Grasp-relevant Representation of Objects in the Human Parietal and Occipito-temporal Cortices

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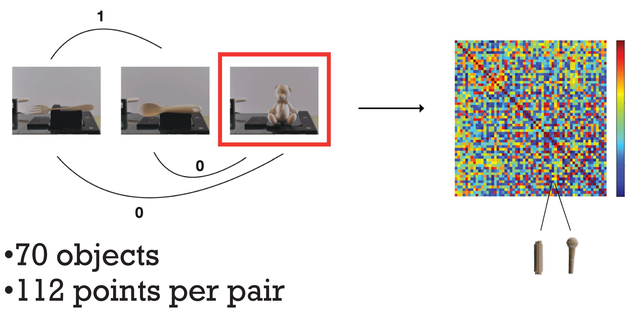
Introduction

- Human visual system is capable of various behaviors toward objects, from recognizing them to performing action on them.
- Multiple studies have shown object representation in both human occipito-temporal and parietal cortices.
- Previous studies suggest distinct roles for object-selective occipito-temporal and parietal regions.

How do these object representations support such diverse behaviors?

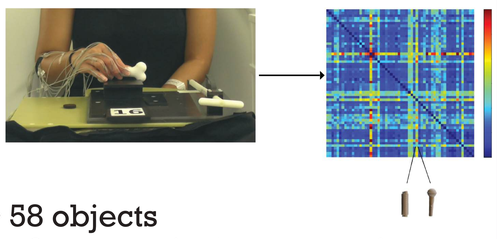
Behavioral Tasks

Odd-one-out (subjective similarity)



- 70 objects
- 112 points per pair

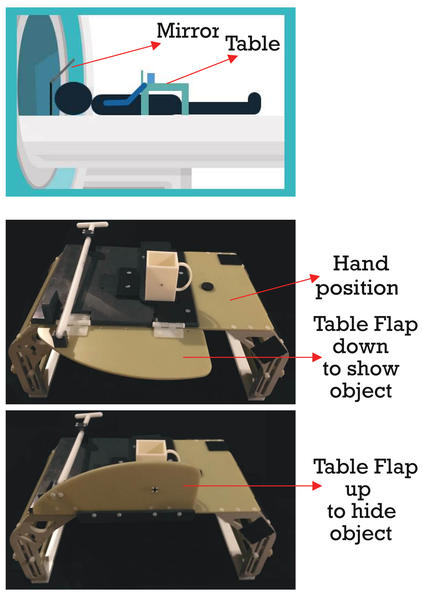
Grasp Similarity

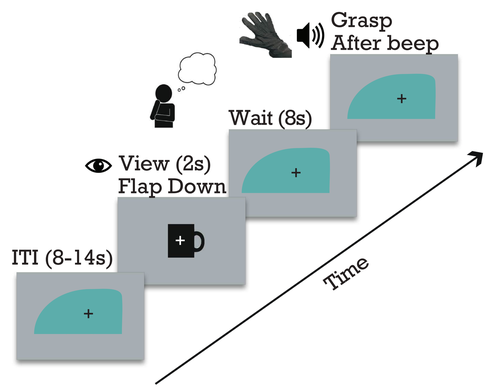


- 58 objects
- 16 sensors in three coordinates (48D vector)

RDMs are ρ = 0.27 correlated!

fMRI Experiment

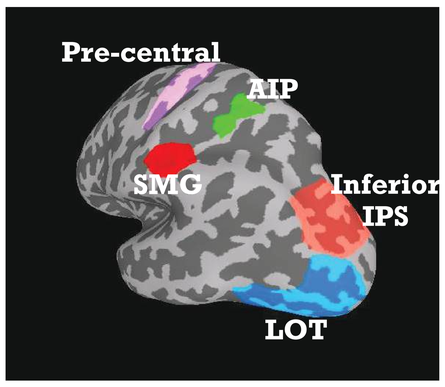


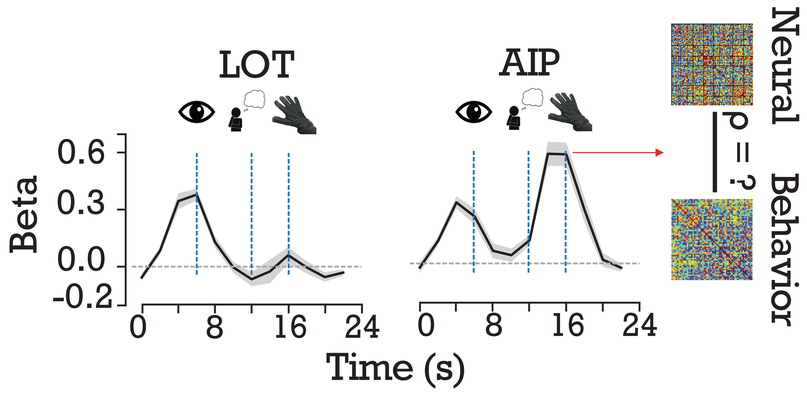


- 64 3D-printed objects
- Data collected in four sessions

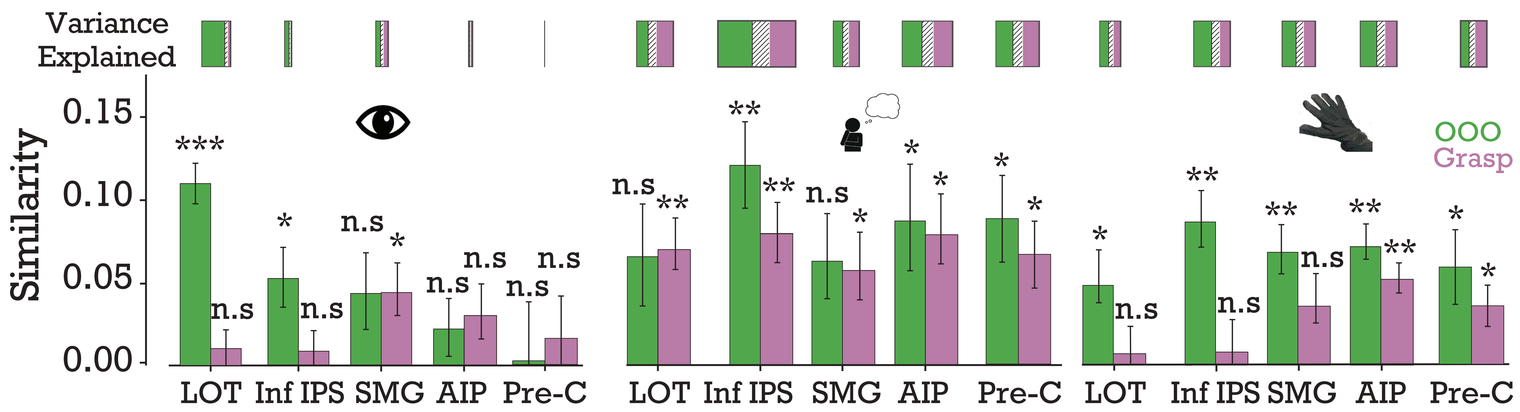
Object Localizer
Objects > Scrambled

Grasp Localizer
Grasp> Touch

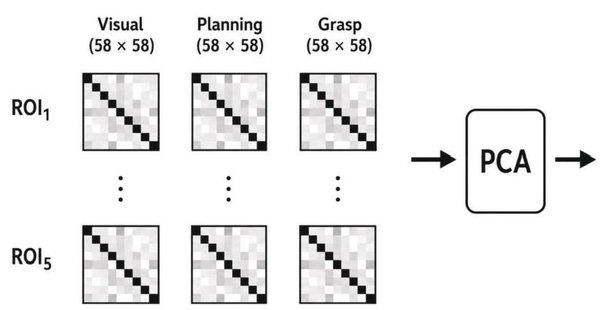


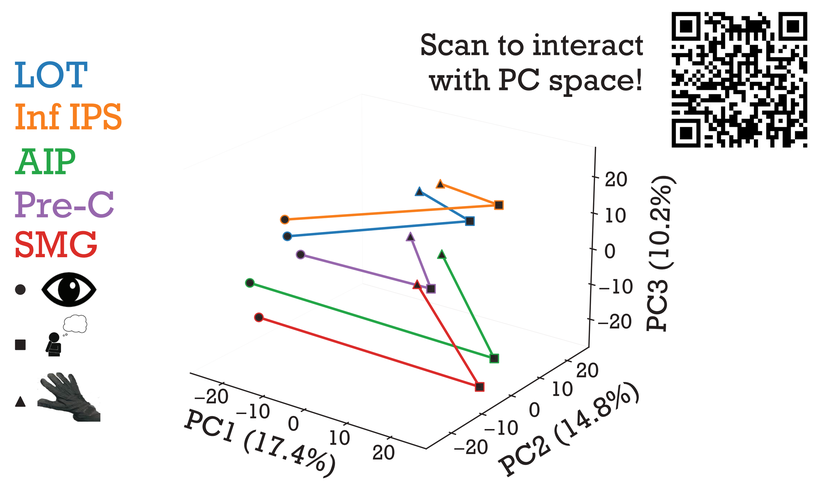


Multiple response profiles were observed in the distinct ROIs



Distinct patterns in the higher-level visual regions in relation to the behaviors





First principal components create a manifold reflecting phase transition in addition to ROI separation

Conclusion

- **Occipito-temporal and posterior parietal regions represent features relevant for subjective judgements when viewing objects.**
- **Anterior parietal regions jointly represent features relevant for subjective judgements and grasp when planning and performing movements.**
- **Experimental phase and function jointly determine patterns of response in object-selective cortex.**

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