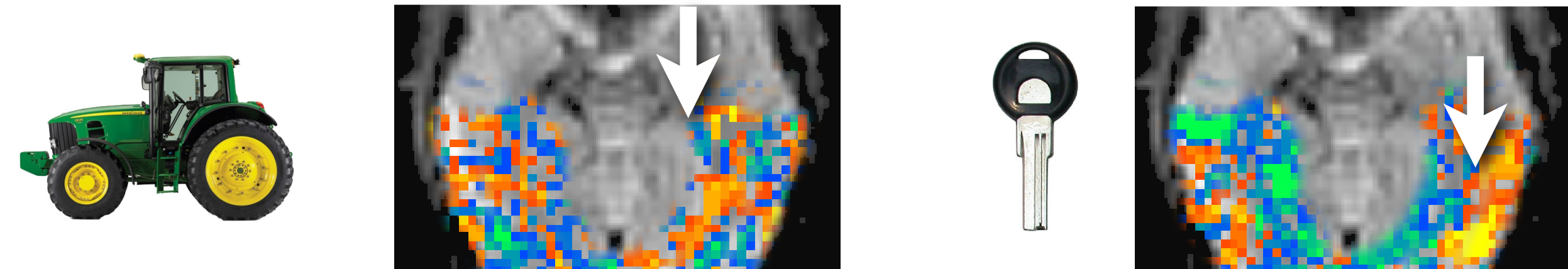


Organizing Object Knowledge by Real-World Size

Talia Konkle & Aude Oliva

Department of Brain and Cognitive Sciences, MIT

Introduction



Object categories have distinct distributed patterns of activity (e.g. Haxby et al., 2001)

Patterns are reliable with increased spatial smoothing (Op de Beeck, 2010)

This suggests a **large-scale organization** of object knowledge in ventral visual cortex

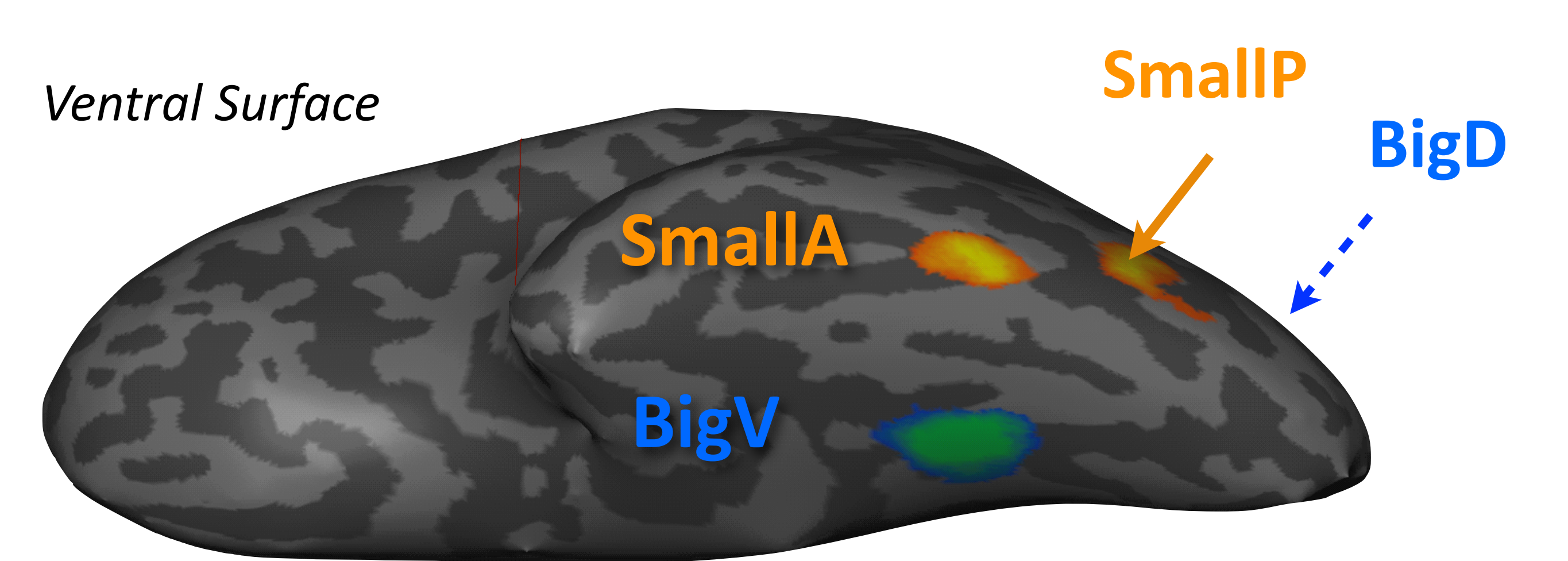
Question

What is this large-scale organization?

Proposal: Object representations are organized by their real-world size



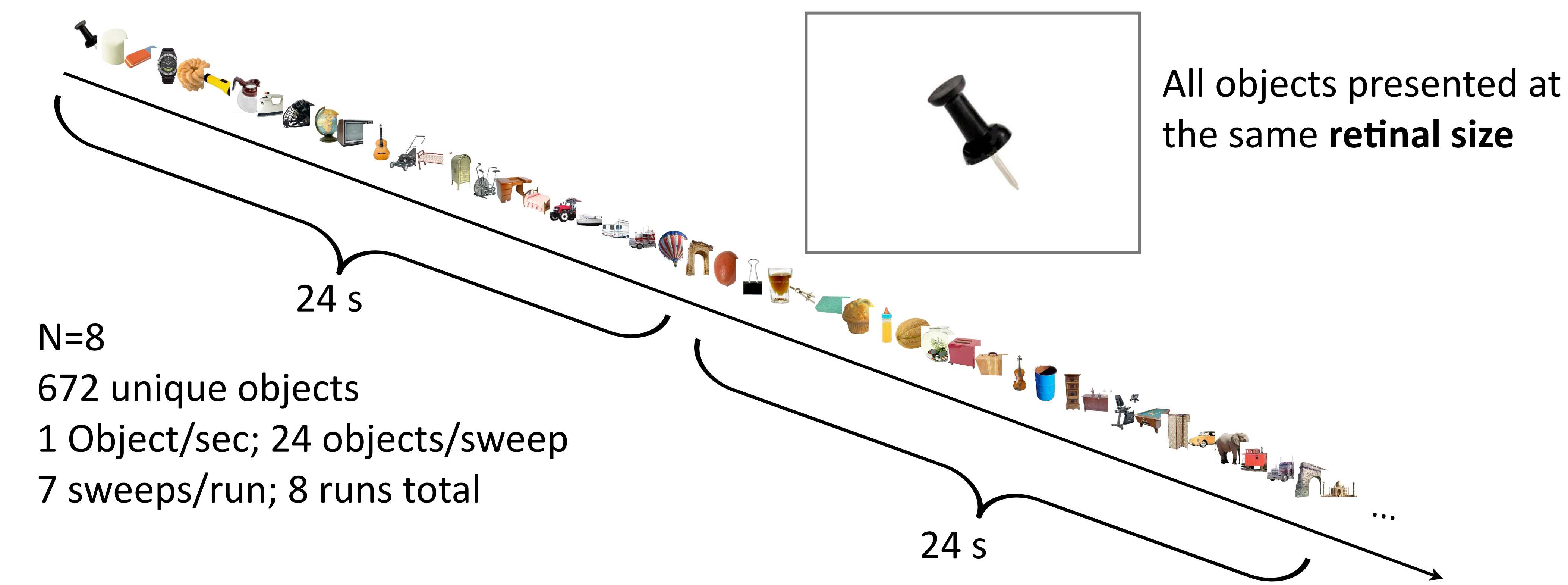
Small Objects > Big Objects Contrast



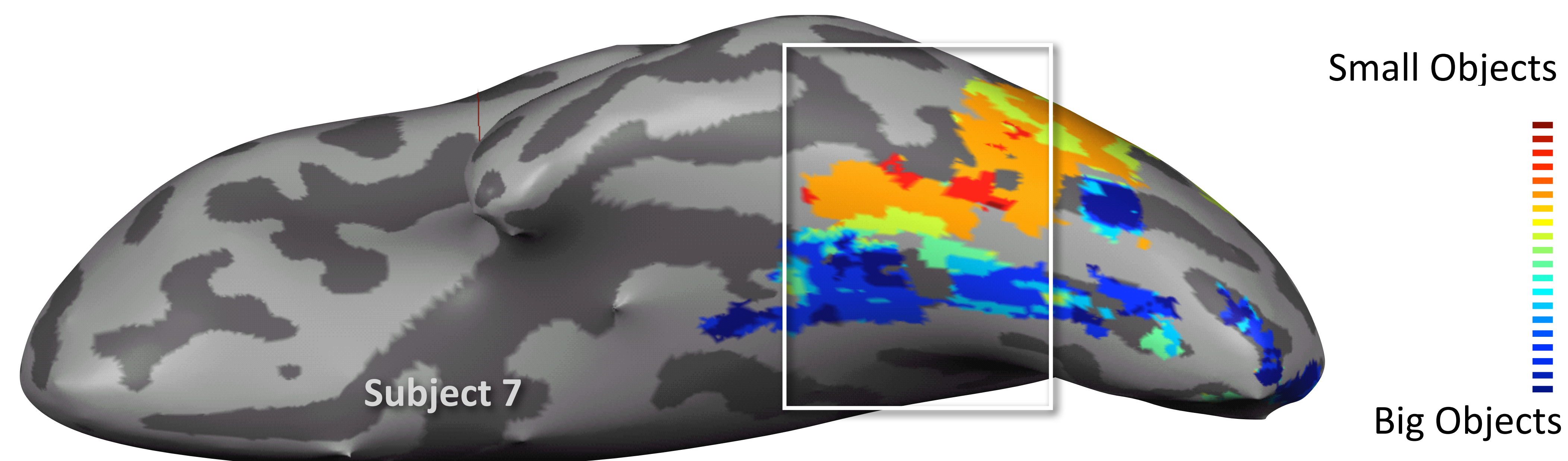
Konkle & Oliva, VSS 2010

Is there a sizeotopic map of object representations?

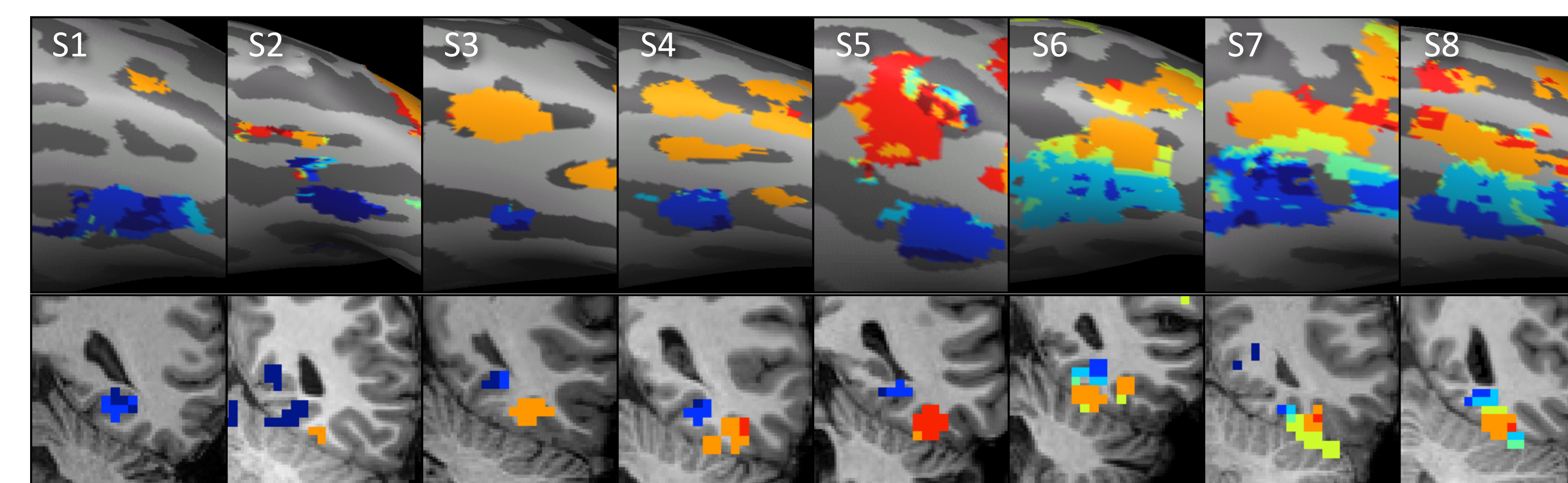
Expt 1: Phase-Encoding



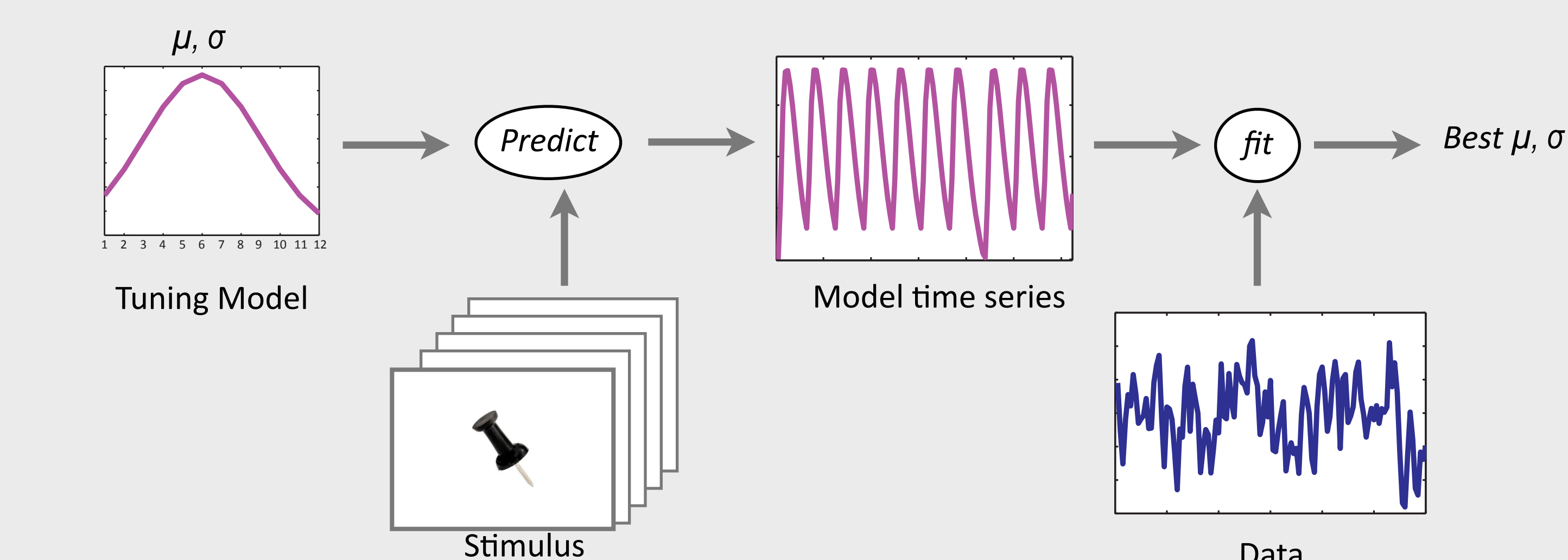
Results



Some subjects show a gradient of selectivity; others show two poles

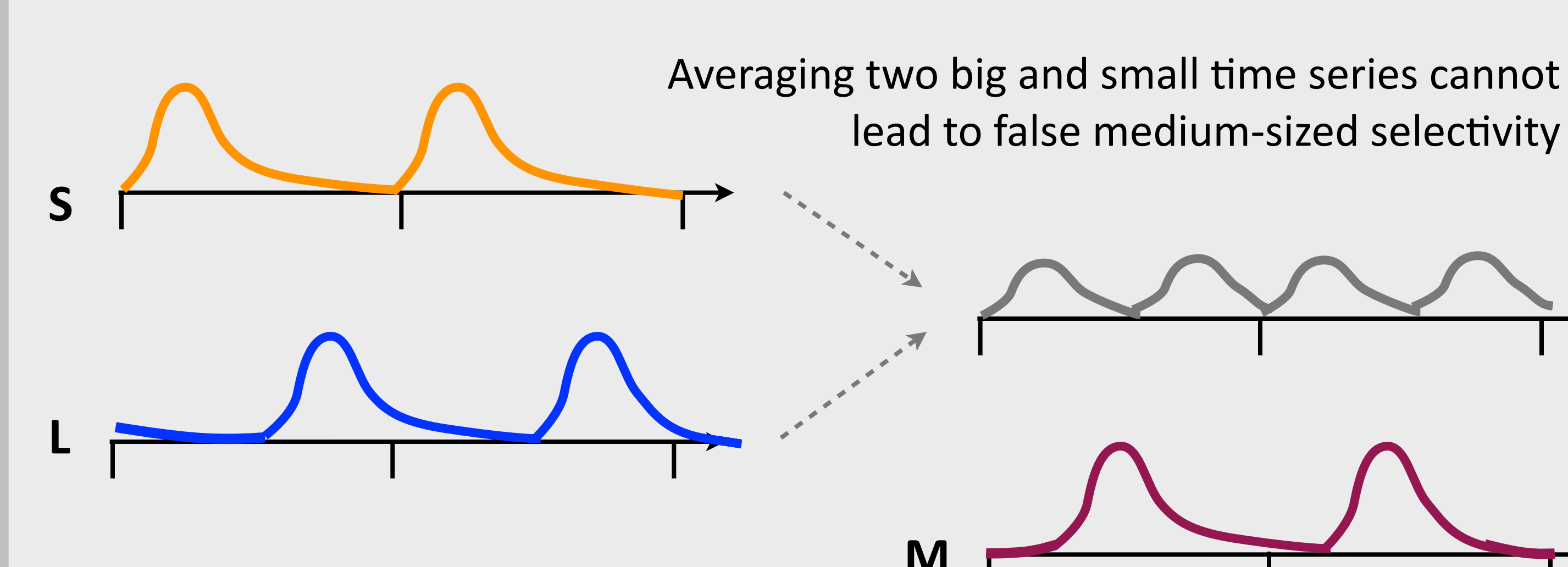


Phase-Encoding Analysis Method

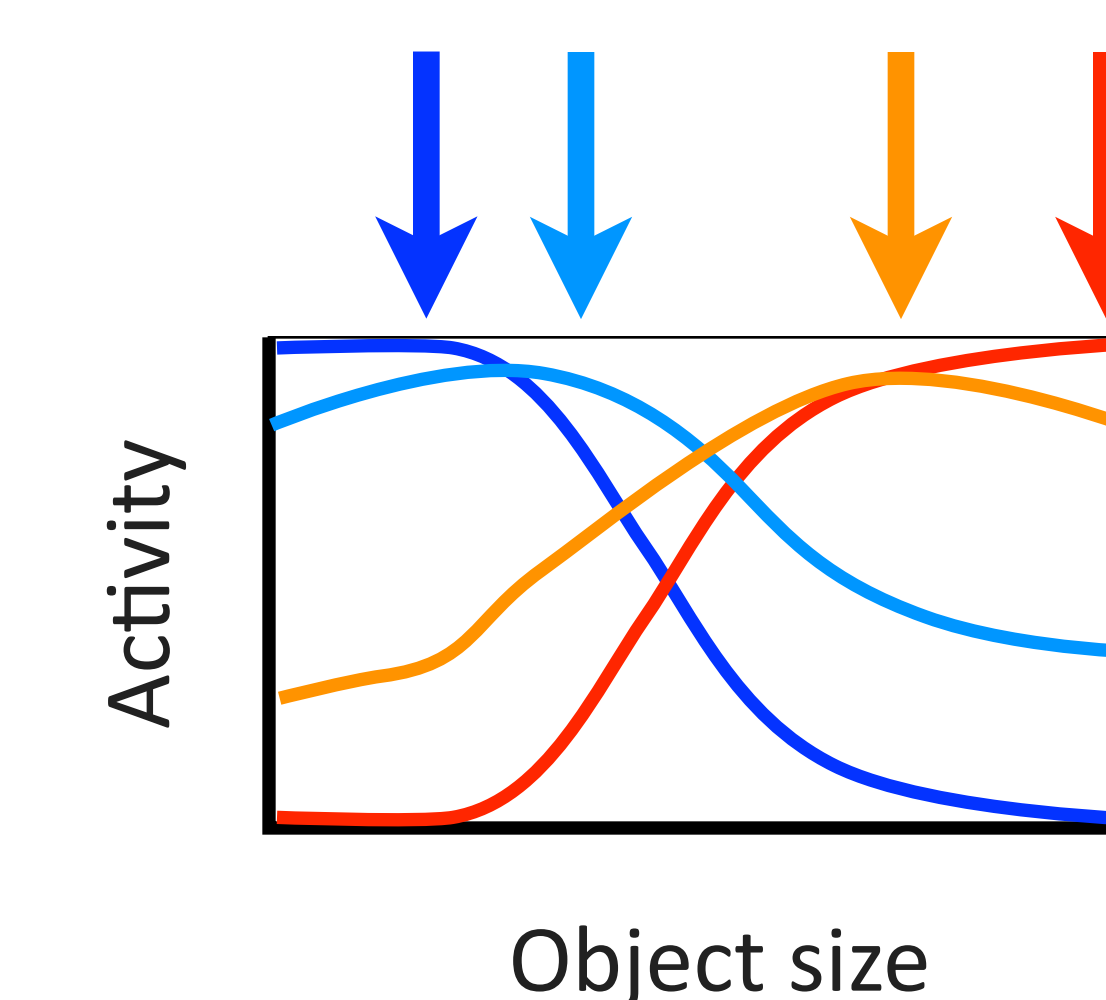


Dumoulin & Wandell, 2008

Movement/Smoothing cannot lead to false maps



Conclusions

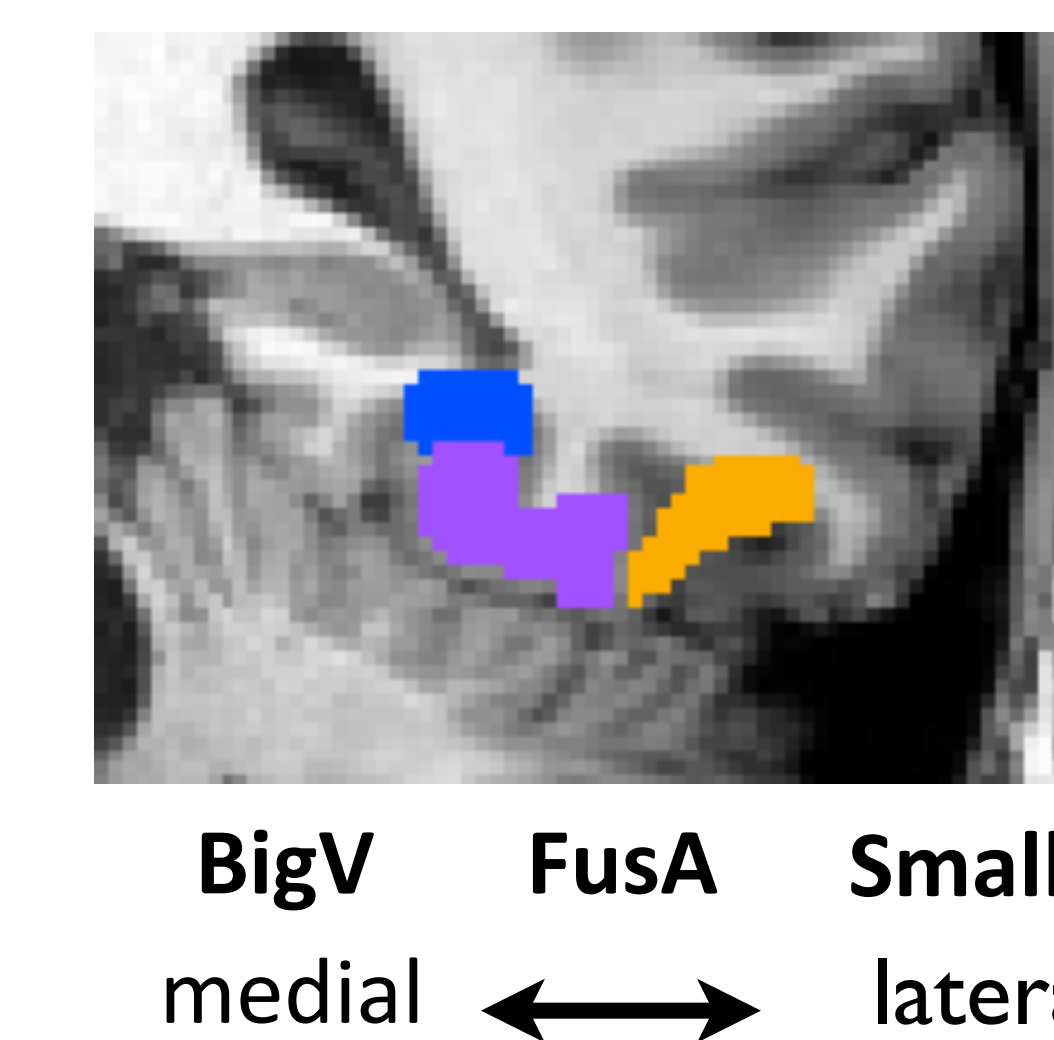


Expt 2: Blocked Design



16s stimulus blocks
18 images/block
650ms per image
24 blocks/condition
over 7 runs
N=6

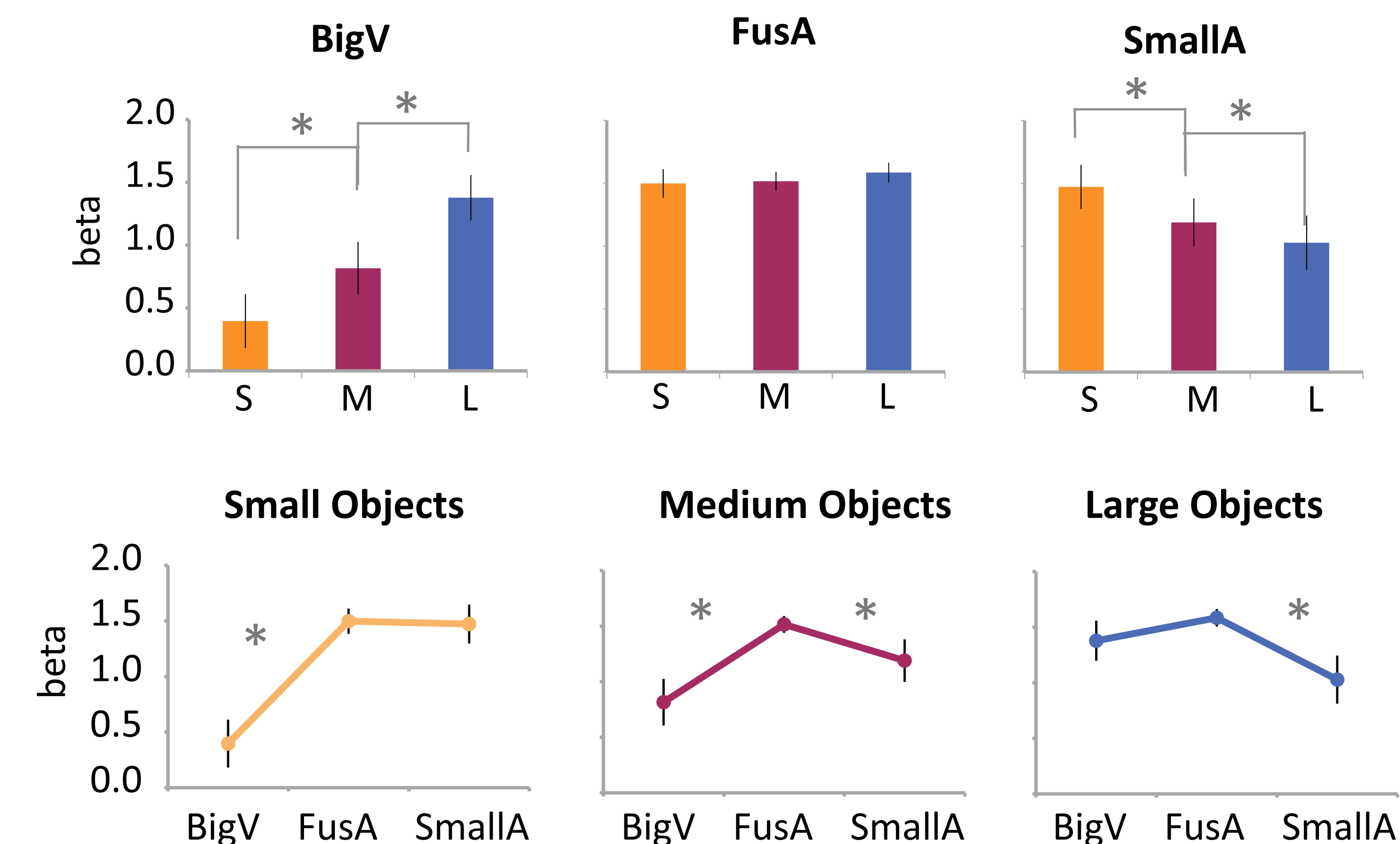
Results



Whole-brain contrasts revealed no medium-object selective areas

BigV and SmallA regions of interest localized from an independent localizer for each subject

FusA region drawn anatomically between functionally localized BigV and SmallA Regions



Anterior fusiform is active to large, medium, and small objects

Coarse "MVPA":
Peak of activation across cortex shifts with object size