



Angular gyrus and precuneus jointly support memory vividness during retrieval

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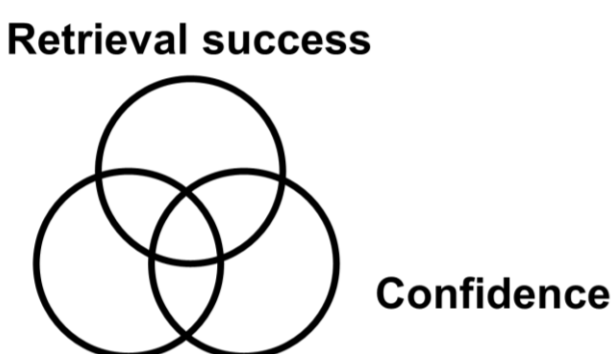
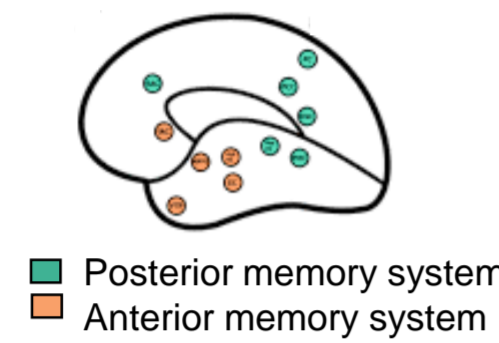
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Introduction

- Posterior memory system contributes to episodic memory and recollection
- Previous researches have implicated the posterior parietal cortex, especially **angular gyrus** and **precuneus**, in subjective aspects of memory processes (Richter et al., 2016; Ye et al., 2018; Wynn et al., 2018)
- The relationship between two subjective mnemonic experience, namely vividness and confidence ratings, remains inconclusive



- Here we test whether confidence ratings is dependent on self-sensed vividness during retrieval and how angular gyrus is involved in subjective components of memory retrieval using repetitive transcranial magnetic stimulation (rTMS)
- Meta-d'/d' (meta-efficiency)** -- how well is confidence rating in tracking memory performance
- Vivid-d'/d' (vivid-efficiency)** -- how well is vividness rating in predicting memory performance

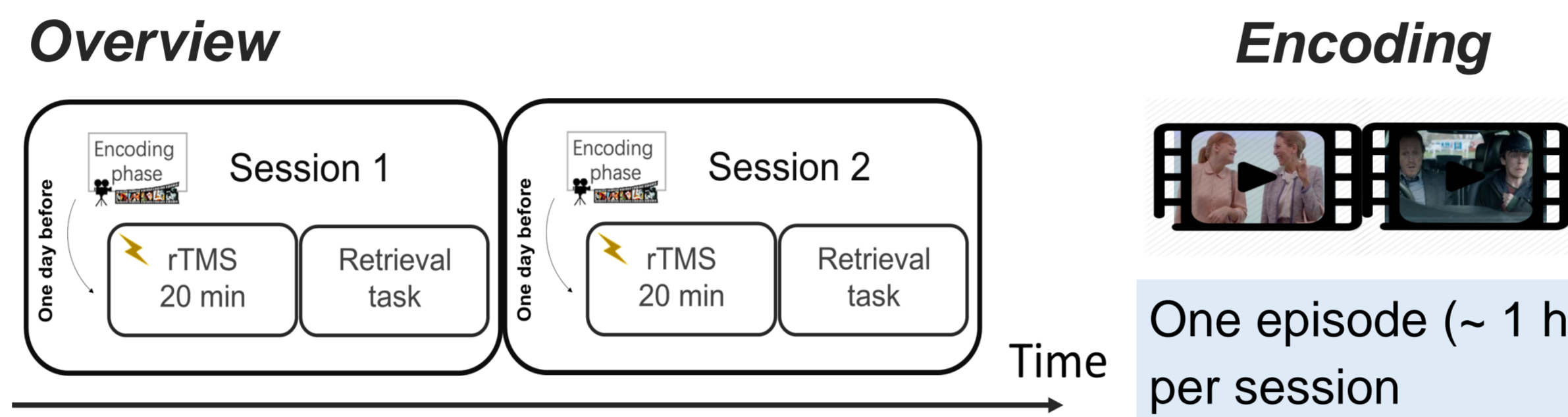
Hypotheses

- The relationship between vividness ratings and confidence ratings is dissociable;
- Angular gyrus plays a role in the vividness component during retrieval.

References

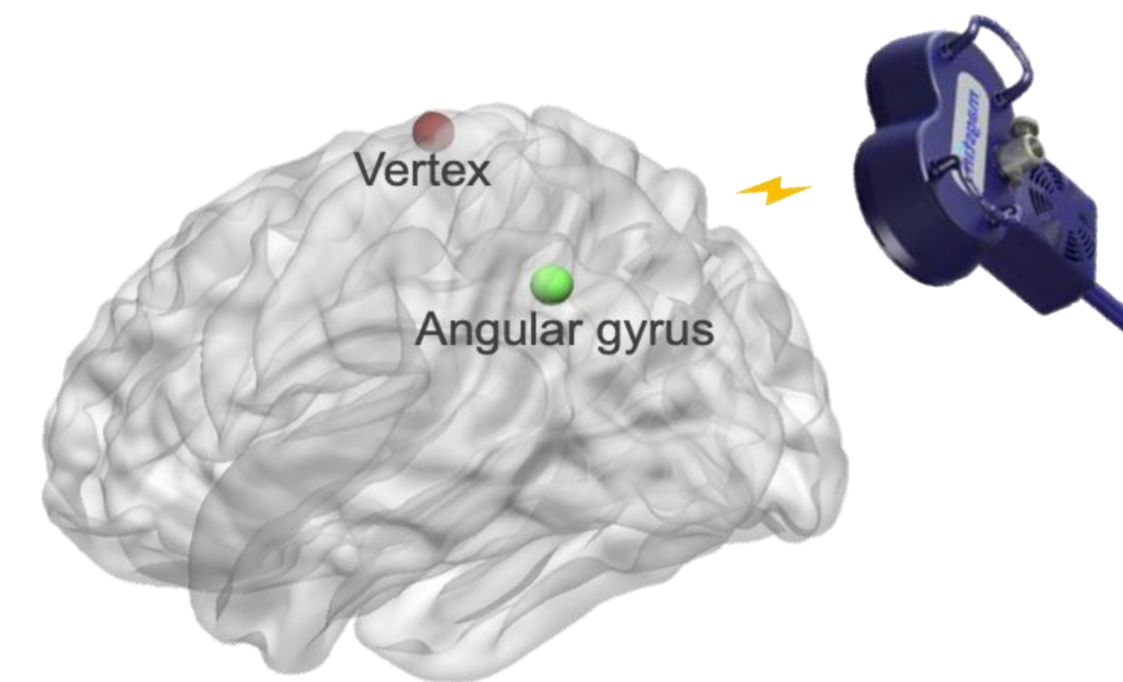
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 2. Ye Q, Zou F, Lau H, Hu Y, Kwok SC (2018) Causal evidence for mnemonic metacognition in human precuneus. *J Neurosci* 38:6379–6387
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Experimental design

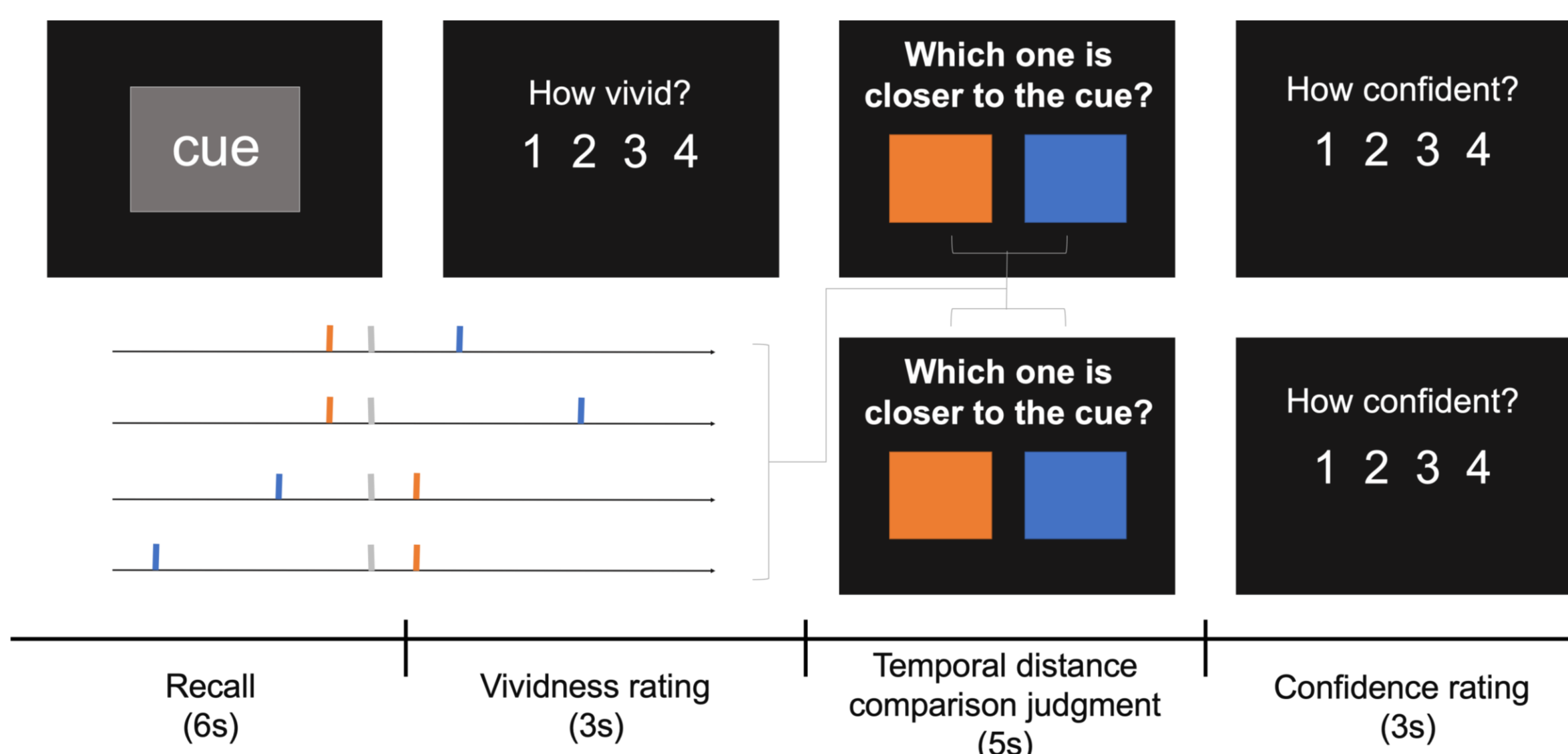


TMS protocol

- 1Hz, 20-min rTMS (1200 pulses in total) at 110% of active motor threshold
- Angular gyrus (AnG) MNI coordinates: x=-43, y=-66, z=38



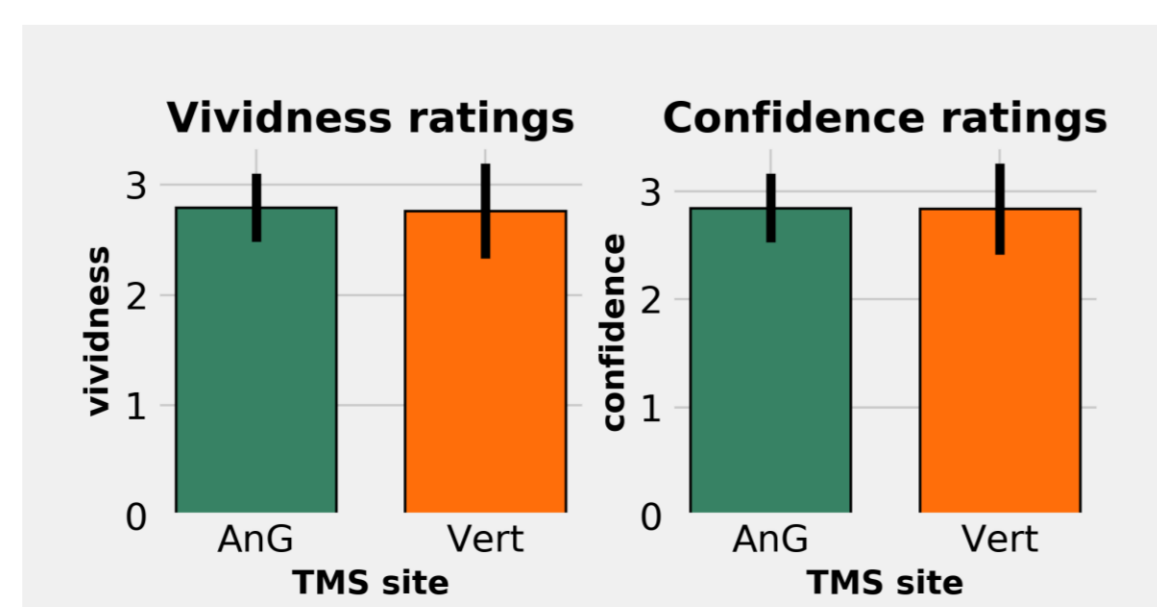
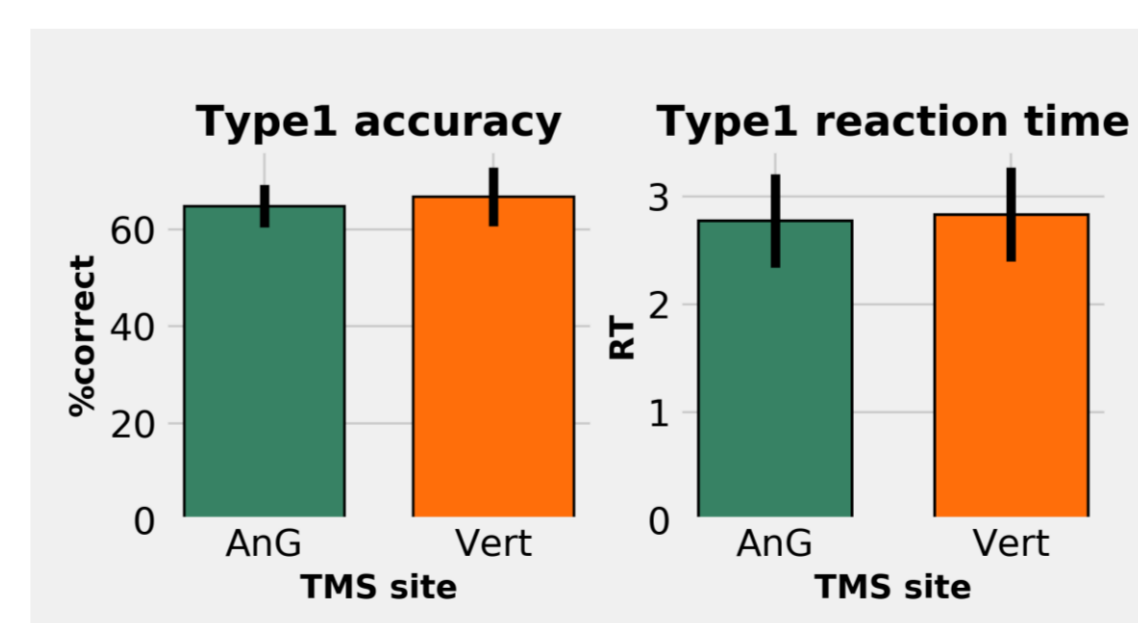
Retrieval task



Basic performance

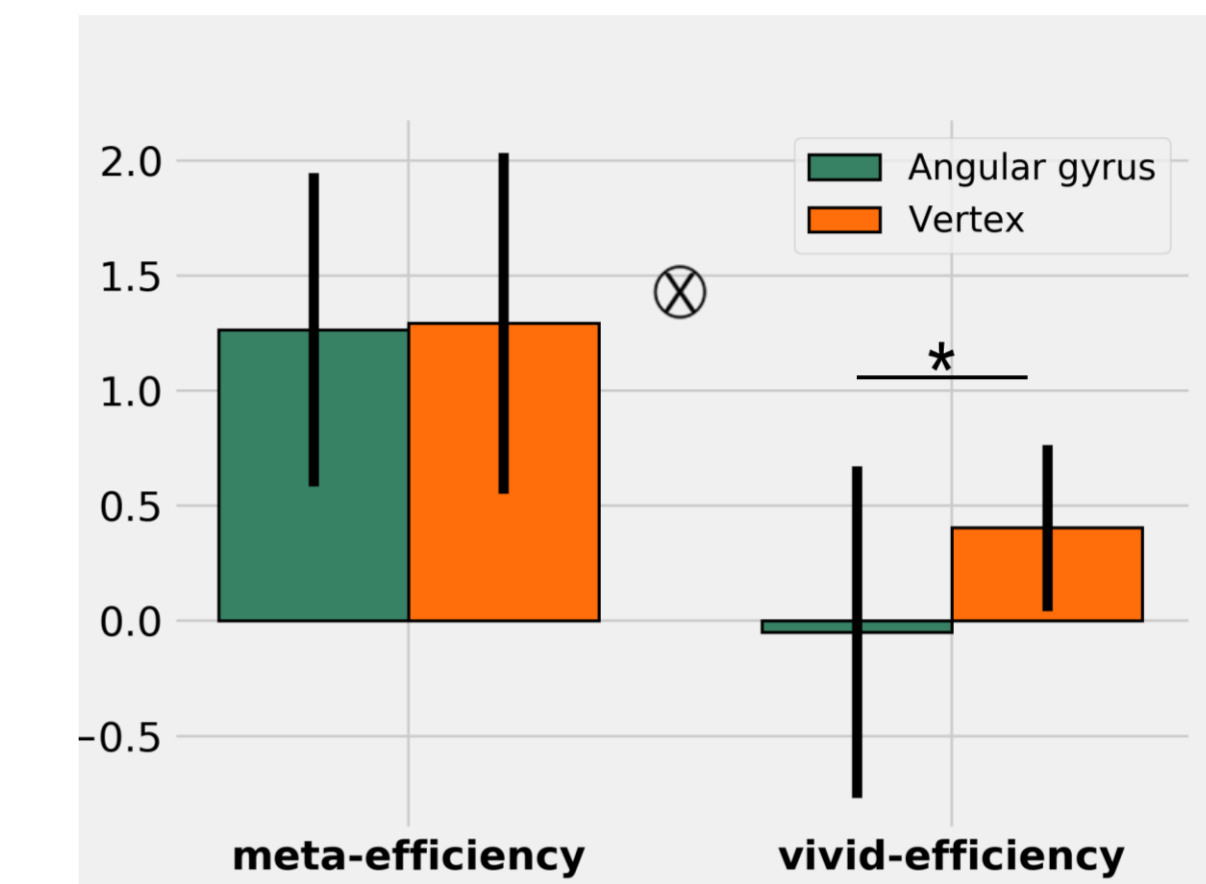
20 healthy young adults tested (11 females, 9 males)

Memory task (type1) accuracy and reaction time were not affected by TMS
 > AnG: Accuracy=64.86%; RT=2.77;
 > Vert: Accuracy=66.81%; RT= 2.84

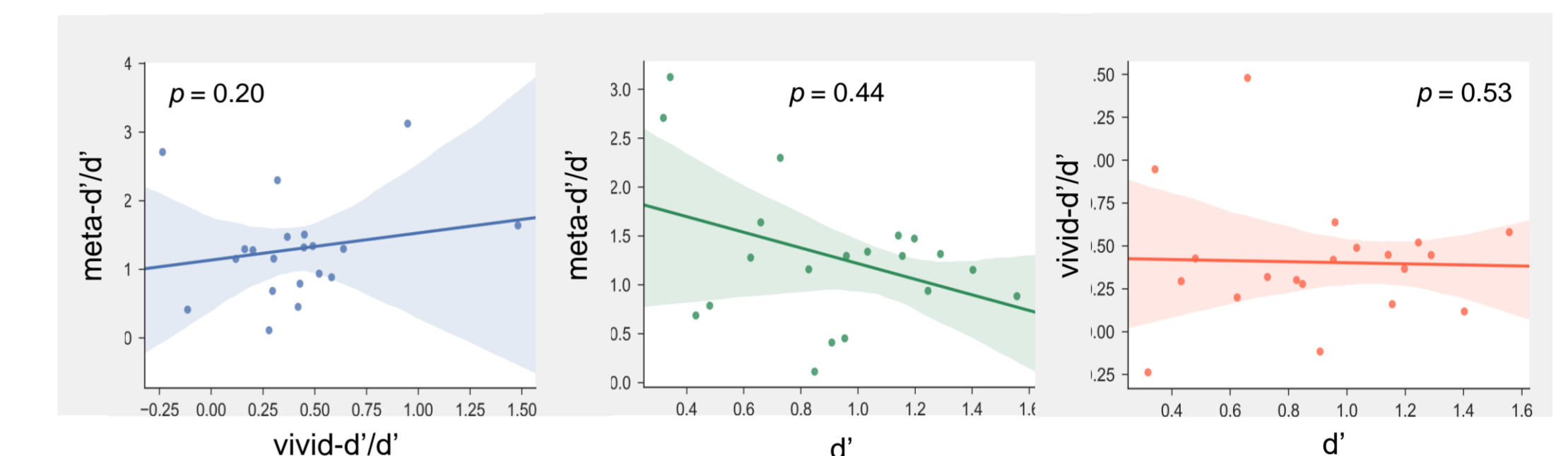


Mean levels of vividness and confidence ratings were intact after TMS
 > AnG: vivid=2.79; RT=2.85;
 > Vert: vivid=2.76; RT= 2.84

Results

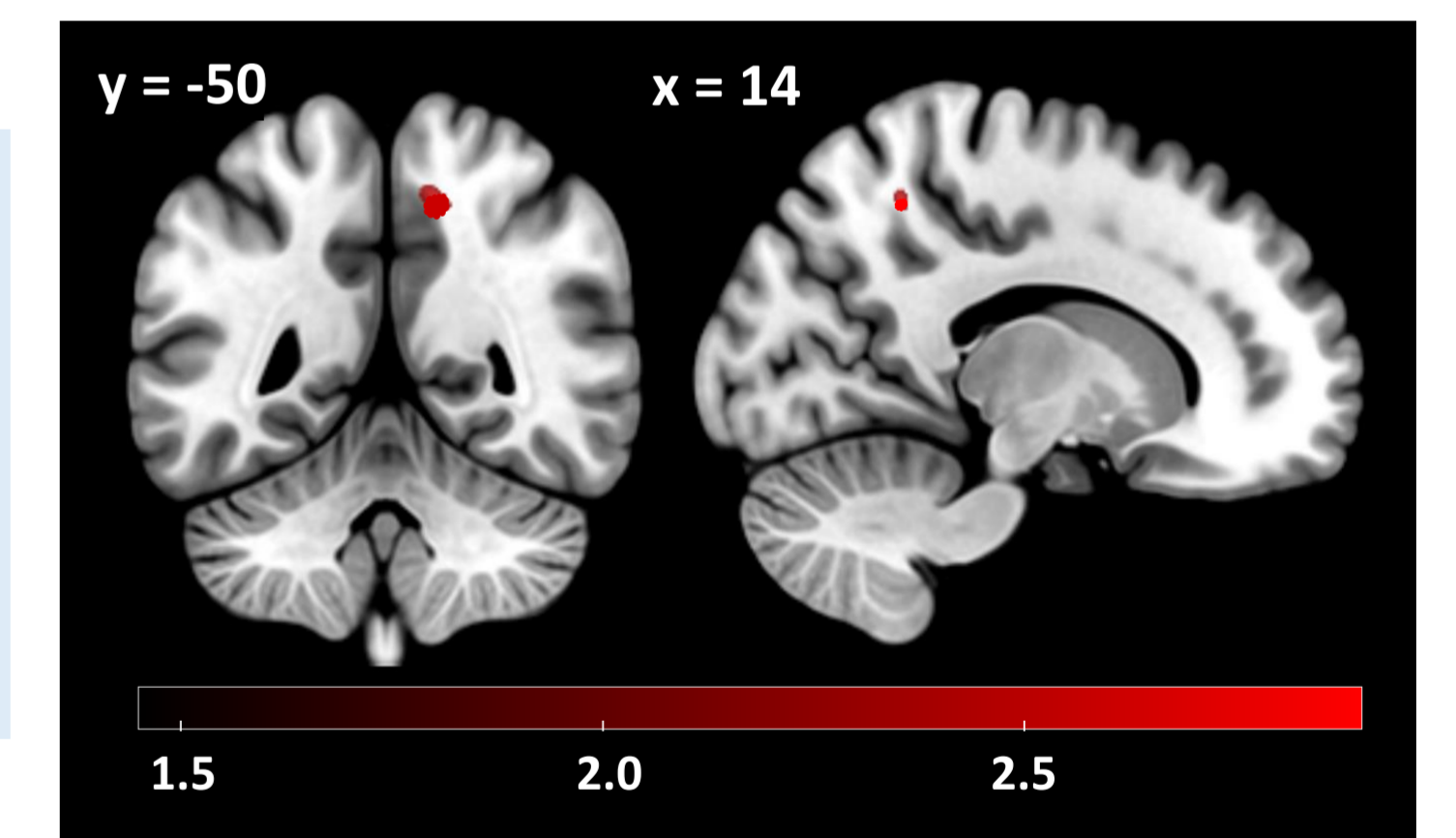


Inhibition to AnG significantly reduces the efficiency of vividness ratings, albeit without affecting meta-efficiency



Relationship between three measures of retrieval performance

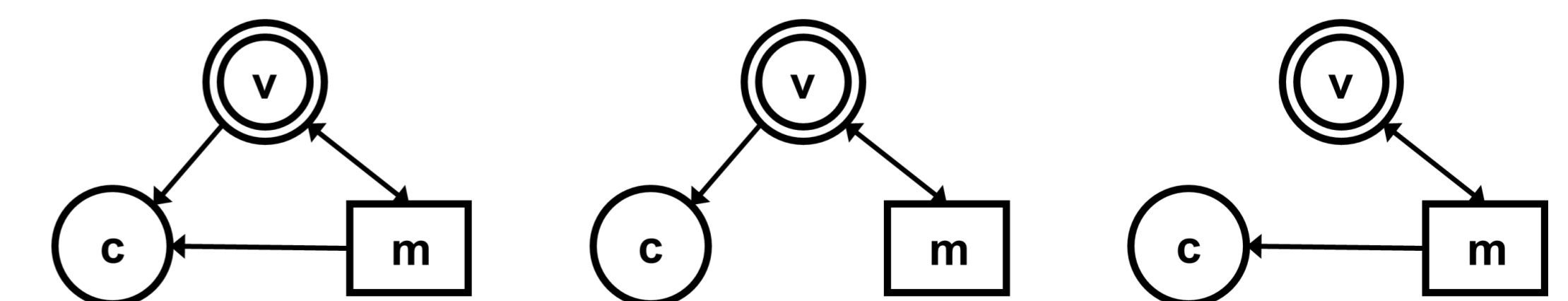
Gray matter density correlates with vividness efficiency in the precuneus (x=14, y=-50, z=51)



p < .05, FWE corrected at the cluster level

Discussion

- Sub-regions of posterior memory network jointly support subjective evaluation of our memory quality
- There is a dissociation between vividness and confidence ratings
- Three potential models for **vividness (v)**, **confidence (c)** and **memory (m)** judgments during episodic retrieval:



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