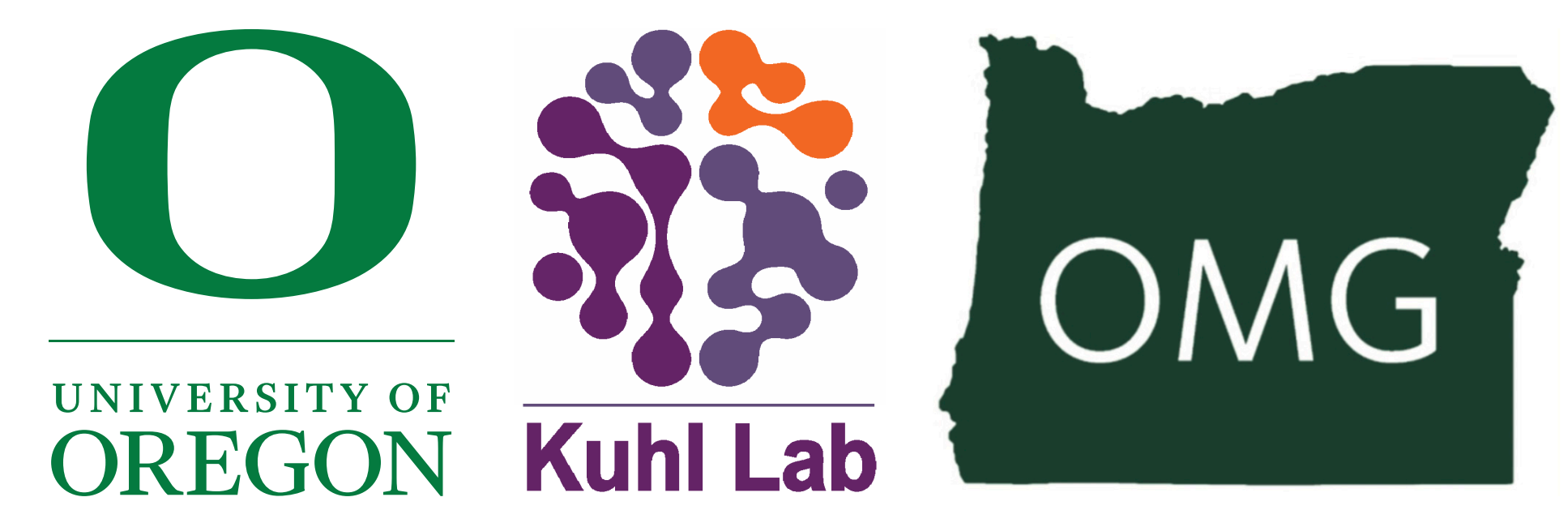


Episodic simulation samples from recently encoded memories

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Background

- The episodic memory system supports both memory retrieval and constructive episodic simulation of future or imagined events^{1,2}
- Retrieval and simulation activate many of the same brain regions, including the core recollection network, which includes the hippocampus, MPFC, and angular gyrus^{3,4,5}
- Episodic simulation is thought to 'sample' from recent experience⁴

Does the availability of recent experience influence the *representational format* of episodic simulation?
Does recent experience *uniquely* influence representations in *core memory networks*?

Methods

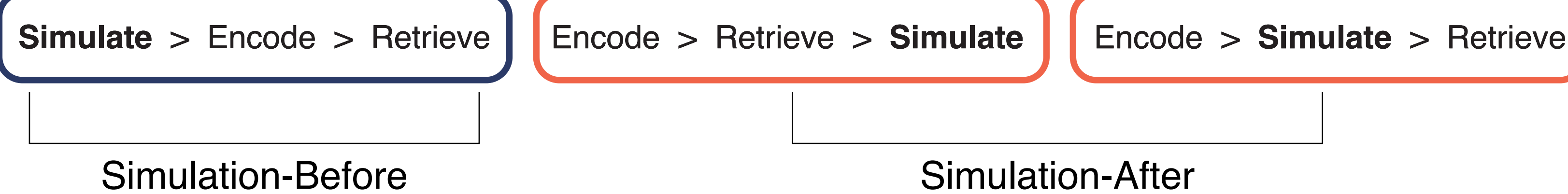
fMRI Procedures

- n = 35 participants
- fMRI: 3T Siemens Skyra, 2mm isotropic voxels, TR = 2s

Experimental Procedures

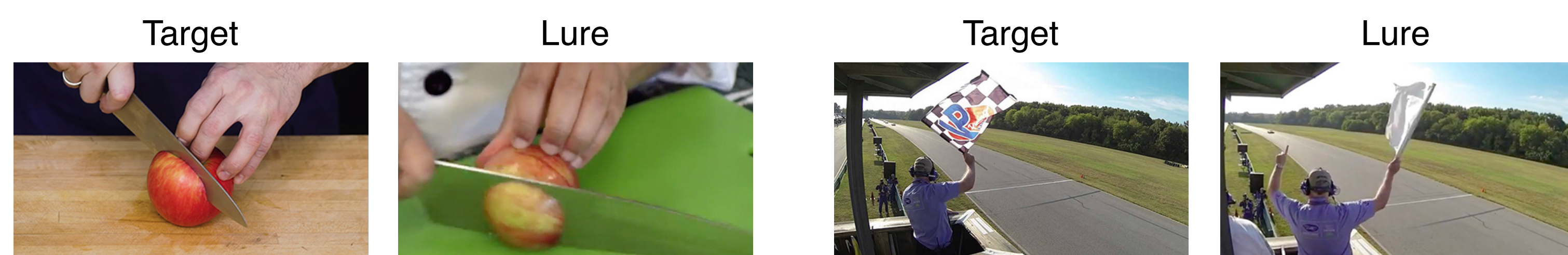
	Cue	Task	Response
Encoding	cutting		+
Retrieval	cutting		Successful? yes (1) no (2)
Simulation	apple		Successful? yes (1) no (2)

- Participants completed encoding, retrieval, and simulation tasks during fMRI scanning
- Task order was varied to assess how prior encoding influences simulation
- 90 trials total: three runs per task order, ten trials per run

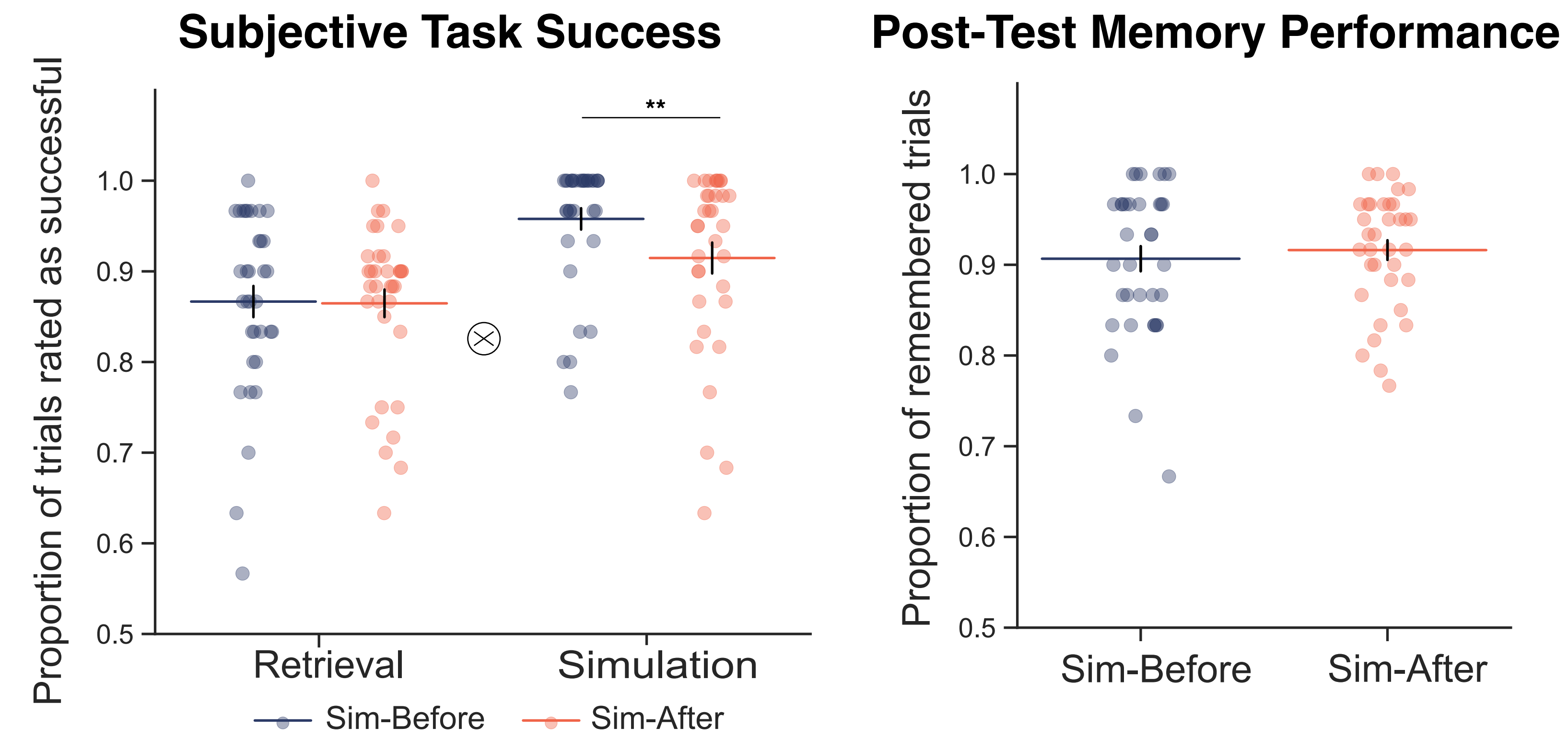


Post-Scan Memory Test

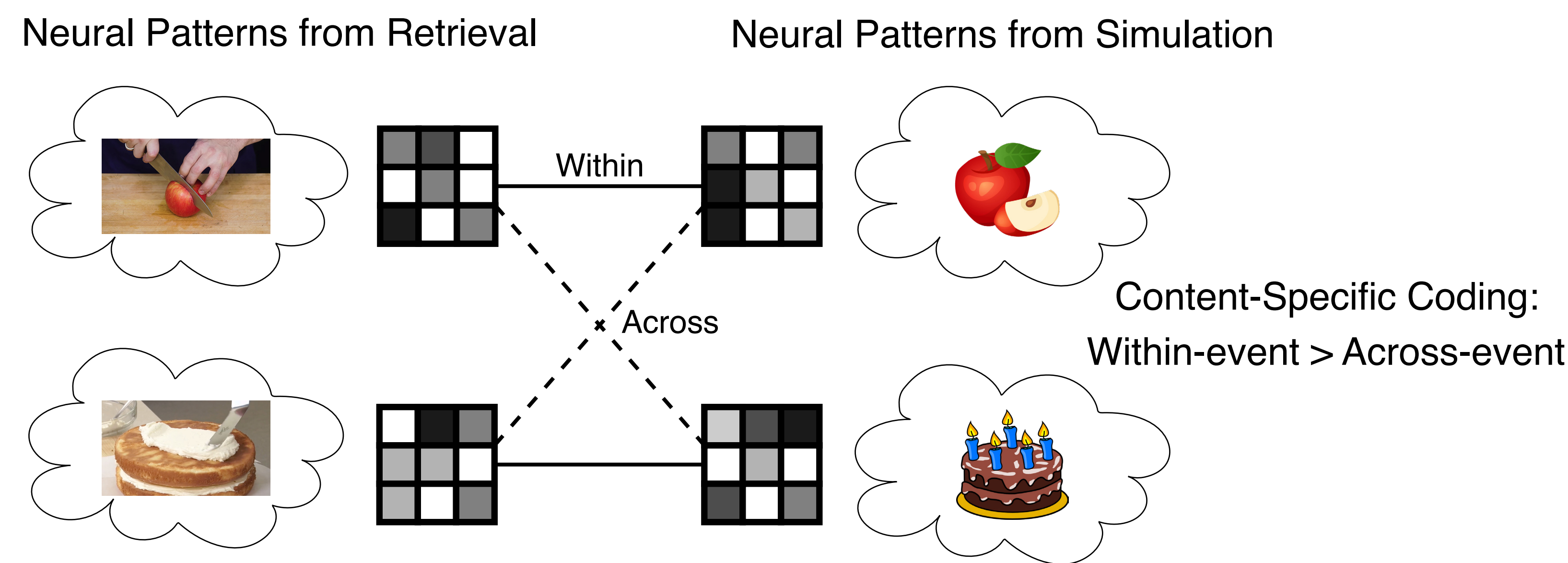
- Participants completed memory test after exiting fMRI scan
- Presented with screenshots from watched videos (targets) and similar lure images



Results

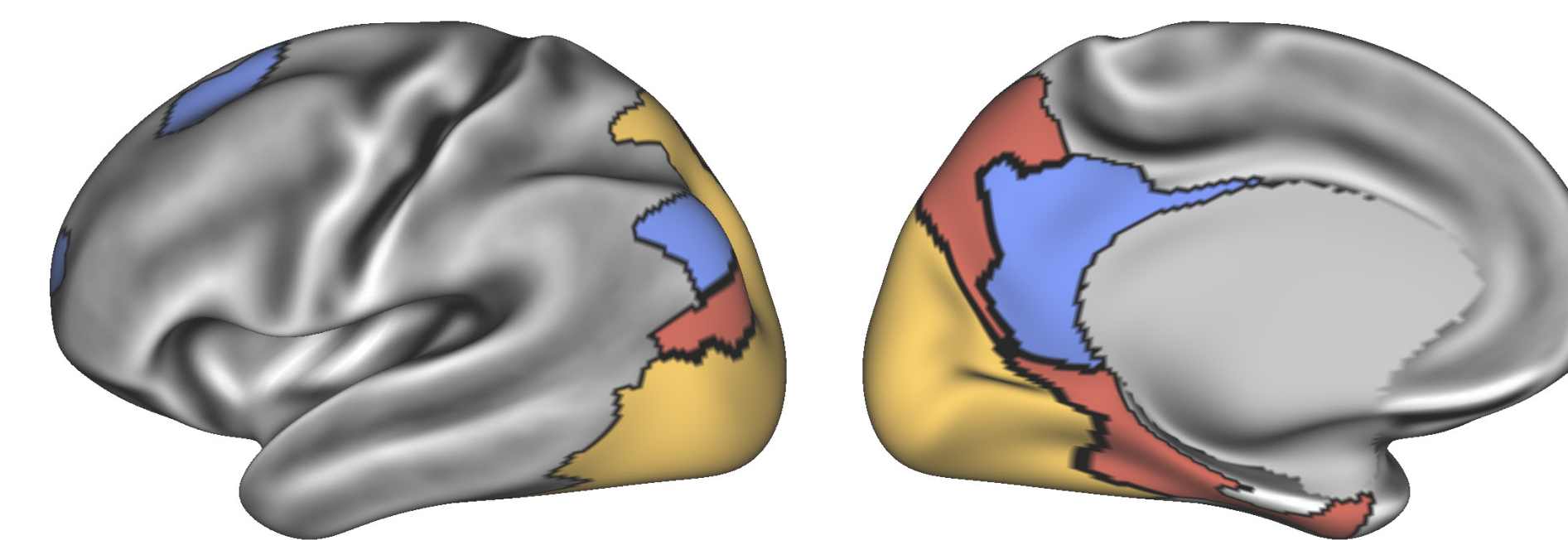


Content-Specific Pattern Similarity

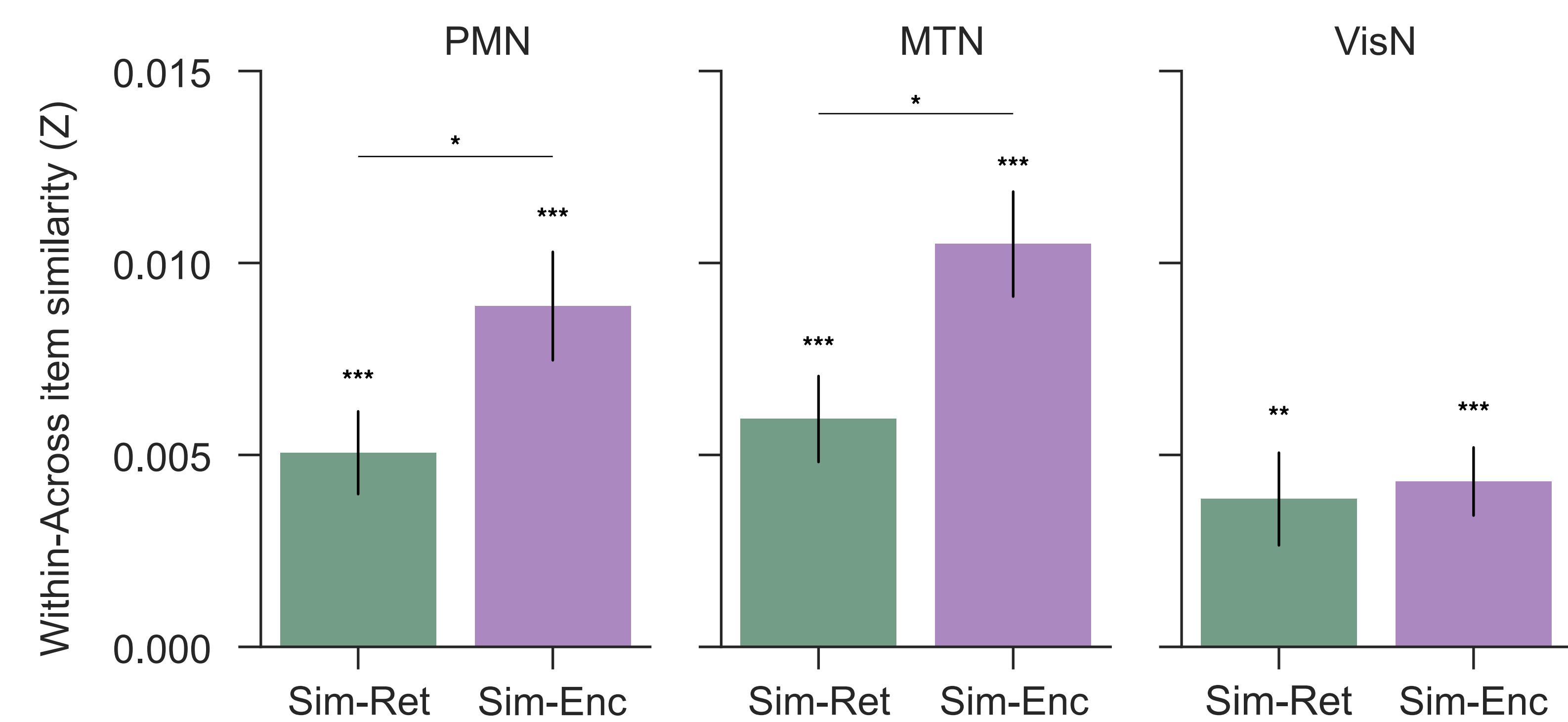


Regions of Interest⁶

- PMN (blue)
- MTN (red)
- VisN (yellow)



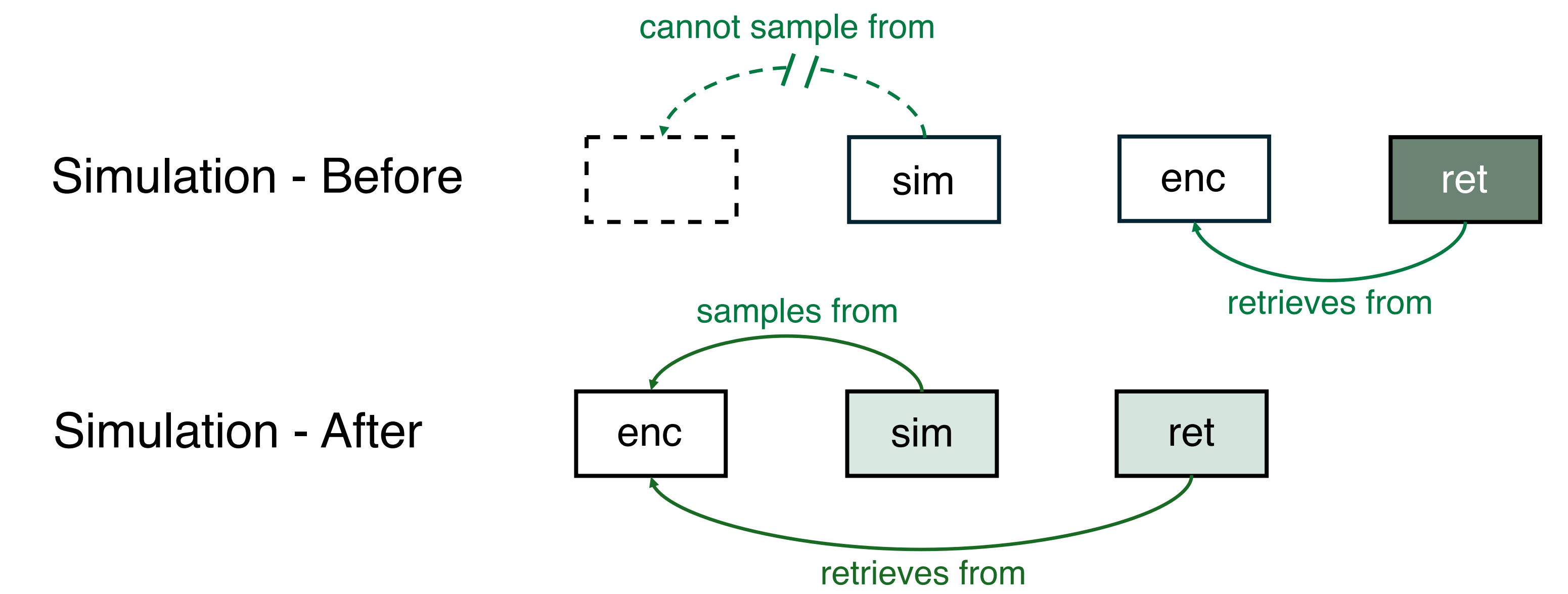
Content-Specific Pattern Similarity



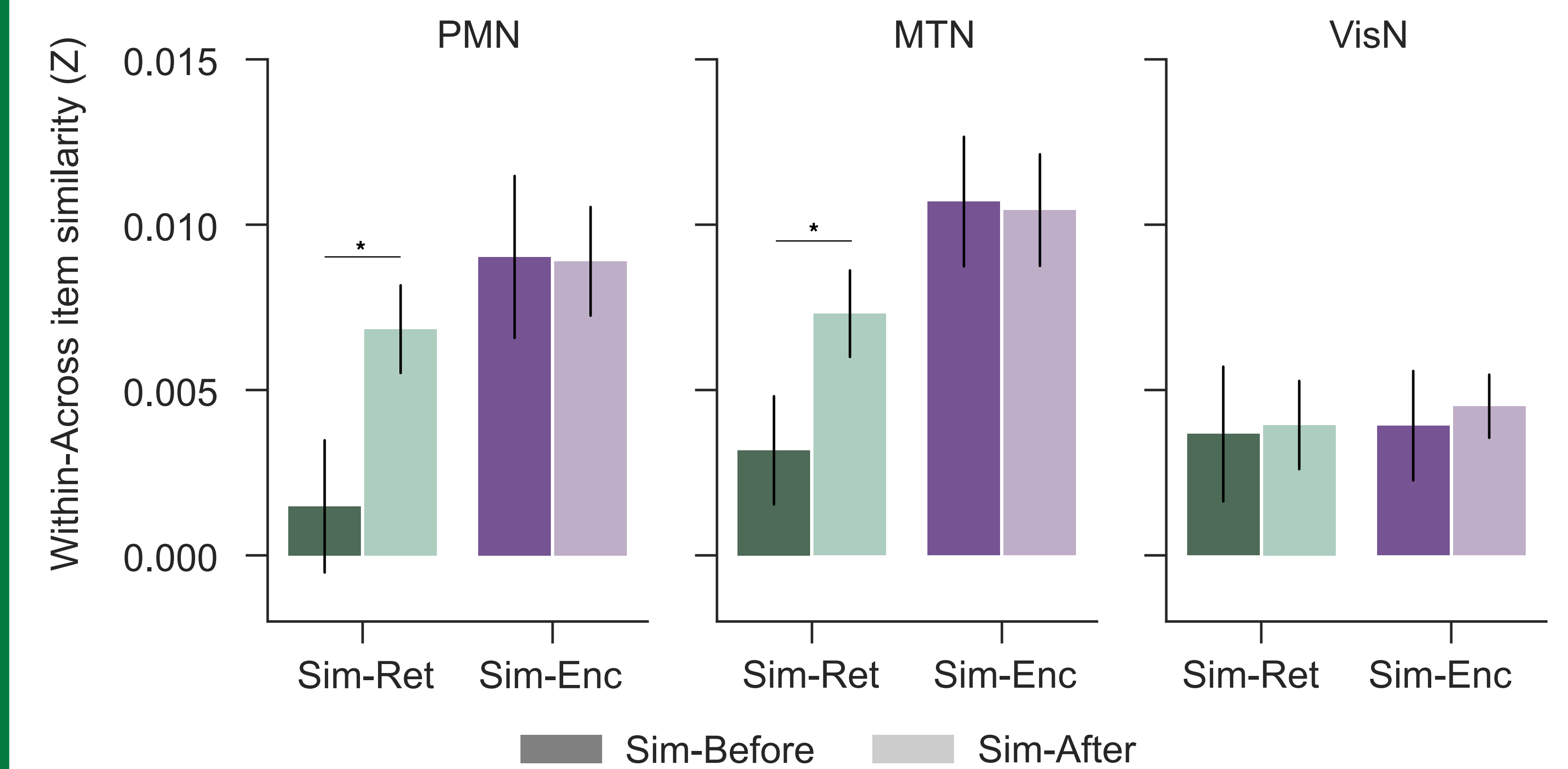
ROI x Similarity Interaction: p = 0.021

* p < 0.05, ** p < 0.01, *** p < 0.001

Results



Content-Specific Pattern Similarity as a Function of Task Order



Conclusions

- Within the memory network, simulated representations have content-specific fMRI pattern similarity to encoded and retrieved representations
- Overall, greater similarity to encoding than retrieval
- Simulation more strongly resembles retrieval when simulation occurs after encoding, consistent with idea that simulation samples from memory
- However, simulation-encoding similarity was not influenced by task order, possibly because simulated experiences are always 'new,' even if they sample from memory
- Pattern of results suggests recent experience changes the **representational format** of simulation^{7,8}: episodic sampling shifts the format toward retrieval
- Recent experience uniquely influenced representations in core memory networks (PMN, MTN)

References & Acknowledgements

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