

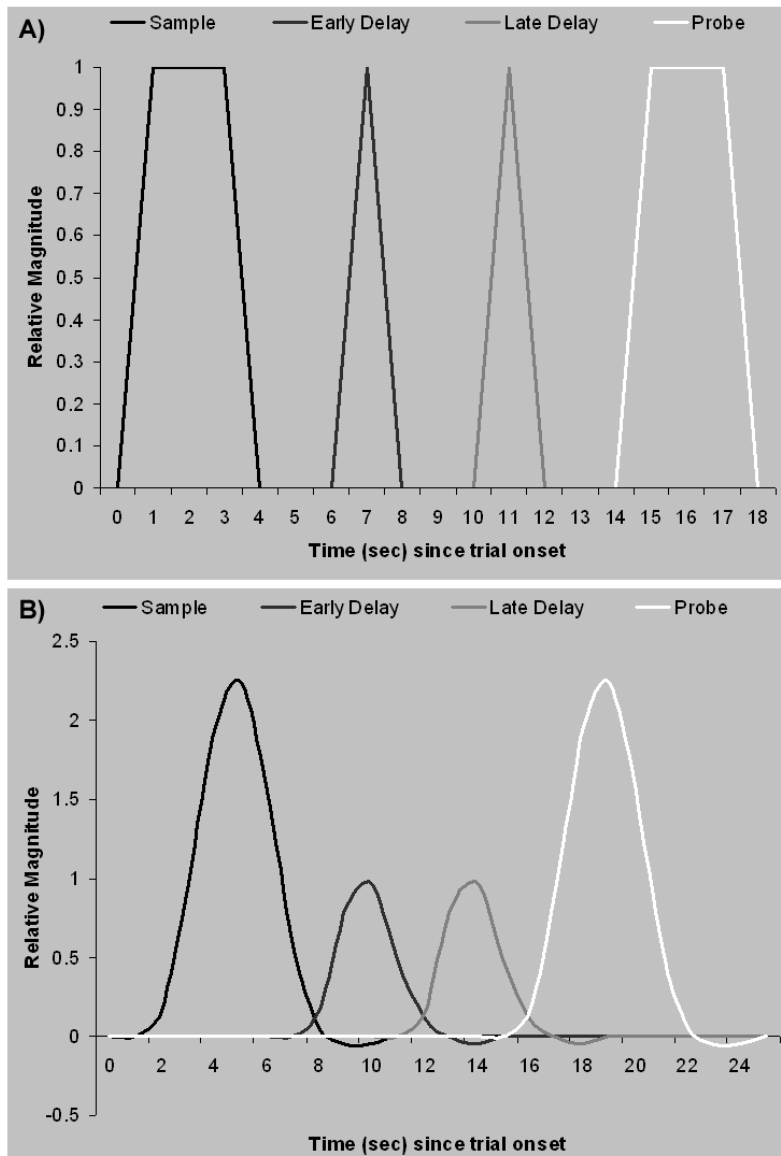
SUPPLEMENTAL RESULTS

Delay Period Activation Collapsed across Correct and Incorrect Trials

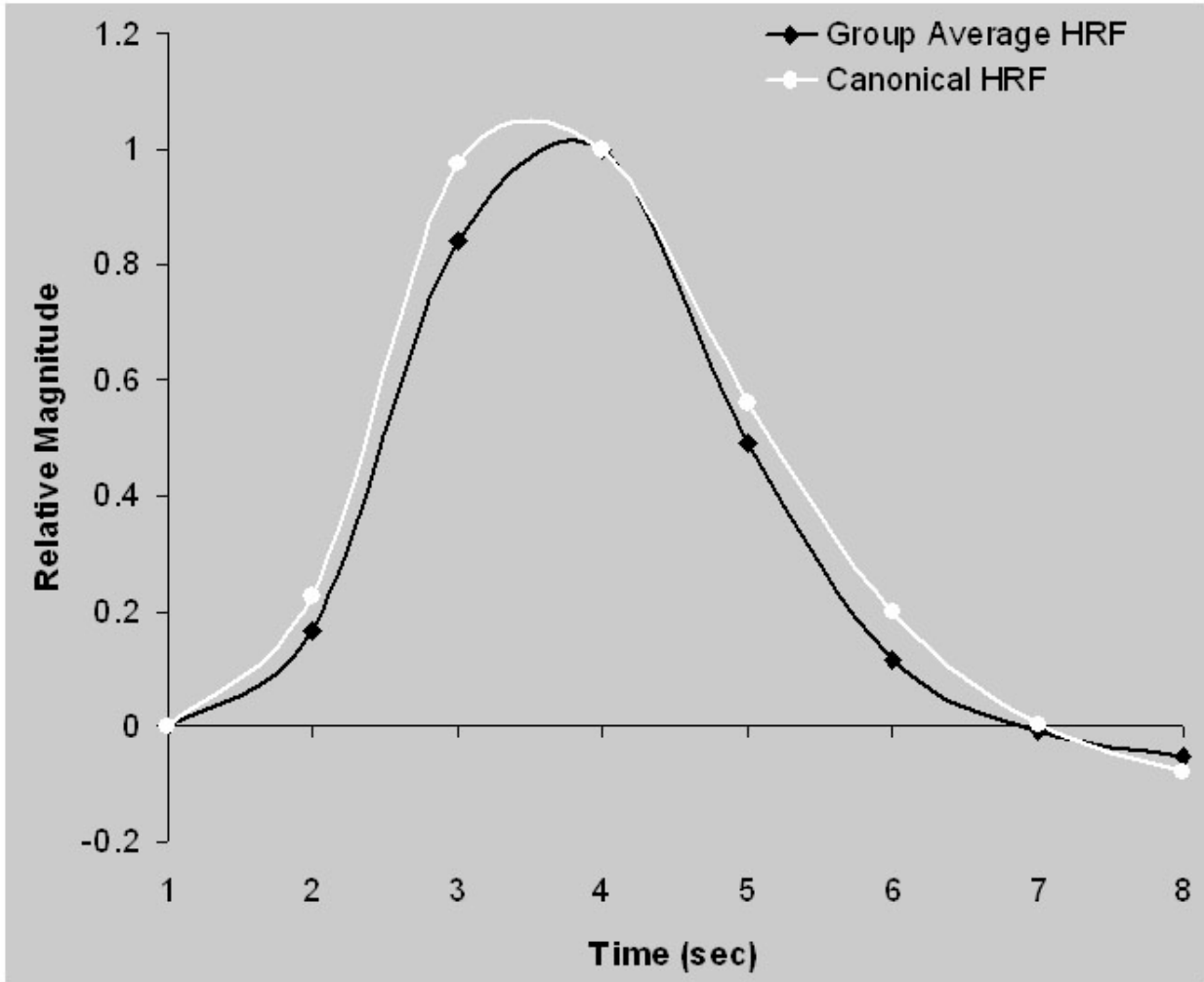
As indicated in the manuscript, there were no differences in brain activation as a function of accuracy during the delay period. However, when trials associated with correct and incorrect behavioral responses were collapsed and contrasted against the ITI baseline, delay period activity was evident in a network of brain regions that are commonly implicated in spatial working memory tasks (see Curtis, 2006). Brain regions that remained active over the course of the delay included bilateral anterior insula, bilateral frontal eye fields, bilateral posterior parietal cortex, supplementary eye fields, and left lateralized dorsolateral prefrontal cortex. Local maxima of activations identified in the delay period contrast are provided in supplemental Table 2, and graphs of the parameter estimates for each region are plotted in supplemental Figure 3.

Reference

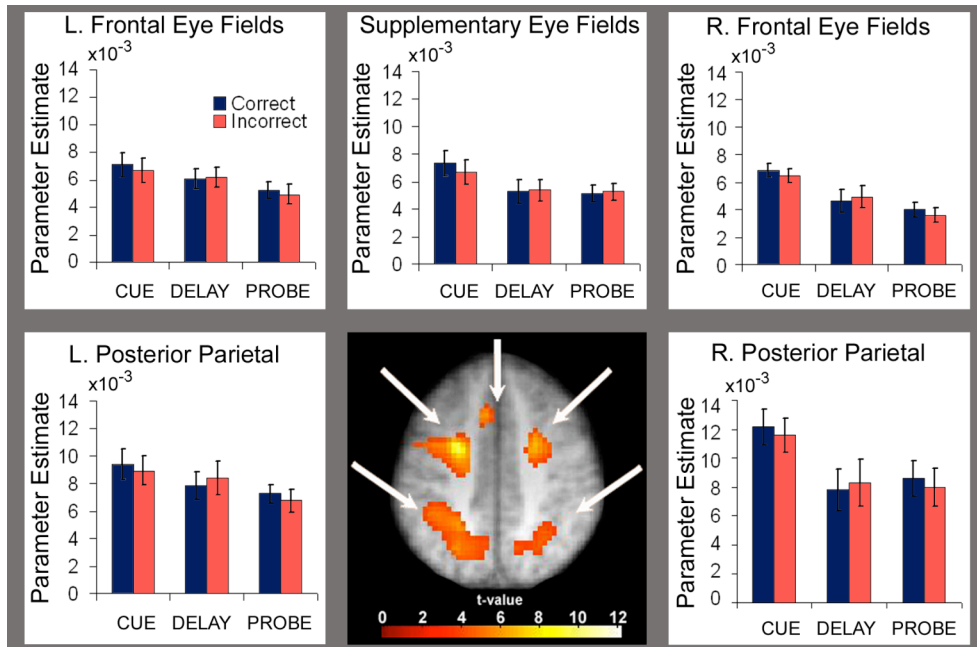
Curtis, C.E. (2006). Prefrontal and parietal contributions to spatial working memory. *Neuroscience*, 139, 173-180.



Supplemental Figure 1: A) Separate covariates were used to model each event within a trial. The sample period was modeled with a single covariate (from 0-4 sec). The delay period was modeled with an early delay covariate (from 6-8 sec) and a late delay covariate (from 10-12 sec). The probe event was modeled with a single covariate (from 14-18 sec). B) A plot of the covariates of interest convolved with the average empirically-derived HRF.



Supplemental Figure 2: Plots of the canonical hemodynamic response function (HRF) and the empirically derived group-average HRF used to model the data in the current experiment.



Supplemental Figure 3: Brain regions that remained active over the course of the delay for both correct and incorrect trials. Plots of parameter estimates (indexing response amplitude) for correct (blue bars) and incorrect (pink bars) trials are shown for the: (top) left and right frontal eye fields, along with the supplementary eye fields, and (bottom) left and right posterior parietal lobes. Activations are plotted on an averaged T1-weighted image.

Supplemental Table 1: Cue and Probe Period Activation Greater for Correct than for Incorrect Trials.

| <u>Brain Region</u> | <u>BA</u> | <u>X</u> | <u>Y</u> | <u>Z</u> | <u>T-Value</u> |
|--|------------------|-----------------|-----------------|-----------------|-----------------------|
| <i><u>CUE CORRECT > INCORRECT</u></i> | | | | | |
| <i><u>Frontal Lobe</u></i> | | | | | |
| L. Precentral Gyrus | 6 | -63 | 0 | 33 | 6.67 |
| R. Precentral Gyrus | 4 | 6 | -30 | 72 | 5.44 |
| L. Inferior Frontal Gyrus | 44 | -48 | 12 | 6 | 4.99 |
| R. Inferior Frontal Gyrus | 45/47 | 51 | 24 | 6 | 6.41 |
| R. Superior Frontal Gyrus | 8/9 | 6 | 45 | 45 | 4.74 |
| <i><u>Parietal Lobe</u></i> | | | | | |
| R. Postcentral Gyrus | 2 | 24 | -36 | 66 | 6.87 |
| R. Inferior Intraparietal Sulcus | 7/19 | 21 | -78 | 33 | 4.84 |
| <i><u>Temporal Lobe</u></i> | | | | | |
| L. Perirhinal Cortex | 20/36 | -30 | -15 | -33 | 4.29 |
| R. Perirhinal Cortex | 20 | 39 | -3 | -33 | 4.87 |
| L. Fusiform Gyrus | 20 | -39 | -15 | -30 | 4.10 |
| R. Fusiform Gyrus | 20 | 42 | -27 | -24 | 4.62 |
| L. Anterior Hippocampus | | -36 | -12 | -21 | 5.17 |
| L. Posterior Hippocampus | | -27 | -33 | 3 | 4.29 |
| L. Inferior Temporal Gyrus | 37 | -54 | -72 | 9 | 4.02 |
| | 20 | -45 | -6 | -42 | 4.33 |
| L. Middle Temporal Gyrus | 21 | -51 | 9 | -27 | 4.21 |
| | 21 | -39 | 3 | -42 | 3.86 |
| | 21 | -48 | -45 | 9 | 4.93 |
| L. Superior Temporal Gyrus | 22 | -48 | -24 | 0 | 5.10 |
| | 38 | -45 | 15 | -30 | 3.89 |
| R. Superior Temporal Gyrus | 22 | 45 | -36 | 18 | 4.68 |
| | 22 | 54 | -18 | -3 | 5.55 |
| <i><u>Occipital Lobe</u></i> | | | | | |
| L. Middle Occipital Gyrus | 19 | -36 | -66 | 12 | 5.82 |

| | | | | | |
|-------------------------------------|-------|-----|-----|-----|------|
| | 18/19 | -39 | -84 | 15 | 4.47 |
| R. Cuneus | 18/19 | 15 | -81 | 24 | 3.97 |
| <u>Midline Structures</u> | | | | | |
| L. Midbrain | | -9 | -21 | -15 | 5.57 |
| <u>Cerebellum</u> | | | | | |
| L. Cerebellum | | -3 | -51 | -6 | 4.36 |
| <u>PROBE CORRECT > INCORRECT</u> | | | | | |
| <u>Frontal Lobe</u> | | | | | |
| R. Precentral Gyrus | 4/6 | 33 | -9 | 69 | 5.15 |
| | 4/6 | 27 | -15 | 75 | 4.07 |
| R. Superior Frontal Gyrus | 8/9 | 18 | 42 | 39 | 4.96 |
| Medial Frontal Gyrus | 6 | -6 | -6 | 51 | 6.89 |
| L. Insula | | -36 | 6 | 15 | 7.66 |
| | | -30 | -3 | 15 | 6.85 |
| R. Insula | | 30 | 3 | 15 | 6.91 |
| <u>Parietal Lobe</u> | | | | | |
| L. Postcentral Gyrus | 1 | -54 | -21 | 54 | 4.19 |
| R. Postcentral Gyrus | 5/7 | 24 | -39 | 66 | 4.22 |
| R. Paracentral Lobule | 5/7 | 9 | -33 | 54 | 4.48 |
| L. Inferior Parietal Lobe | 40 | -63 | -24 | 33 | 4.44 |
| | 40 | -54 | -27 | 48 | 3.94 |
| R. Inferior Parietal Lobe | 40 | 51 | -36 | 33 | 6.32 |
| R. Superior Parietal Lobe | 5/7 | 15 | -51 | 66 | 4.66 |
| <u>Temporal Lobe</u> | | | | | |
| L. Amygdala | | -21 | 3 | -15 | 4.17 |
| R. Entorhinal Cortex | 28/36 | 21 | -3 | -27 | 4.18 |
| L. Posterior Hippocampus | | -30 | -30 | -3 | 4.20 |
| | | -24 | -36 | 3 | 4.20 |
| R. Posterior Hippocampus | | 27 | -27 | -6 | 4.90 |
| L. Inferior Temporal Gyrus | 37 | 39 | -63 | 0 | 4.18 |
| R. Inferior Temporal Gyrus | 37 | 48 | -63 | -9 | 4.23 |

| | | | | | |
|---|-------|-----|-----|-----|------|
| | 20/21 | 57 | -12 | -21 | 4.15 |
| L. Superior Temporal Gyrus | 22 | -66 | -39 | 15 | 4.25 |
| <i><u>Occipital Lobe</u></i> | | | | | |
| R. Inferior Occipital gyrus | 19 | 33 | -81 | -6 | 4.59 |
| L. Middle Occipital Gyrus | 19 | -36 | -75 | 3 | 4.23 |
| | 19 | -42 | -66 | 6 | 4.01 |
| <i><u>Midline Structures</u></i> | | | | | |
| Anterior Cingulate | 32 | -9 | 36 | -6 | 4.53 |
| <i><u>Cerebellum</u></i> | | | | | |
| R. Cerebellum | | 18 | -54 | -30 | 4.25 |
| <i><u>PROBE MATCH > MISMATCH</u></i> | | | | | |
| <i><u>Frontal Lobe</u></i> | | | | | |
| R. Precentral Gyrus | 4 | 27 | -24 | 63 | 5.35 |
| | 4 | 15 | -33 | 63 | 4.24 |
| R. Superior Frontal Gyrus | 8 | 12 | 54 | 42 | 6.04 |
| L. Insula | | -45 | -15 | -3 | 4.39 |
| | | -36 | -18 | -6 | 3.97 |
| R. Insula | | 39 | -12 | 18 | 4.44 |
| | | 42 | -27 | 21 | 4.23 |
| <i><u>Parietal Lobe</u></i> | | | | | |
| R. Postcentral Gyrus | 1 | 24 | -33 | 66 | 5.10 |
| <i><u>Temporal Lobe</u></i> | | | | | |
| R. Perirhinal | 20/28 | 33 | -6 | -33 | 4.75 |
| L. Fusiform Gyrus | 19/37 | -30 | -51 | -3 | 4.70 |
| L. Posterior Hippocampus | | -30 | -33 | -6 | 3.96 |
| | | -27 | -33 | 3 | 3.91 |
| R. Middle Temporal Gyrus | 21 | 51 | -3 | -9 | 4.48 |
| R. Superior Temporal Gyrus | 42 | 66 | -15 | 9 | 5.01 |
| <i><u>Occipital Lobe</u></i> | | | | | |
| L. Cuneus | 18 | -24 | -84 | 3 | 7.52 |

| | | | | | |
|-----------------------------|----|-----|-----|----|------|
| R. Cuneus | 19 | 21 | -90 | 30 | 5.43 |
| L. Inferior Occipital Gyrus | 18 | -36 | -81 | -3 | 6.32 |
| R. Inferior Occipital Gyrus | 18 | 30 | -90 | -3 | 5.28 |
| L. Middle Occipital Gyrus | 19 | -33 | -78 | 6 | 5.83 |
| R. Middle Occipital Gyrus | 19 | 33 | -84 | 6 | 6.41 |

Cerebellum

| | | | | | |
|---------------|--|----|-----|-----|------|
| R. Cerebellum | | 30 | -54 | -15 | 4.33 |
|---------------|--|----|-----|-----|------|

PROBE MISMATCH > MATCH

| | | | | | |
|---------------------------|----|-----|-----|----|------|
| L. Inferior Parietal Lobe | 40 | -36 | -30 | 54 | 4.62 |
|---------------------------|----|-----|-----|----|------|

Supplemental Table 2: Delay Period Activation Collapsed Across Correct and Incorrect Trials and Contrasted against Baseline.

| <u>Brain Region</u> | <u>BA</u> | <u>X</u> | <u>Y</u> | <u>Z</u> | <u>T-Value</u> |
|----------------------------|------------------|-----------------|-----------------|-----------------|-----------------------|
| L. Inferior Frontal Gyrus | 45 | -42 | 24 | 21 | 5.22 |
| Supplementary Eye Fields | 6 | -12 | 6 | 63 | 8.12 |
| | 6 | -3 | 3 | 60 | 7.95 |
| L. Frontal Eye Fields | 8 | -24 | -3 | 54 | 12.19 |
| R. Frontal Eye Fields | 8 | 24 | -3 | 51 | 7.10 |
| L. Anterior Insula | | -30 | 21 | 0 | 5.65 |
| | | -30 | 18 | 9 | 5.10 |
| R. Anterior Insula | | 27 | 24 | 6 | 5.61 |
| L. Inferior Parietal Lobe | 40 | -27 | -45 | 42 | 6.92 |
| L. Superior Parietal Lobe | 7 | -18 | -63 | 66 | 7.55 |
| | 7 | -27 | -57 | 57 | 7.30 |
| R. Calcarine Sulcus | 17 | 27 | -57 | 12 | 5.62 |
| R. Cerebellum | | 9 | -69 | -24 | 4.68 |

Supplemental Table 3: Cue, Early Delay, Late Delay, and Probe Activation, Greater for Correct than for Incorrect Trials, and Correlated with Individual Performance.

| <u>Brain Region</u> | <u>BA</u> | <u>X</u> | <u>Y</u> | <u>Z</u> | <u>T-Value</u> |
|----------------------------|---------------------------|-----------------|-----------------|-----------------|-----------------------|
| | <i><u>CUE</u></i> | | | | |
| L. Inferior Temporal Gyrus | 20/21 | -54 | -15 | -18 | 5.22 |
| Medial Frontal Gyrus | 10 | 0 | 57 | 6 | 5.07 |
| L. Superior Frontal Gyrus | 10 | -12 | 69 | 0 | 6.73 |
| | 10 | 3 | 63 | 24 | 5.87 |
| | <i><u>EARLY DELAY</u></i> | | | | |
| L. Entorhinal Cortex | 28 | -18 | 3 | -30 | 4.84 |
| | <i><u>LATE DELAY</u></i> | | | | |
| Medial Frontal Gyrus | 10 | 3 | 66 | 0 | 4.87 |
| L. Superior Frontal Gyrus | 10 | -12 | 69 | -3 | 6.93 |
| | 10 | -9 | 60 | -9 | 4.62 |
| R. Superior Frontal Gyrus | 11 | 18 | 57 | -15 | 4.34 |
| | <i><u>PROBE</u></i> | | | | |
| L. Postcentral Gyrus | 2 | -51 | -21 | 48 | 5.44 |
| R. Postcentral Gyrus | 2 | 54 | -18 | 33 | 5.33 |
| Medial Frontal Gyrus | 11 | 6 | 60 | -18 | 4.75 |
| | 11 | -6 | 60 | -15 | 3.96 |
| Middle Temporal Gyrus | 39 | 60 | -60 | 18 | 4.22 |