Separation of items from their context observed via fMRI pattern analysis of item-method directed forgetting

Judy Y.C. Chiu*1, Tracy H. Wang*2, Diane M. Beck1, Jarrod A. Lewis-Peacock2 and Lili Sahakyan1 *indicates co-first authorship

Department of Psychology and Beckman Institute, University of Illinois, Urbana-Champaign
Department of Psychology and Biomedical Imaging Center, University of Texas at Austin

email: ychiu4@illinois.edu

1Neural Correlates of Directed Forgetting

- Previous studies have characterized univariate fMRI correlates of directed forgetting (DF).
- Items are bound to the Context in which they are encoded.
- Two recent studies of DF used multi-voxel pattern analysis (MVPA) to decode memory representation during DF.

2Behavioral and GLM Results: Successful Replication of Item-Method DF Effects

We show both behavioral and neural evidence of item-method DF effects.

3Decoding Context Reinstatement

We can read-out "tag context" by presenting words (items) with scenes (context). We can later decode for context reinstatement during item-directed forgetting when items appear alone.

4How specific is context representation after the TBF cue?

Representational Similarity Analysis (RSA)

5Context representation during Directed Forgetting

For TBR trials, there was an upregulation of item representation during the TBF postcue period. This effect did not interact with emotion (word type).

6Subsequent Memory x DF intention

TBF hits and misses show that items and context separate regardless of their subsequent memory outcome.

7Summary and Conclusions

- In this Item-method DF study: item representation: TBR vs TBF context representation: TBR vs TBF
- The intent to remember elicited more processing of an item with no further engagement with the item’s previous context. The intention to forget downregulated item representation while showing evidence of reinstatement for intrasubject information, thus 'neural separation' of item and context.
- Item/context neural separation is related to forget intention, not memory outcome.

- RSA of context activity showed greater similarity between encoding and DF phase for TBR relative to TBR items. When an item is presented during the DF phase, the context being reinstated is the same context as when the item is first learned.

References