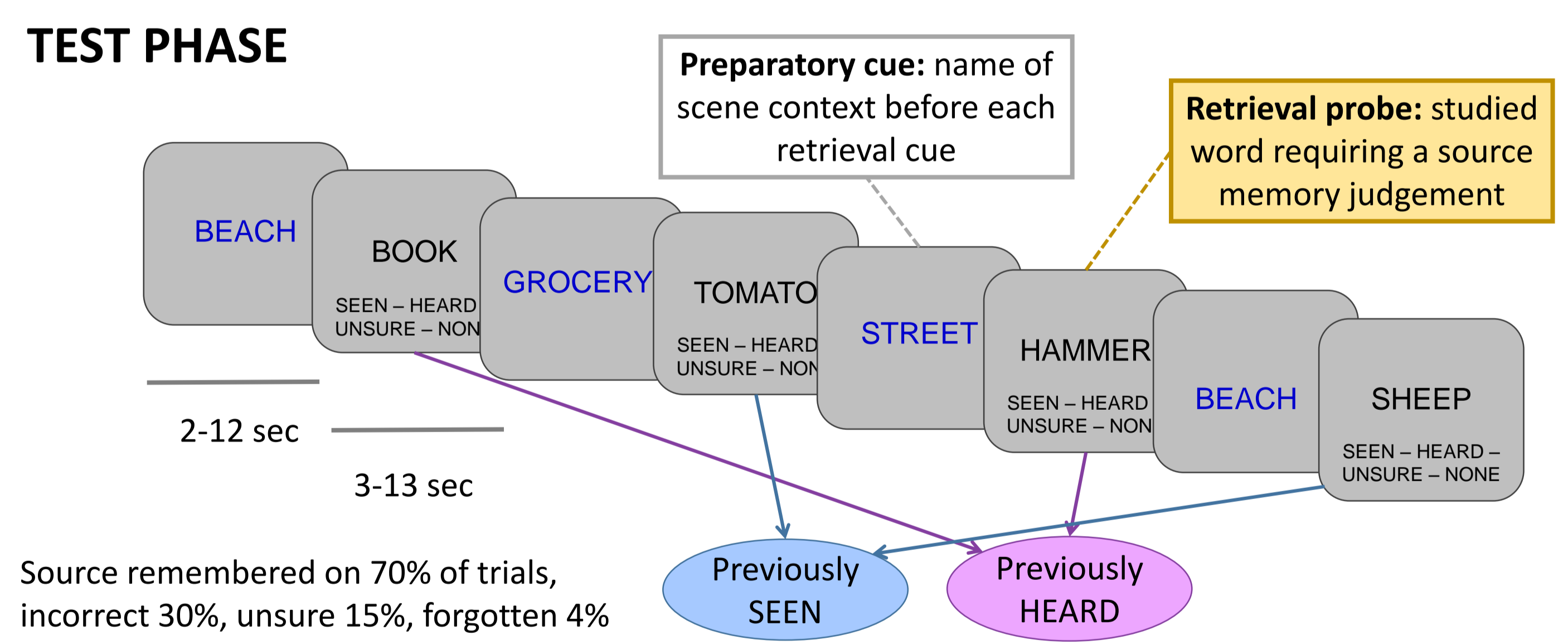
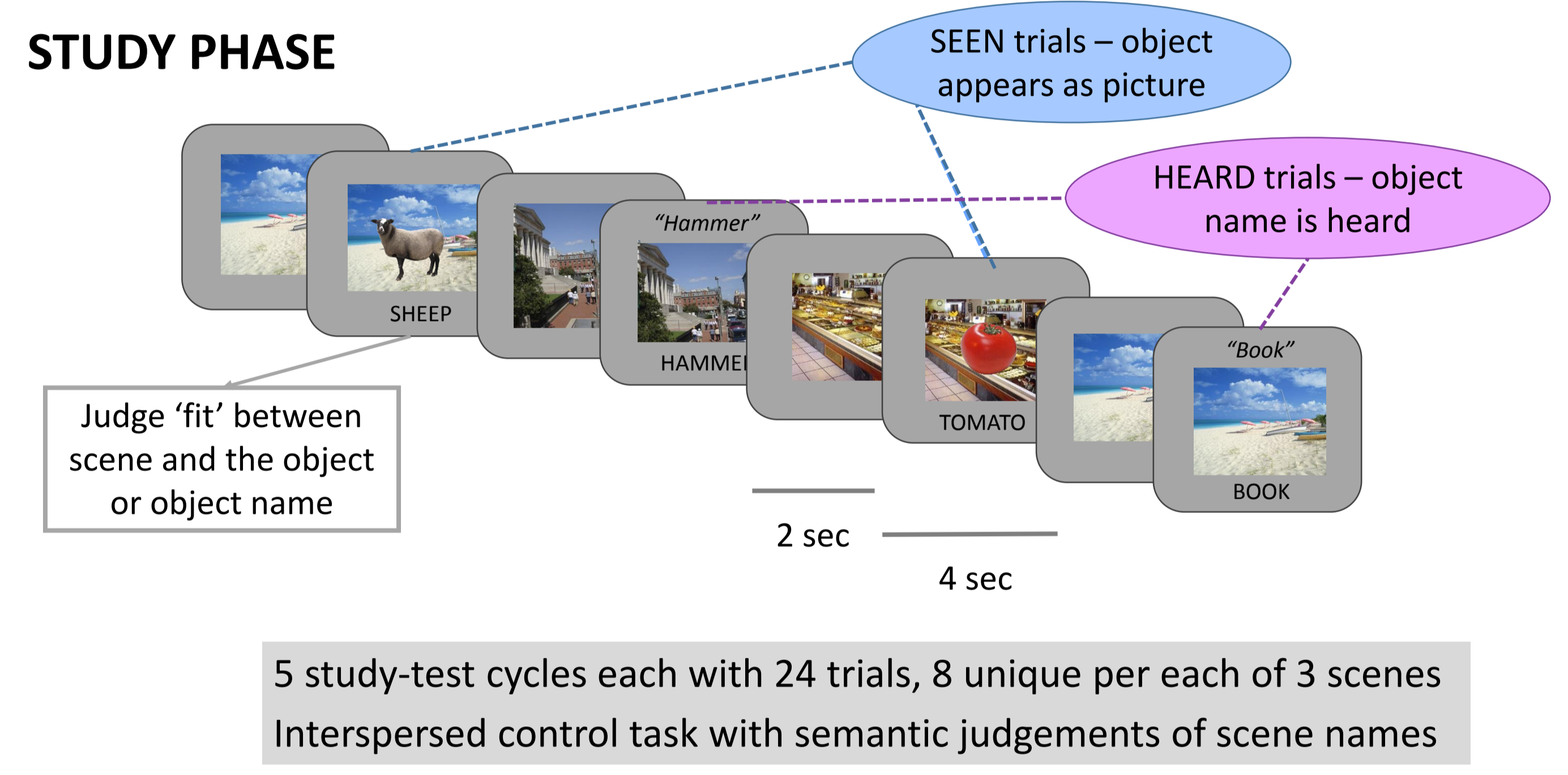




## Introduction

- Are events remembered as **complete episodes**?
- Computational theories of memory [2,3] propose that retrieval cues trigger recollection via hippocampal pattern completion, leading to cortical **reinstatement** of neural patterns present during the original events.
- Is reinstatement therefore complete = holistic [4,6]? Behavioral and fMRI data suggest yes, at least when reinstated event features are currently task-relevant.
- Here we tested reinstatement of information that is incidental (not required for task) using fMRI & Representational Similarity Analysis (RSA) to test Encoding-Retrieval Similarity (ERS)

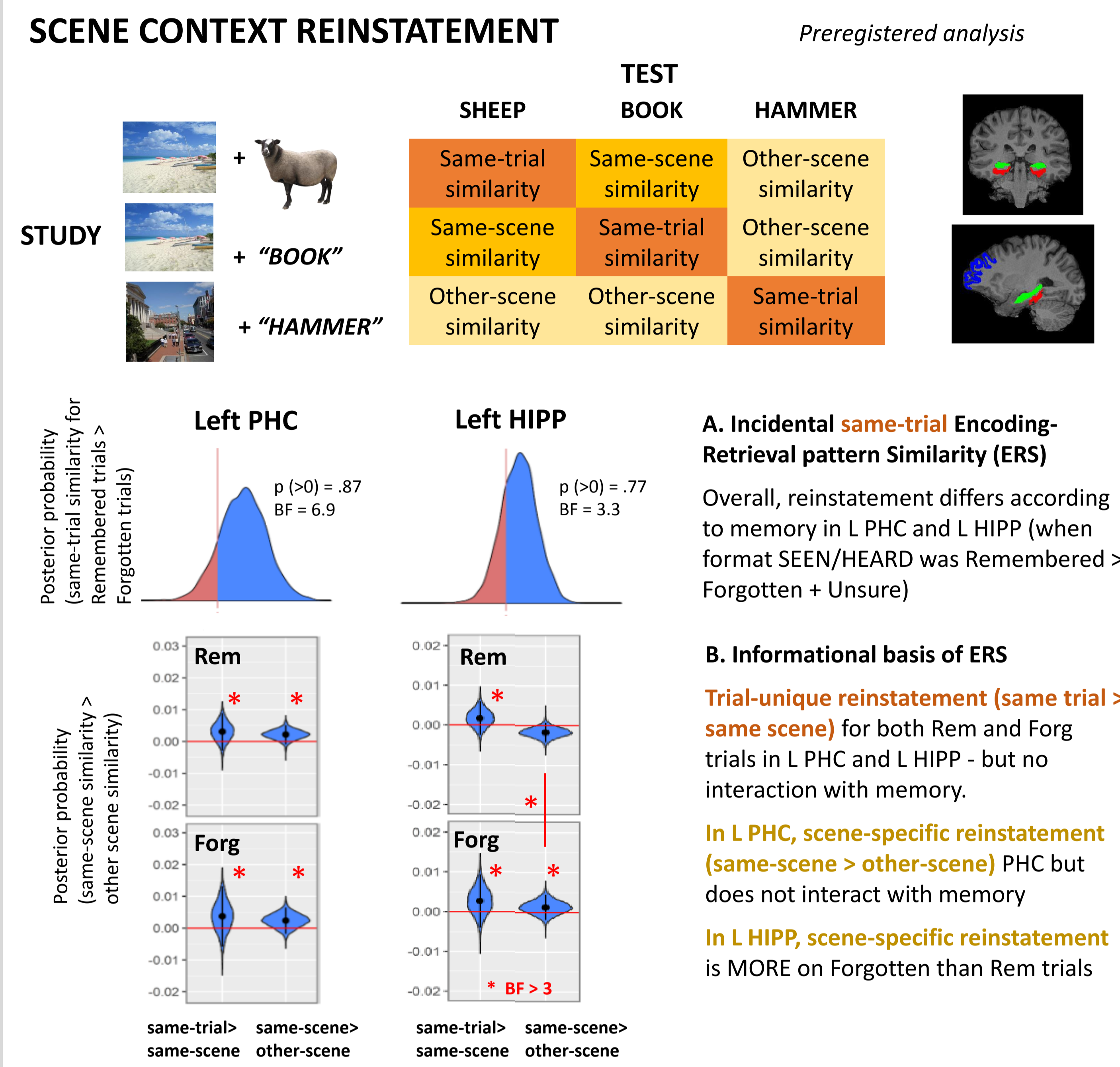
## Procedure



## fMRI Methods

**N = 28** young adults (20 F, R-handed), 7 exclusions.  
Study protocol, preprocessing pipeline and scene context reinstatement analysis strategy were **preregistered** at the OSF (<https://osf.io/hndbq/>) tho' fMRI & similarity model estimation was changed to Bayesian. Study format analysis is exploratory. Preparatory cue phase activity will be reported elsewhere.  
5 runs whole brain fMRI, 60 3 mm<sup>3</sup> slices, TR 1.25, 3T Prisma, Edinburgh Imaging Facility, Royal Infirmary.  
Bilateral **ROI masks** for RSA: 1) Parahippocampal Cortex (PHC) defined semi-manually following same protocol as Pruessner et al. [5], posterior third of parahippocampal gyrus following [1]; 2)-5) hippocampus (HIPP), middle frontal gyrus (MFG), superior temporal gyrus (STG), fusiform gyrus (FUS) FreeSurfer (v5.3), Desikan-Killany atlas.  
Trial-wise betas from Least-Squares-All (LSA) GLM, SPM12 Bayesian estimation with AR-3. Encoding-retrieval similarity per trial pairing after univariate noise normalization, Fisher transformed Pearson correlation. **Full Bayesian Linear Mixed Effects models for similarity effects** in R-Stan; RFX intercepts & slopes for items (scenes), subjects, interaction (not preregistered standard LMMs as better convergence).

## RSA: Incidental scene reinstatement



## ACTIVATION AND REINSTATEMENT

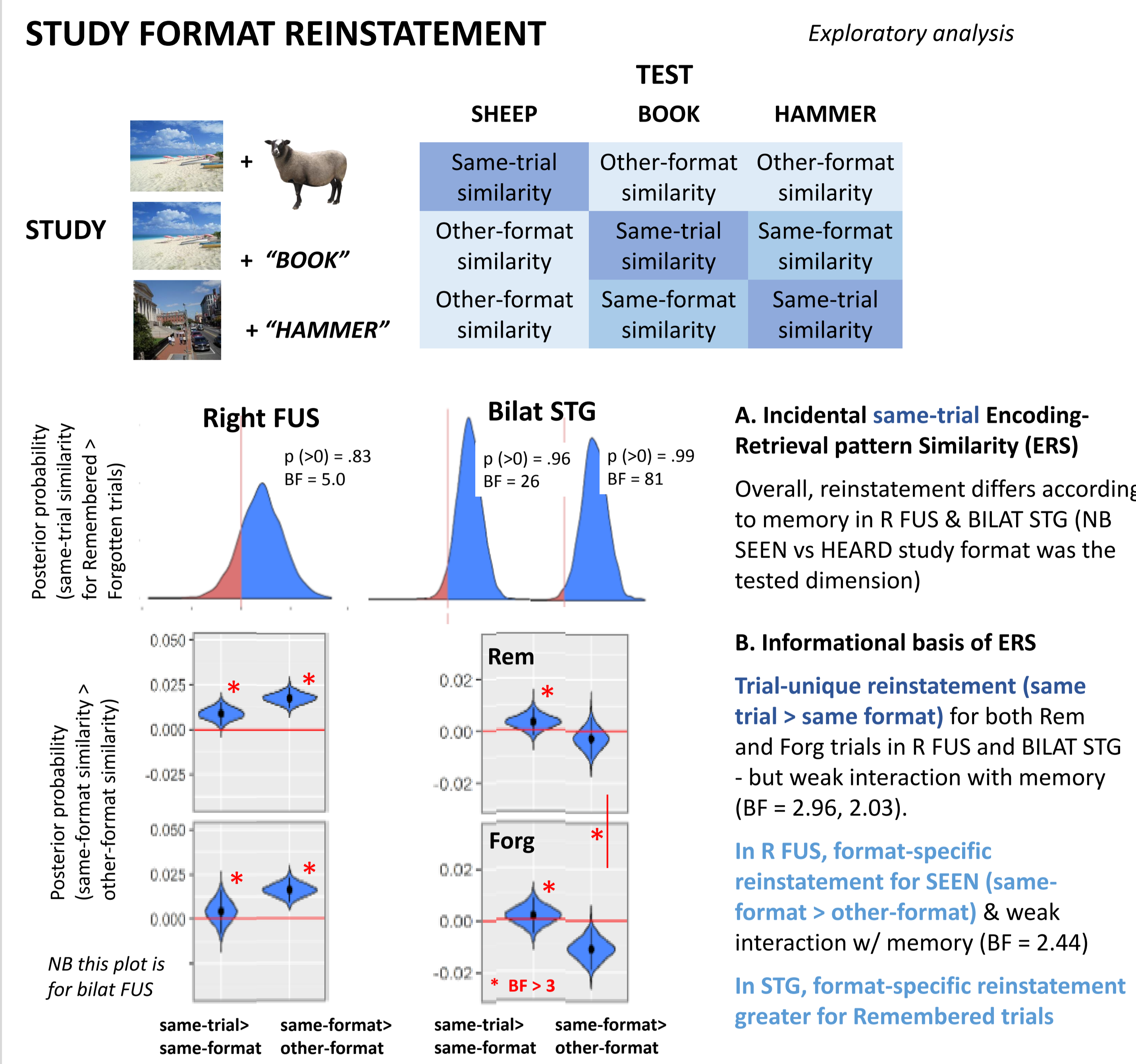
**C. Activation in hippocampus at test is associated with reinstatement in L PHC**  
Hippocampal activation increased during successful vs. unsuccessful encoding, and during successful vs. unsuccessful retrieval, i.e. when study format (source) **Remembered > Forgotten**

1. Test of relation between activation at retrieval and strength of reinstatement of scene context over trials [1] shows that **L HIPP activation is correlated with same-trial similarity in L PHC**.
2. This correlation is stronger when format is **Remembered > Forgotten**

## Conclusions

- **Data are broadly consistent with idea that recollection is holistic [4,6]**, i.e. information about incidental encoding context (scenes) is more likely to be reinstated on trials where source memory (for study format) is correct, and reinstatement of these two dimensions in different cortical regions is intercorrelated (though informational basis less clear)
- Findings of **parahippocampal incidental trial-unique reinstatement** of scene context and correlation of this reinstatement with activation in L HIPP both conceptually replicate [1] even though here, scene recollection was not required for the task [see also 4]
- **BUT incidental hippocampal scene-specific reinstatement (not overall) decreases when format remembered**, analyses of relation to activation and format reinstatement pending
- Extends earlier findings of holistic reinstatement [4,6] to multimodal event features and to fMRI ERS as well as activation [4] and ECoG ERS [6] measures of reinstatement

## RSA: Multiple feature reinstatement



## COUPLED CONTEXT REINSTATEMENT

**Is reinstatement of scene context and study format context coupled over trials?**  
Test correlation of ERS in L PHC and Bilat STG over retrieval trials within participants using robust Bayesian regression

1. When format was Remembered, **Same-Format ERS in Bilat STG predicts Same-Scene ERS in L PHC**
2. This correlation is stronger when the format was **Remembered > Forgotten**

Suggests scene context reinstated alongside format context trial by trial as predicted if holistic reinstatement supports holistic recollection  
(NB plot shows similarities by trials and participants)

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