

Can memory representations in the parietal regions be predicted from perception representations in the sensory regions?

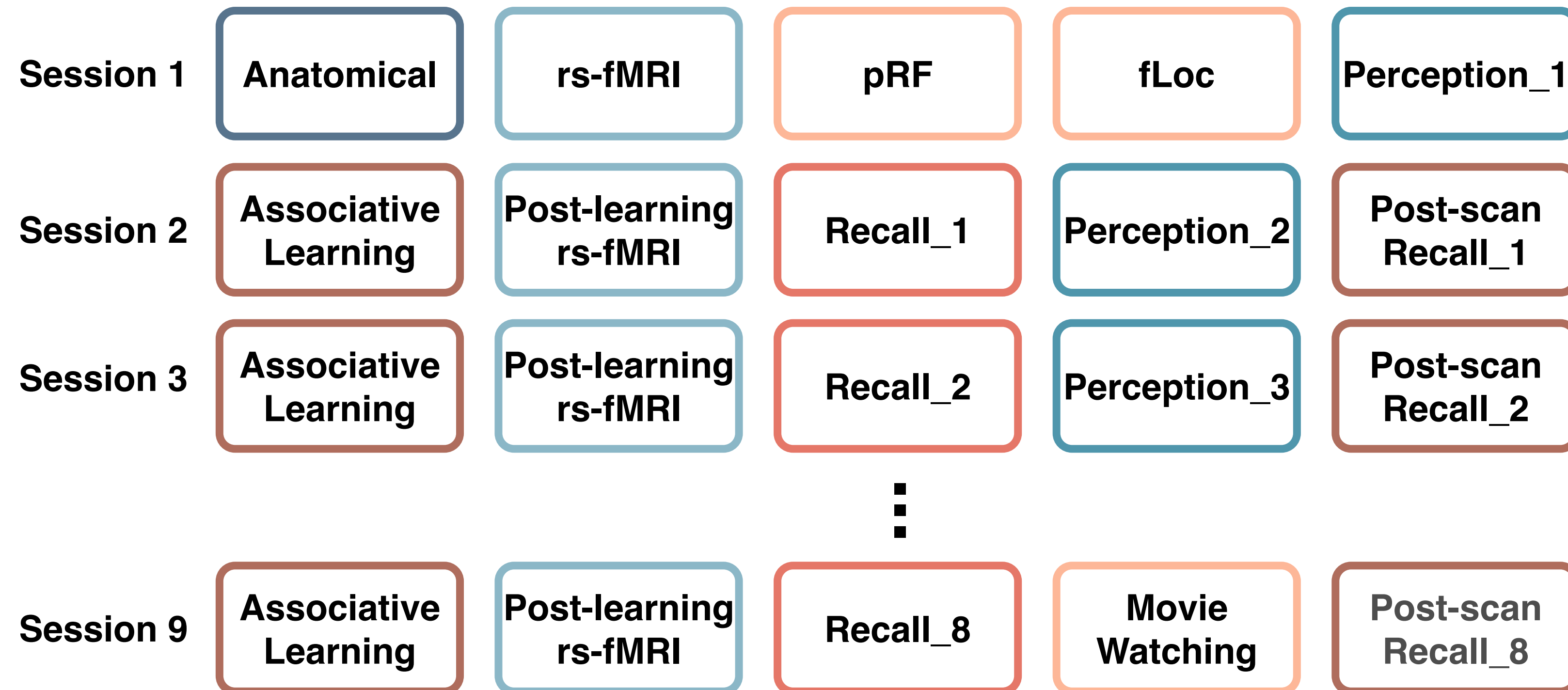
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Background

- Remembering an event from the past involves the reinstatement of initial perceptual experiences.
- Common neural measurements of reinstatement only test for the match between perception and memory retrieval.
- Recent studies indicate systematic differences in the brain regions that code for perception vs. memory^{[1][2]}.
- Whereas visual cortical areas are biased toward visual perceptual information, parietal cortex exhibits the opposite bias: stronger representations when information is retrieved from memory than when it is perceived^{[3][4]}.
- Memory representations are a transformed version of their perceptual representations^[5].

Can the **transformation of individual memories** from perception (visual cortex) to memory retrieval (parietal cortex) be **predicted**?

Experiment Preview



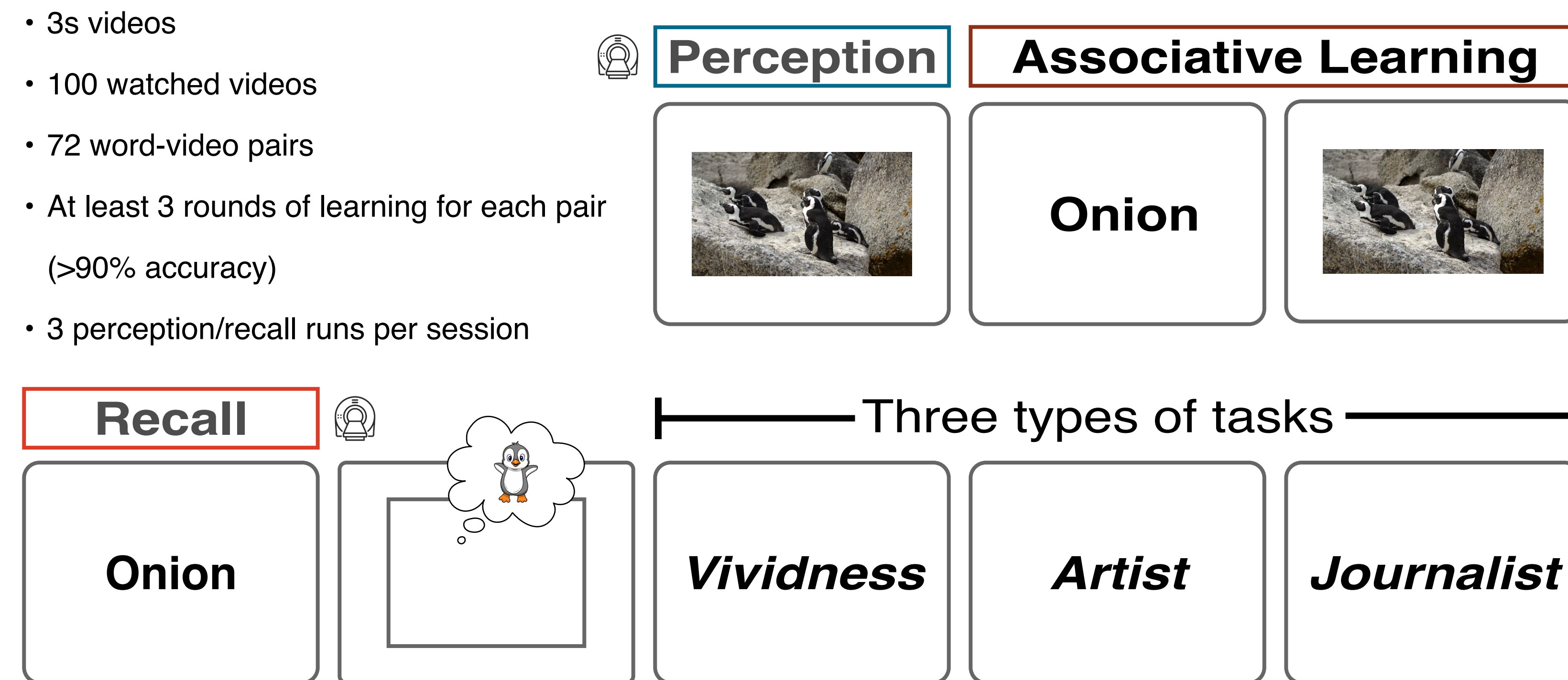
'Intensive' fMRI approach^[6]

- Planned participant number = 24
- Number of session per participant = 9
- Total scanned hours ~ 9h
- Number of memory trials per participant = 576
- Number of watched video stimuli per participant = 800
- Variety of tasks/scans
 - pRF - Retinotopic mapping
 - fLOC - Define category-selective regions
 - Post-learning rs-fMRI - Detect offline reactivation events
 - Post-scan verbal recall - Text-based memory content analysis
 - Movie watching - functional hyperalignment across participants

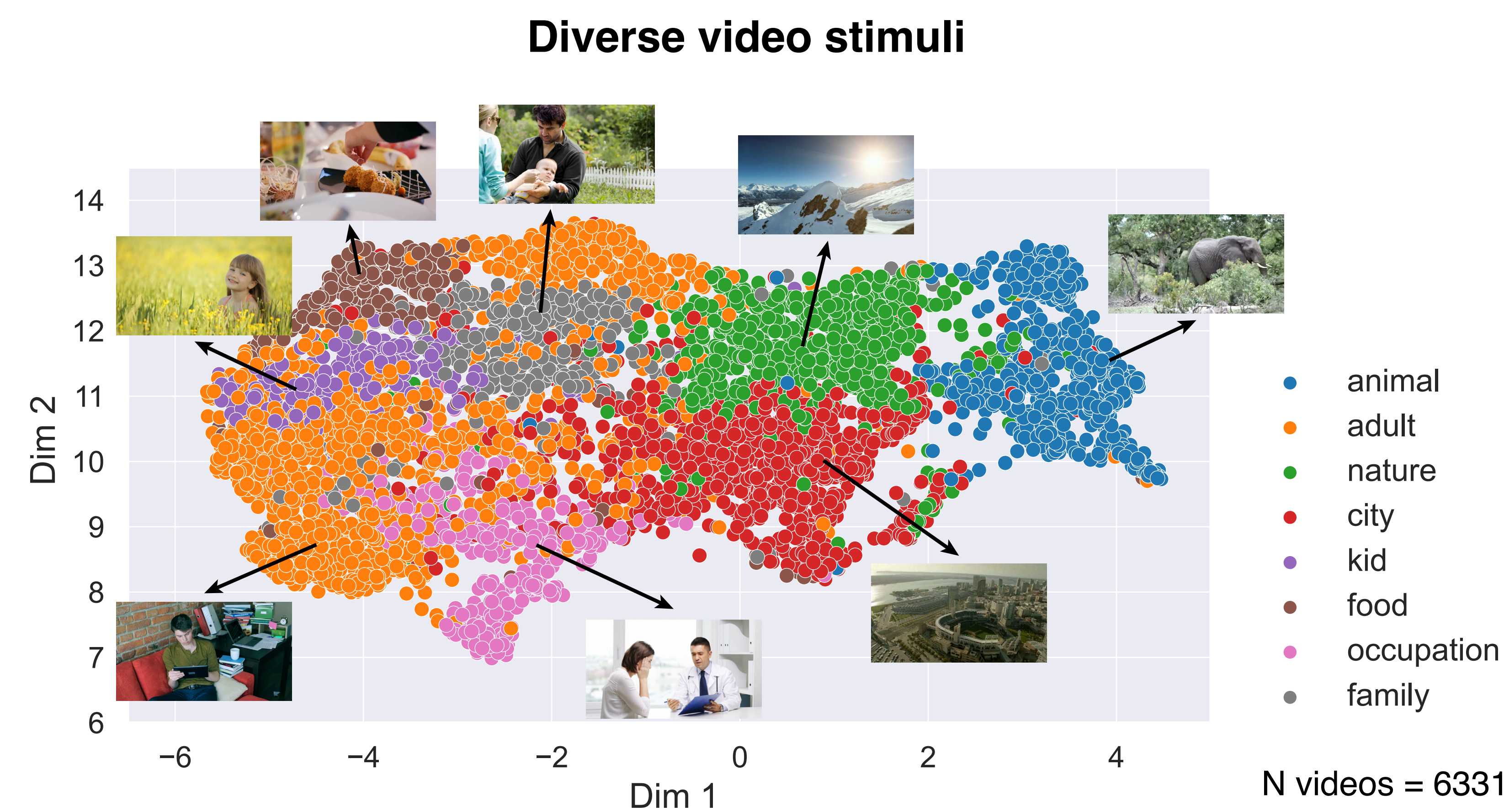
High-quality fMRI data

- Siemens Prisma 3T scanner with 64-ch head coil
- High resolution fMRI scan: 2mm isotropic voxels; 1.7s TR
- Multi-echo EPI sequence: Boost SNR and enable advanced denoising

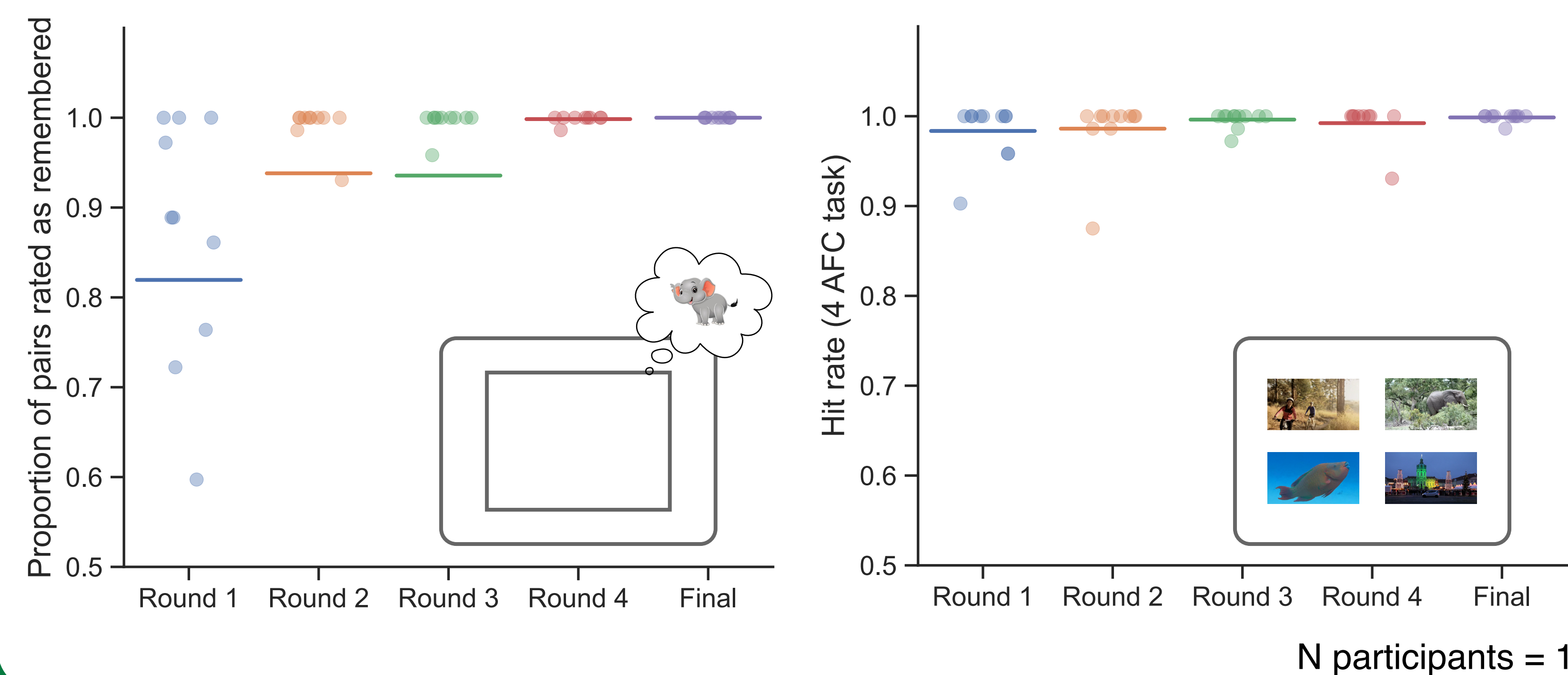
Task Design



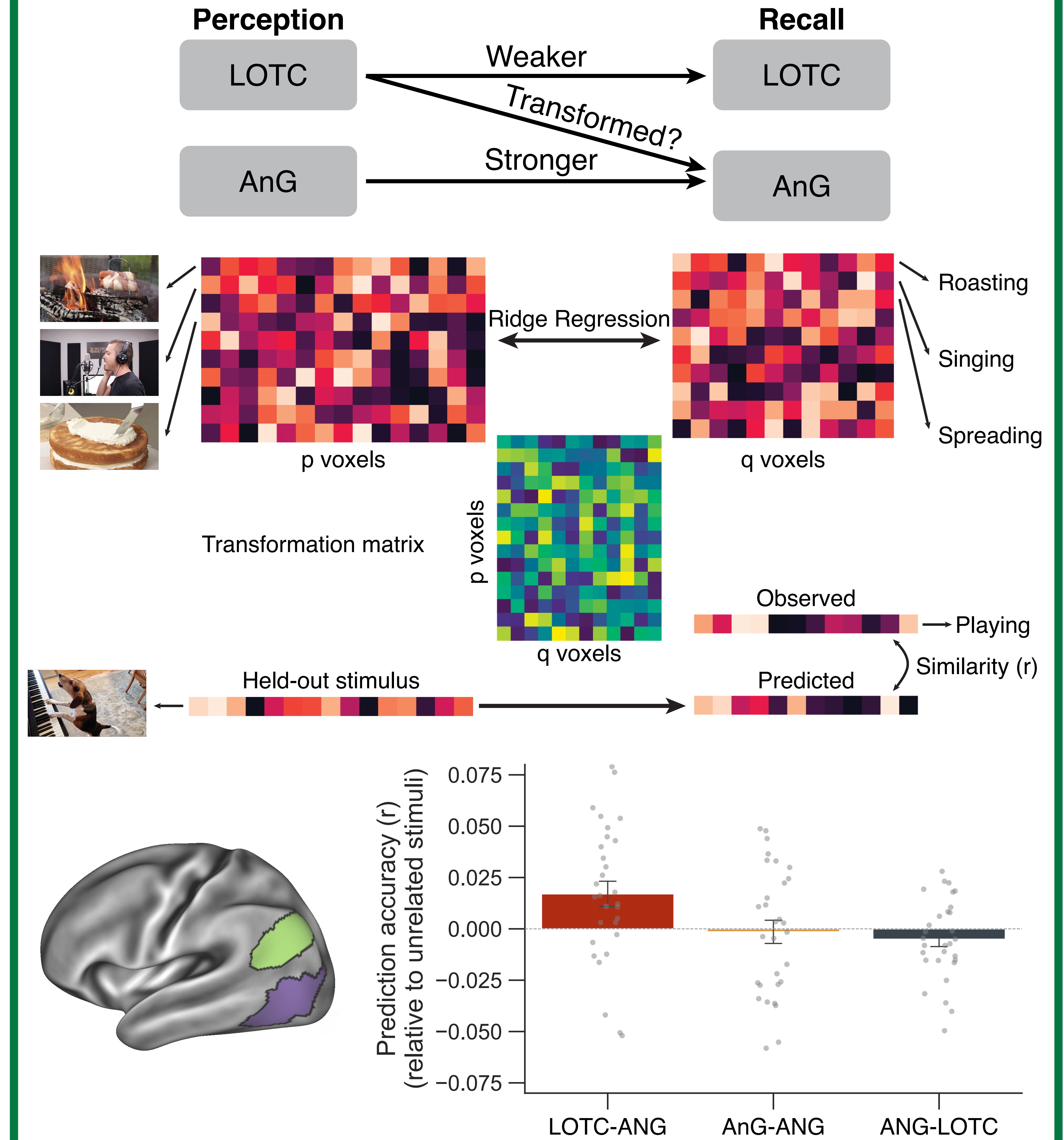
Pilot Results



Associative memory performance



Predictive Model Preview



Outlook

- Data collection starting soon.
- Large-scale and diverse dataset enables more sophisticated predictive models beyond ridge regression, e.g., neural network models.
- The completed data will be made public available.

References:

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