Are items in working memory stored with long-term memory mechanisms?

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Models of WM

- **Cowan (2008)**
- **Oberauer (2012)**
- **McElree (2006)**

**Phase 1**
- Train pattern classifier on the delay period activity from a one-item (face, motion, or word) delayed recognition task
- GLM on Phase 1, main effect of stimulus category, uncorrected p < .0000001, Mean # voxels = 10,225

**Phase 2**
- Test the classifier on a two-item delayed recognition task with prioritization cues
- 3 runs of 24 total (24 per category)
  - Leave-one-trial-out, k-fold cross-validation with L2 regularized logistic regression (A penalty term = 25)
  - Voxels identified by the omnibus F-test or voxels in AFN's Talarach & Tourneaux atlas for the hippocampus and parahippocampal gyrus

**Conclusions**
- MVPA evidence for only the item(s) in focal attention (AMIs); no evidence for UMIs.
- Information about stimulus category was not present in the hippocampus at any time point; information was present in the parahippocampal gyrus, primarily during encoding and retrieval.
- Subsequent declarative LTM was not better for UMIs than AMIs; it was better for items that were cued/tested at least once than for items that were uncued/untested (umi/uml) (see also, LaRocque et al., in press, Memory & Cognition).
- Subsequent nondeclarative LTM was insensitive to cueing or delay.
- Unattended memory items are not preferentially represented in LTM.


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Experiment 1: MVPA of fMRI during WM

**Functional Mask (Voxels Sensitive to Stimulus Category)**

**Structural Mask (Hippocampus)**

**Experiment 2: WM Task**

- Two-item delayed recall task with prioritization cues
- Sample: delay 1, recall 1, case 2, recall 2, and M
- Recall Performance Estimate = 99.9% correct

**Structural Mask (Parahippocampal Gyrus)**

**Subsequent Word-Stem Completion and Cued Recall**

- AMI/AMI: alg
- UMI/UMI: amb

**Phase 2 Behavioral Performance**

- 10 min delay group (n=11)
- 2 hr delay group (n=15)

References