlations between brain activity and behavioral measures beyond the circumscribed areas of the ROIs. To accomplish this, several new design matrices were fit for each group-level task-to-baseline comparison, separately modeling the scores from the two VVQ dimensions (Visualizer, Verbalizer) as parametric regressors of brain activity for each subject at each voxel. The resulting whole-brain parametric images were then combined with the picture-picture > word-word and word-word > picture-picture contrasts and the overlapping regions produced a new conjunction map for each analysis (Figure S2).

# Supplemental References

Zarahn E, Aguirre GK & D'Esposito M (1997) Empirical analyses of BOLD fMRI statistics. I. spatially unsmoothed data collected under null-hypothesis conditions. *Neuroimage* 5: 179-197.

Worsley KJ & Friston KJ (1995) Analysis of fMRI time-series revisited--again. *Neuroimage* 2: 173-181.

Supplemental Figure Legends

*Figure S1:* Main effects contrasts. Top: word-word > picture-picture contrast. Bottom: picture-picture > word-word contrast. Activity displayed at a threshold of $t > 3.60$, $p <$ 001, and superimposed onto axial sections of a representative subject's brain. Numbers next to axial images represent the Z coordinate in MNI space. Cross-sectional lines on saggital image display locations of axial sections.

*Figure S2:* Conjunction images. Top: conjunction of the parametric map of VVQ Verbalizer scores modulating activity during the picture-picture condition and the t-map of the word-word > picture-picture main effect contrast. Bottom: conjunction of the parametric map of VVQ Visualizer scores modulating activity during the word-word condition and the t-map of the picture-picture > word-word main effect contrast. Individual images are thresholded at $t > 2.50$, $p < .01$, resulting in a combined $t > 6.25$, $p < .0001$ for conjunction images. Activity is superimposed onto axial sections of a representative subject's brain. Numbers next to axial images represent the Z coordinate in MNI space. Cross-sectional lines on saggital image display locations of axial sections.

Supplemental Table Legend

*Table S1:* ROI analysis of working memory regions. Peak voxel locations (Talairach coordinates) and *t*-values are given based on the functional contrast defining each ROI (picture-picture > word-word or word-word > picture-picture). Pearson's correlations (*r*) were calculated between the separate VVQ dimensions (Visualizer and Verbalizer) and activity in each ROI for each condition relative to fixation baseline.