Remembering Emotional Stimuli Re-Instantiates Valence Coding Voxel-Patterns from Visual and Temporal Cortex

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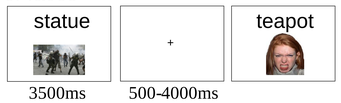
Introduction

- Retrieval involves the ability to reproduce information from the encoding episode[1]
- The reactivation of visual cortex supports memory retrieval of negative, vivid memories in particular[2]
- Do regions that code for valence during encoding of emotional stimuli become re-instantiated during retrieval of those emotional memories?
- Hypothesis: encoding-related valence codes in visual cortex will reinstate during retrieval using non-emotional probes

Methods & Behavioral Results

Siemens 3T Trio; 32 channel head coil
4 encoding-retrieval blocks
48 old & 40 new stim/ block

Encoding: neutral words w/ negative, neutral, or positive scenes or faces

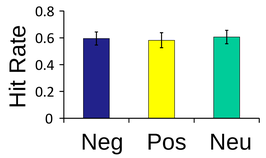


Intentional encoding of words; face/scene judgment

Retrieval: neutral word retrieval cues

Remember, know or new judgment

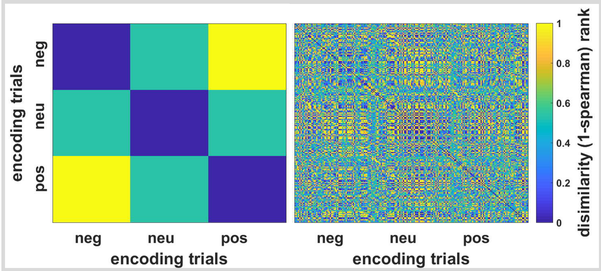
Behavioral Results (N = 16)



Encoding analysis

Identify valence-coding cortex during study

- Searchlight RSA following the Chikazoe et al. analysis[3]



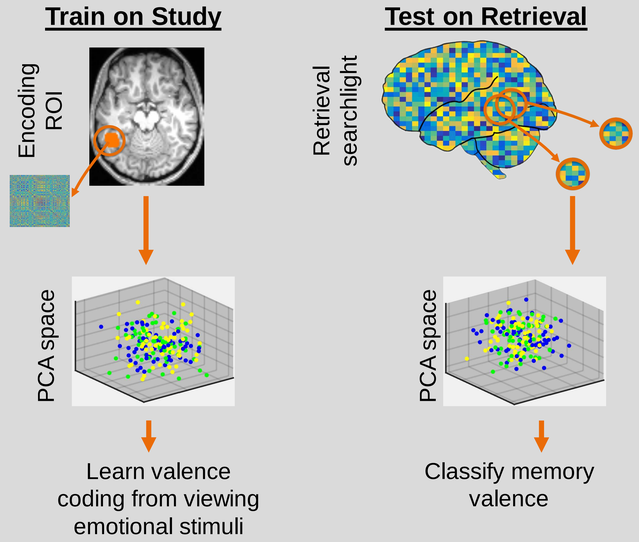
Searchlights

- 5 voxel diameter spheres, volume of 81 voxels
- Statistical evaluation with Stelzer et al.[5] cluster null simulations
- For MVPA , voxel patterns from encoding (ROIs) and test (searchlights) aligned in response space with Srinivasan et al. "lightweight hyperalignment" method[4]
  - Data reduced to the first 60 PCs; LDA classifier does not require identically ordered PCs

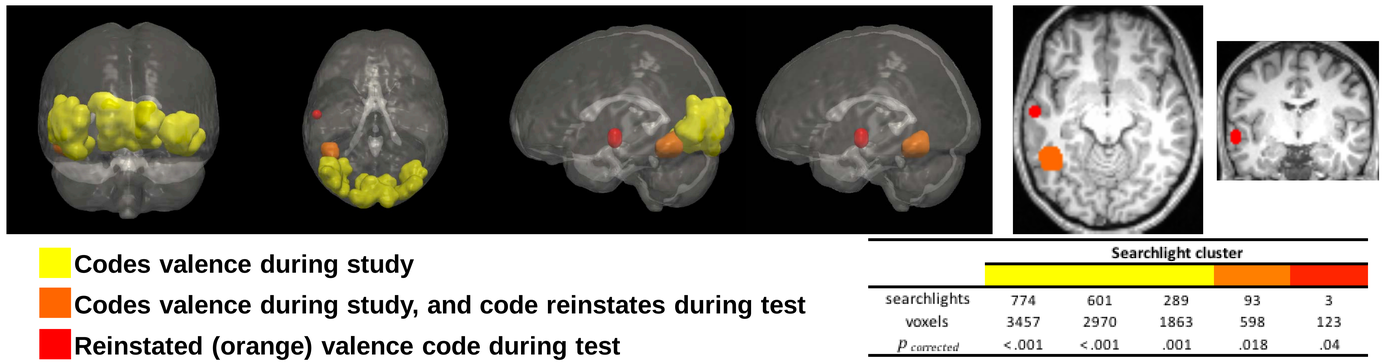
Memory analysis

Find reinstated valence codes during test

- Searchlight MVPA classifying memory valence based on prior valence codes during study



Results



Codes valence during study

Codes valence during study, and code reinstates during test

Reinstated (orange) valence code during test

	Searchlight cluster				
searchlights	774	601	289	93	3
voxels	3457	2970	1863	598	123
$p_{corrected}$	< .001	< .001	.001	.018	.04

Conclusions

- Evidence in support of our hypothesis: valence codes in visual cortex from prior encoding event were reinstated during retrieval using neutral probes
- At study, posterior temporal cortex coded valence; at retrieval coding reinstates in anterior temporal cortex
- Modeling and experimental results show information becomes more abstract along the ventral steam[6]
- Suggests we retrieve emotion as abstract representations of previous experiences

References

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