Delay-period activity of the parietal cortex depends on working memory load

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Background

Multivariate pattern analysis (MVPA) studies of visual short-term memory (VSTM) indicate that elevated delay-period activity often does not carry stimulus information [1, 2].

Methods

- 12 subjects (3 females, 25±4 years old)
- VSTM tasks in 3T MRI: 6 runs of 30 trials and 3 runs of 24 trials (for behavior only) with 3 trial types (1Motion, 1Motion2Colors, 3Motions) and 2 loads (1 and 3).
- Analyses: mixture-model [3] and descriptive for behavior, preprocessing, general linear model and multivariate pattern analysis (MVPA, leave-one-trial-out approach) for fMRI.
- IPS masks based on introspection of individual delay BOLD activity and anatomy, sample masks based on individual sample BOLD activity.

Results

Behavior

BOLD activity

Conclusions

Although behavioral data and BOLD activity in aIPS are consistent with inter-item interference, MVPA results suggest that aIPS: 1) does not represent stimuli; 2) encodes load; 3) encodes trial identity. These are characteristics of a source of attentional control. In contrast, it is posterior, sample-evoked regions that represent stimuli in a manner that tracks psychophysical precision.

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