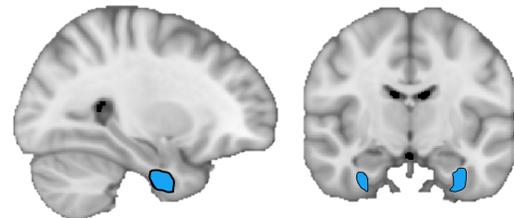


Introduction

- Semantic memory refers to our conceptual knowledge of the world, such as knowing that pancakes are eaten for breakfast
- Episodic memory supports recollection of our personal experiences, such as recalling that you had pancakes for breakfast yesterday
- Cognitive neuroscience research studying how semantic and episodic memory are supported by the brain has traditionally focused on either one system or the other
- An emerging line of evidence suggests that the perirhinal cortex (PRC) contributes to both of these fundamentally different kinds of memory[1]

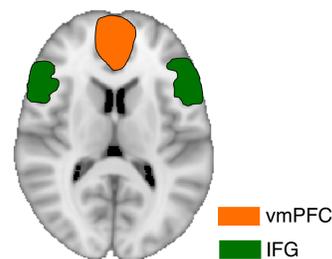


Region of Interest
Perirhinal cortex (PRC) in blue

Research Questions

- Does retrieval of semantic and episodic information reflect a dynamic reshaping of information coded in PRC?
- Does the representational flexibility emerge through interactions with cognitive control mechanisms that are supported by the frontal lobe of the brain?

- Relevant prior research has revealed compelling links between inferior frontal gyrus (IFG) and cognitive control in semantic memory tasks [2], and ventromedial prefrontal cortex (vmPFC) and cognitive control in episodic memory tasks [3]



Regions of Interest
Ventromedial prefrontal cortex (vmPFC) in orange, and inferior frontal gyrus (IFG) in green

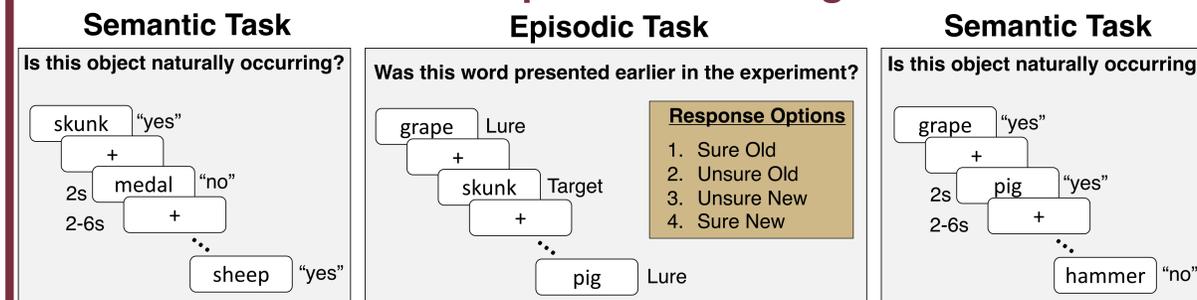
Hypotheses

Information in PRC will be dynamically reshaped to reflect ongoing retrieval demands and that these transient changes will be driven by the establishment of alliances between PRC and either the IFG or vmPFC.

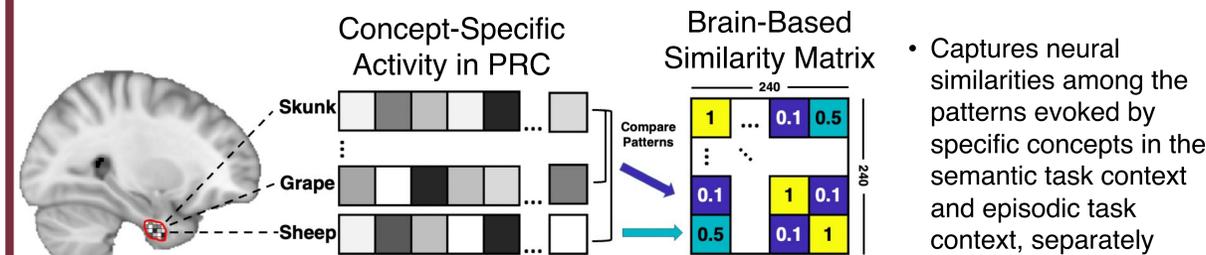
Methods

- 35 cognitively healthy graduate and undergraduate students at Florida State University
- Mixed block / event-related functional Magnetic Resonance Imaging (fMRI) experiment that required retrieval of either semantic or episodic information from memory

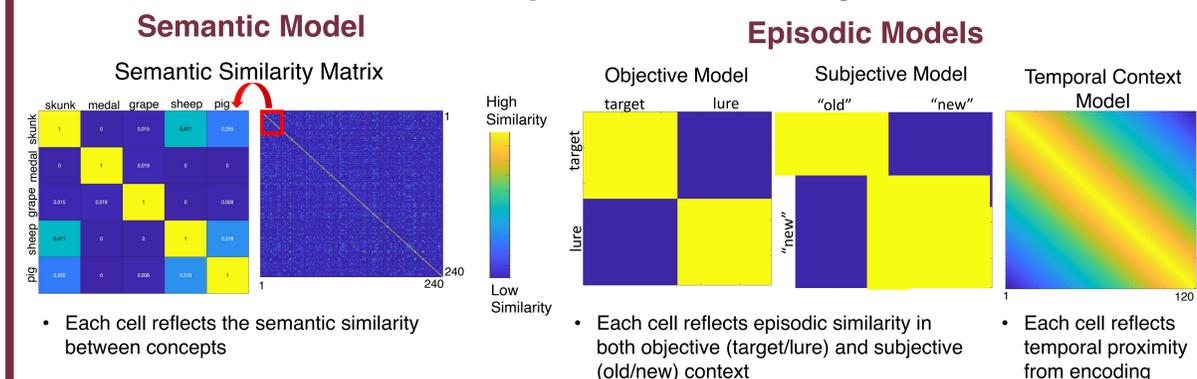
fMRI Experimental Design



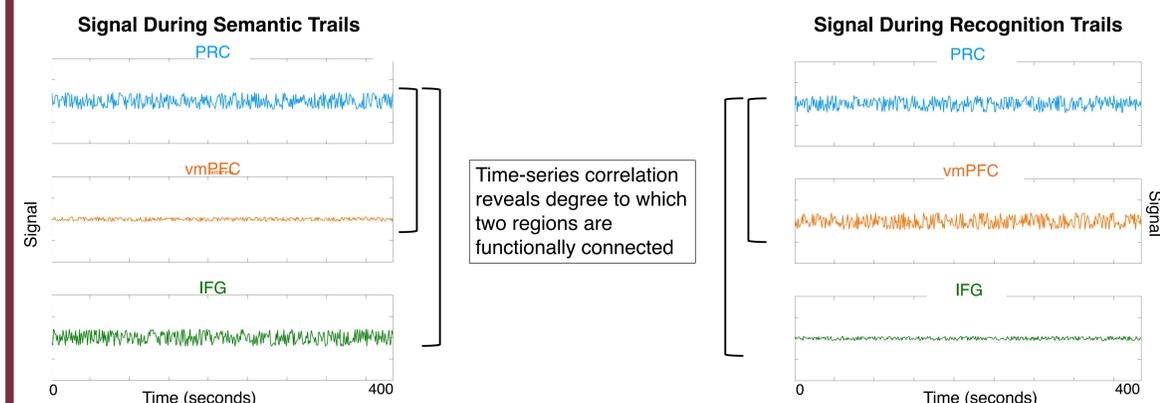
Brain-Based Pattern Similarity Analysis



Semantic and Episodic Similarity Models



Functional Connectivity Analysis

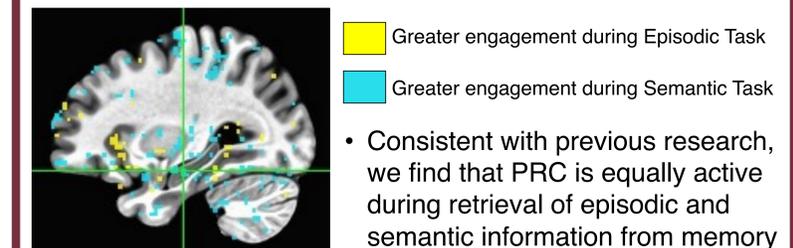


Results

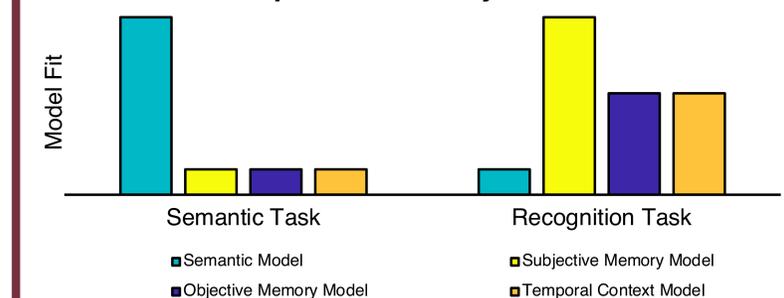
Preliminary Behavioral Results

Participant Number	Semantic Task		Recognition Task							
	Accuracy	Response Bias	Accuracy	Response Bias	Hit	Miss	Hit Rate	False Alarm	Correct Rejection	False Alarm Rate
1	0.99	0.85	-0.62	116	4	0.97	33	87	0.28	2.43
2	0.98	0.88	0.09	104	16	0.87	12	108	0.10	2.39
3	1.00	0.85	-0.16	106	14	0.88	23	97	0.19	2.06
4	0.95	0.67	0.63	54	65.00	0.4538	15	105.00	0.13	1.03
5	0.98	0.43	8.3E-17	51	69	0.43	69	51	0.58	-0.38
Mean	0.98	0.7330544	-0.01189574	86.2	33.6	0.7191	30.4	89.6	0.25333	1.50872

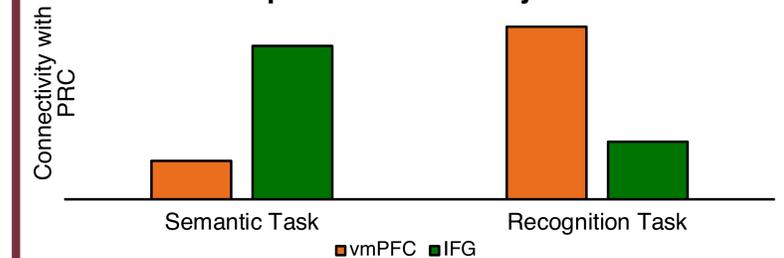
Task-Based fMRI Contrast



Anticipated Similarity Results



Anticipated Connectivity Results



Anticipated Conclusions

- If we obtain the expected similarity results, then we can conclude that mnemonic information in PRC is dynamically reshaped to reflect retrieval demands.
- If we obtain the expected connectivity results, then we can conclude that frontally-mediated control systems contribute to the reshaping of mnemonic information in PRC.
- Together, these results will suggest the semantic and episodic memories are more deeply integrated than was previously thought and reveal a neural mechanism that flexibly enables retrieval of task-relevant information.