Typicality Sharpens Category Representations in Object-Selective Cortex

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CNS 2015 – Data Blitz

DOG

Typical Categories

are recognized and categorized faster than
less typical categories

Rosch 1973

Rosch & Mervis 1975

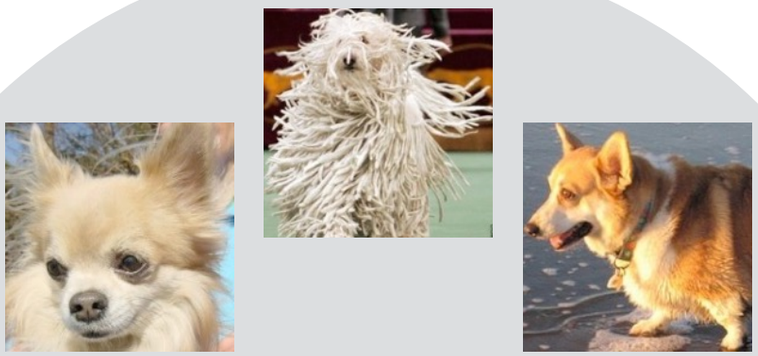
DOG

Neural Correlates of Real-World Object Typicality

more typical — less typical

How does the neural representation of real-world objects vary across the typicality continuum ?

#1: Relationship to category central tendency

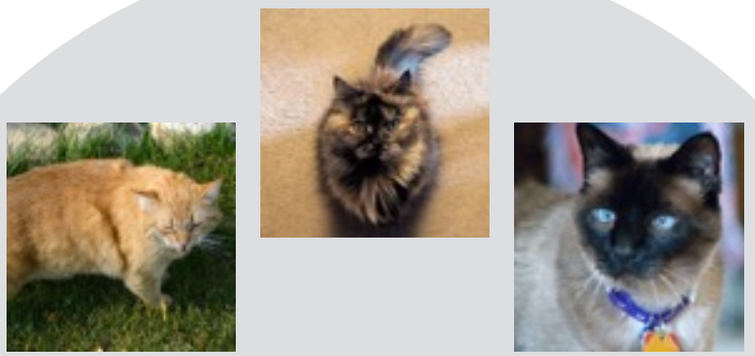


Posner & Keele (1968), Rosch & Mervis (1975), Davis and Poldrack (in press), and many others

Rosch & Mervis (1975)

Family Resemblance Hypothesis

#2: Differentiating between basic level categories



Rosch & Mervis (1975), Sigala & Logothetis (2002), Freedman et al. (2003), and many others

64 exemplars x 16 images per exemplar

Birds

Cats

Dogs

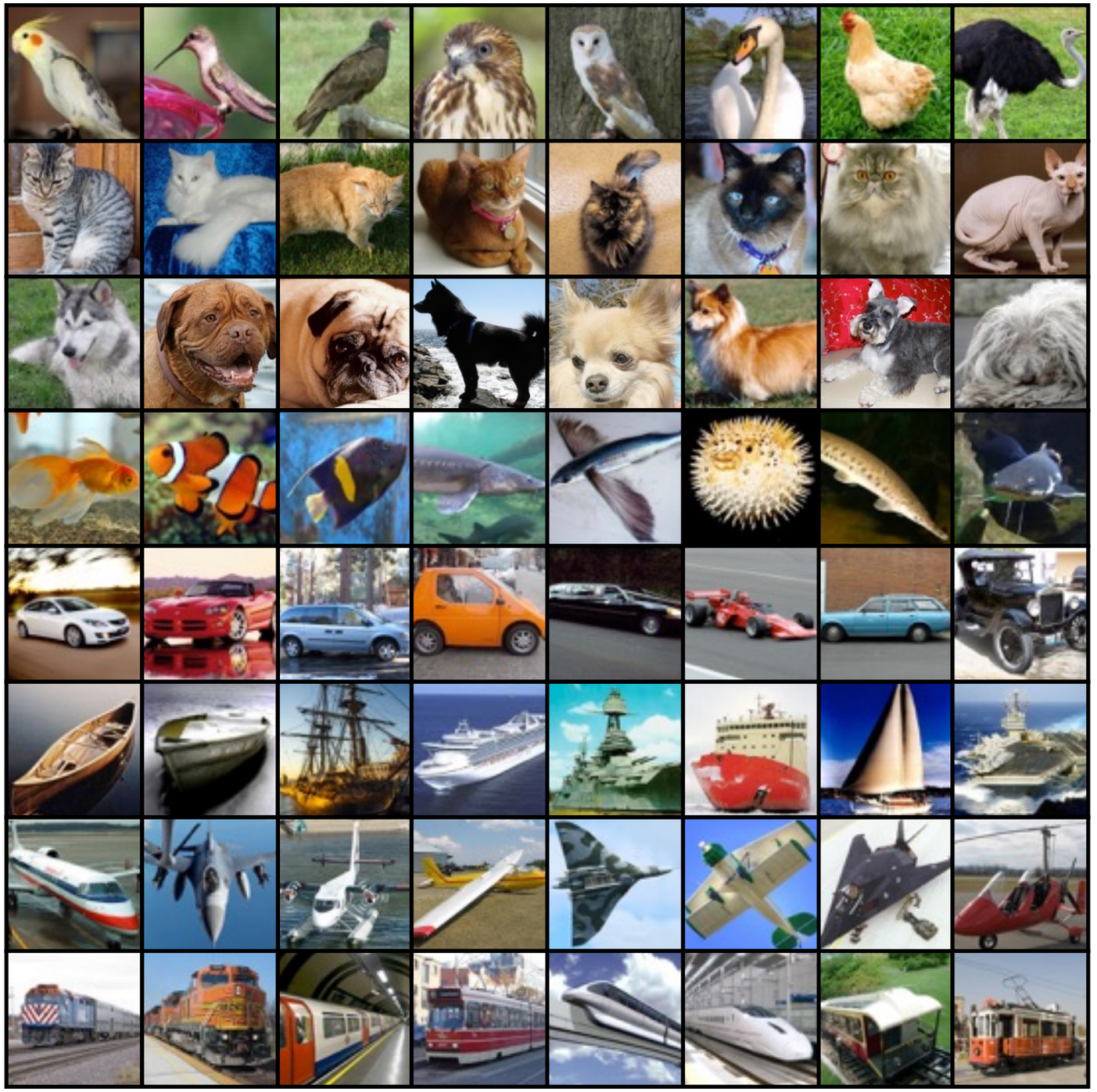
Fish

Cars

Boats

Planes

Trains



fMRI

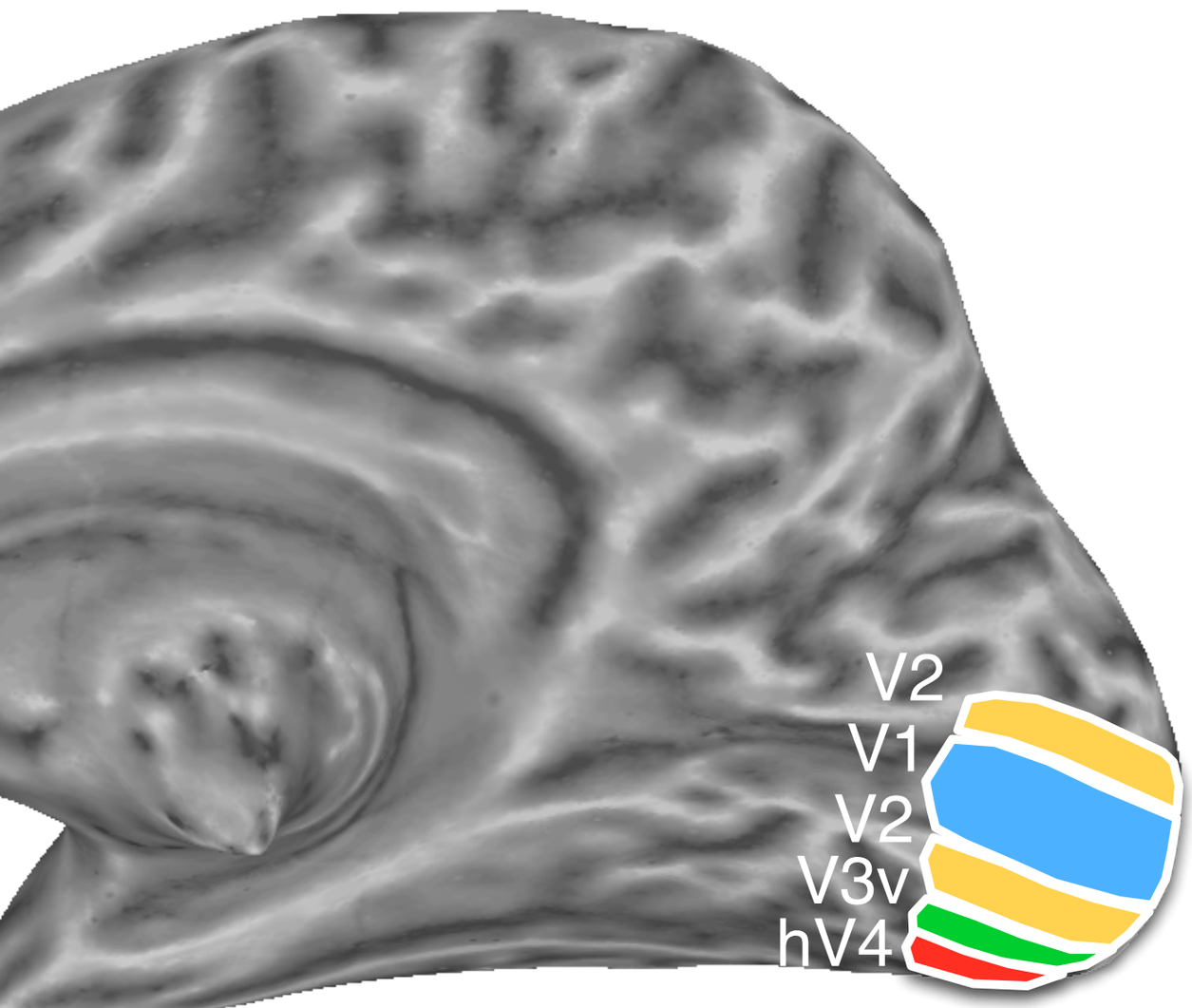
more typical

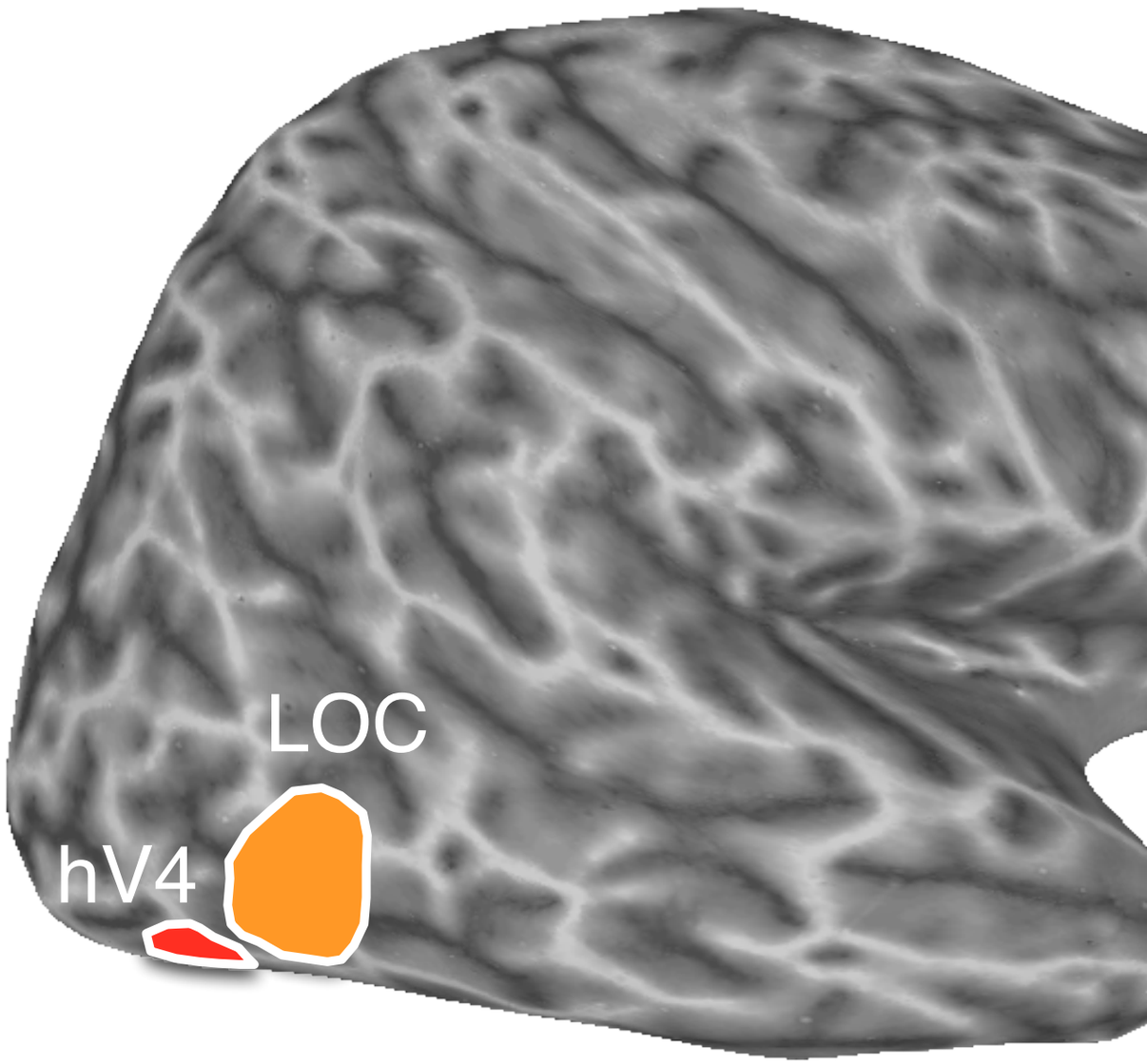
less typical

Cortical Regions of Interest: ROI

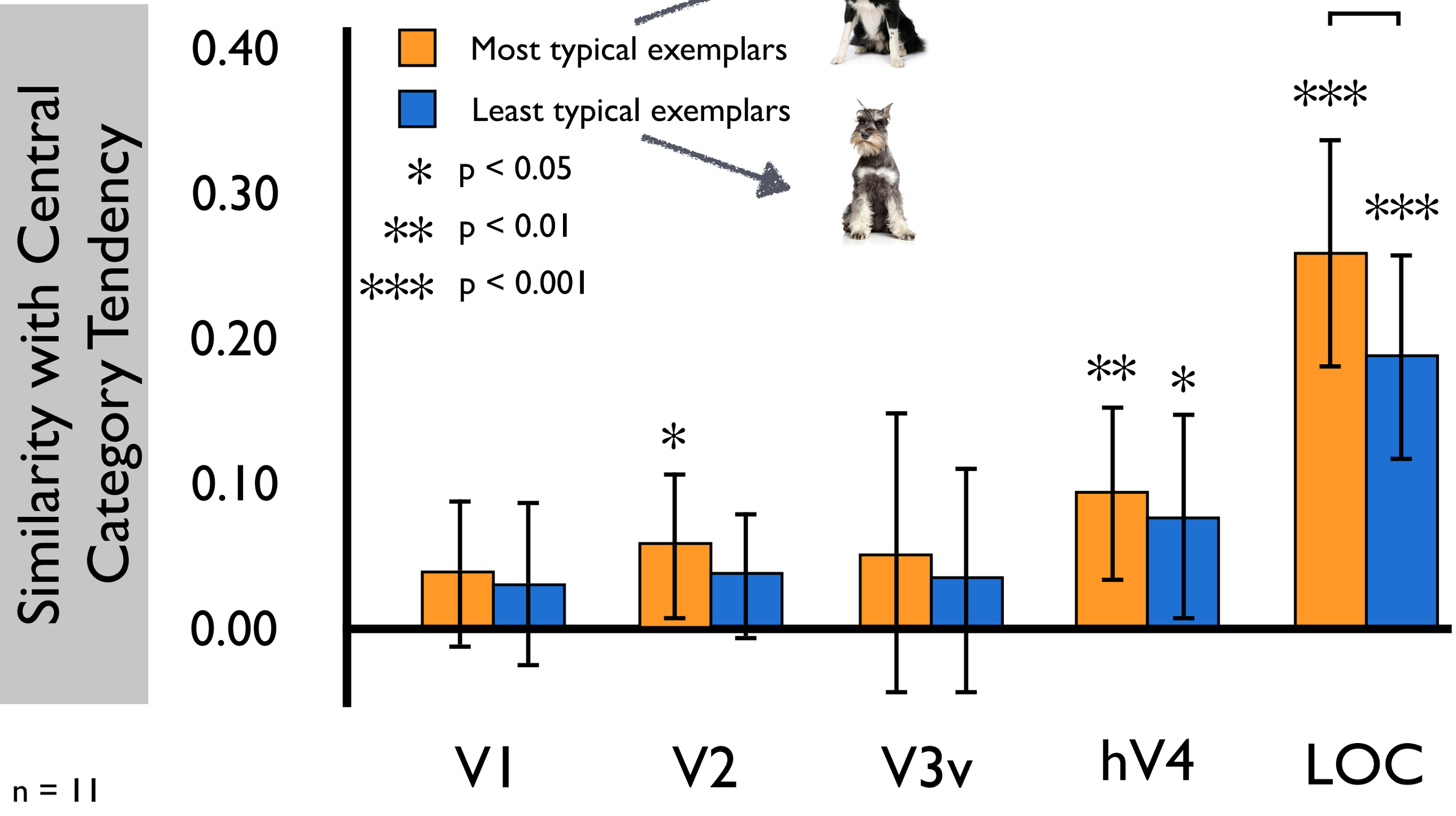
early visual cortex:
V1, V2, V3v, hV4

object-selective:
LOC

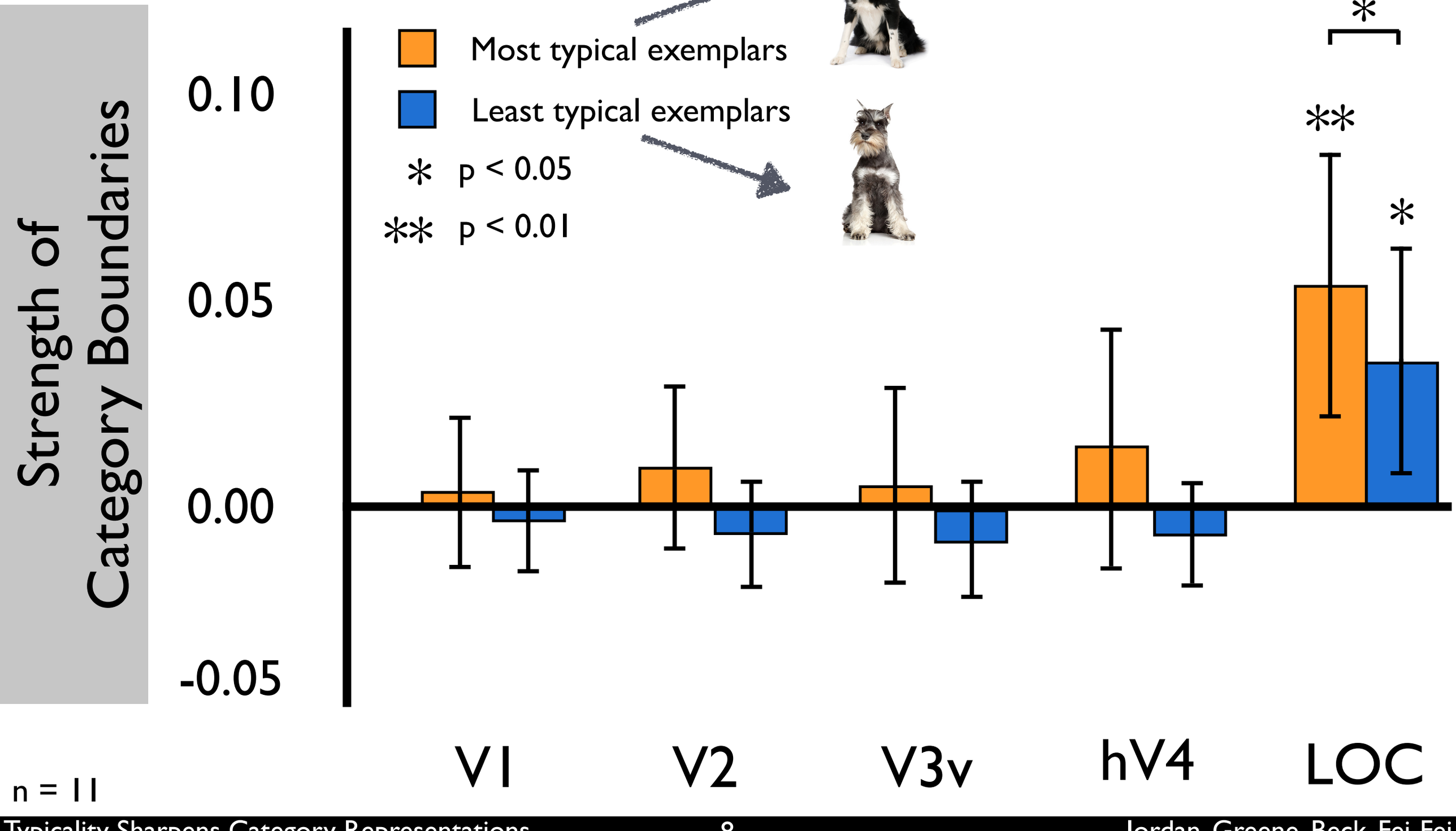




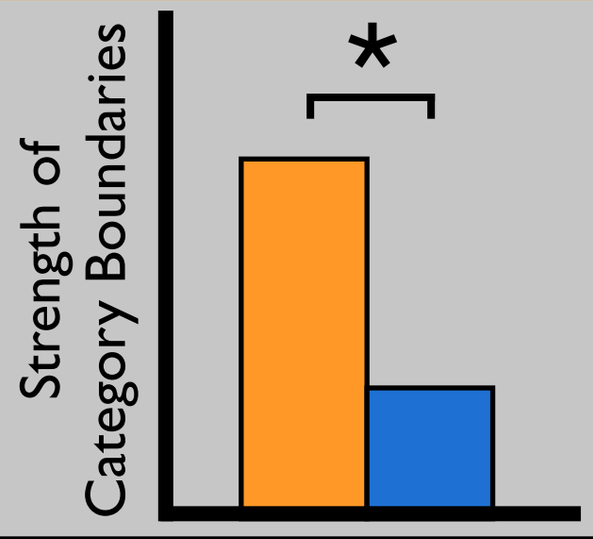
Typical exemplars are more similar to category central tendency in LOC



Typical exemplars are more similar to each other and more distinguishable from other categories in LOC

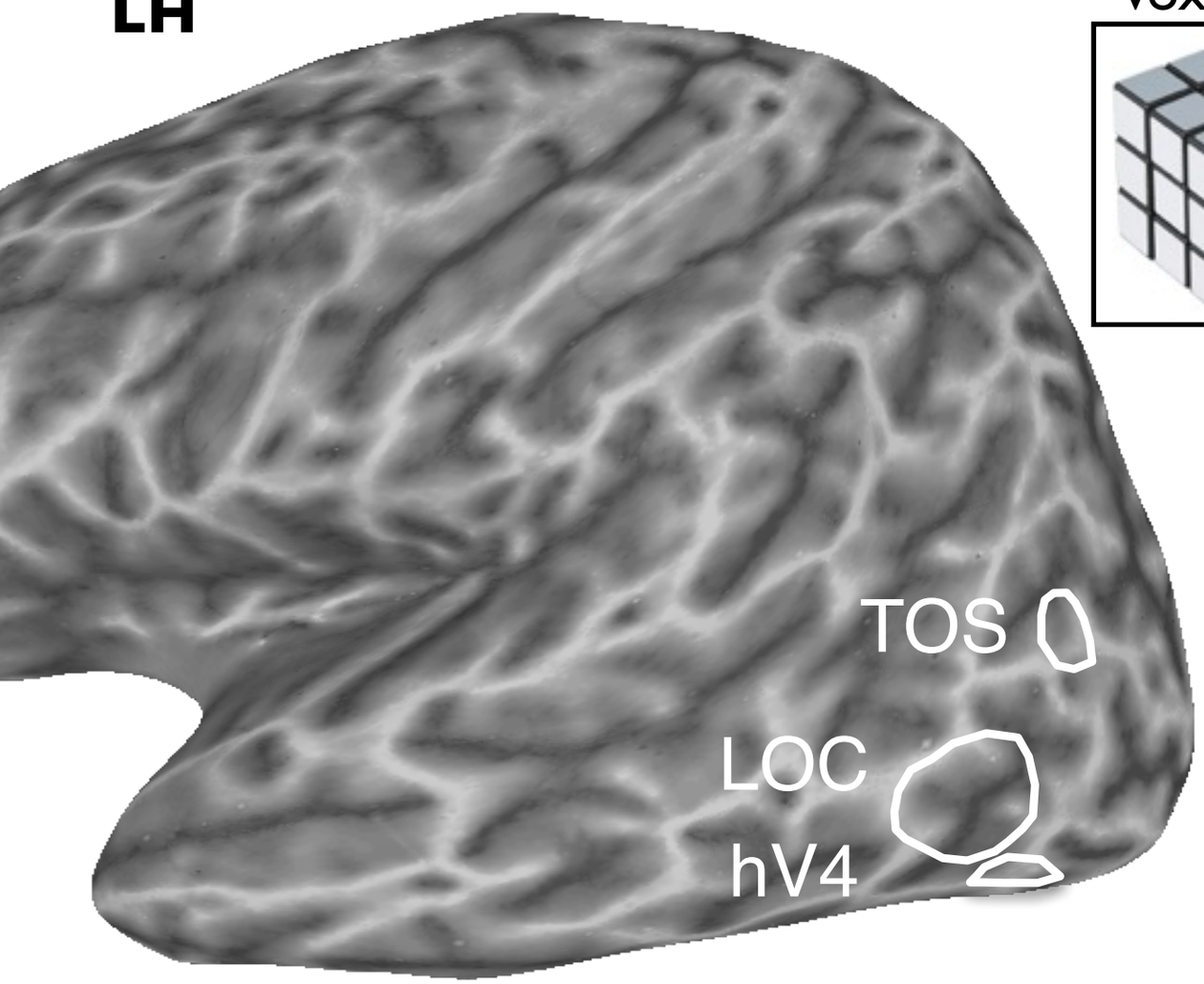


More Typical Objects
More Distinguishable

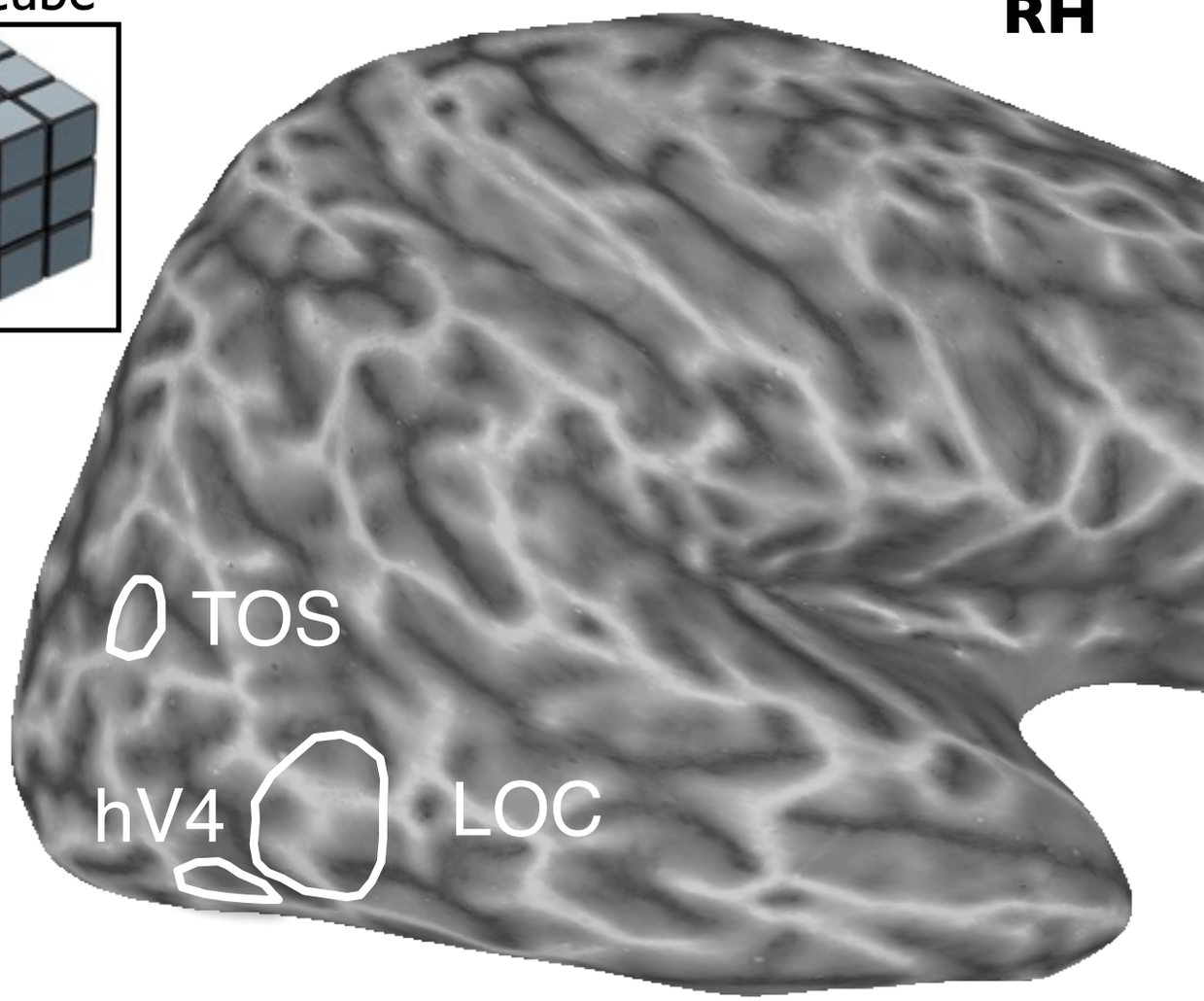


Voxel cube

LH



RH



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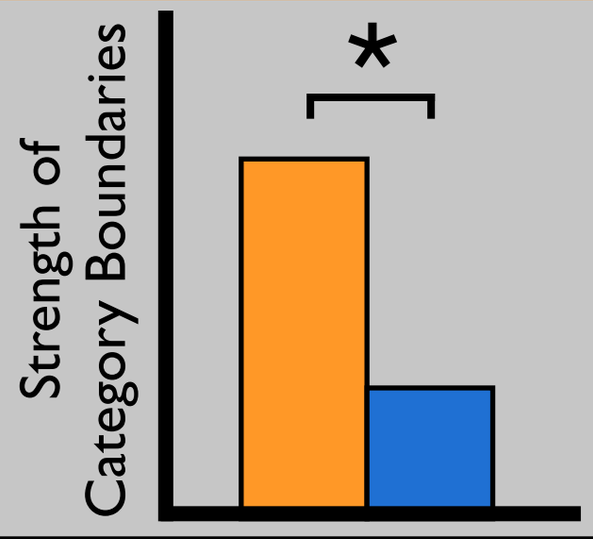
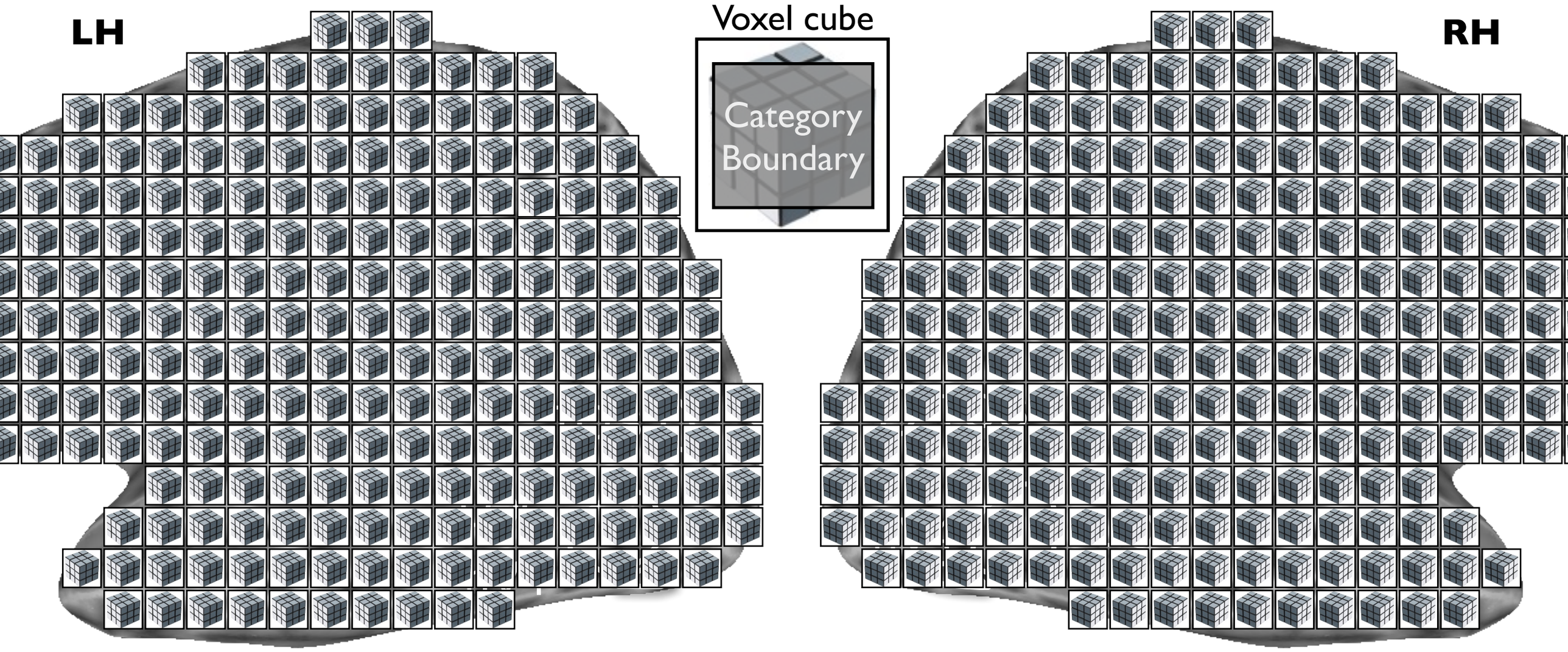
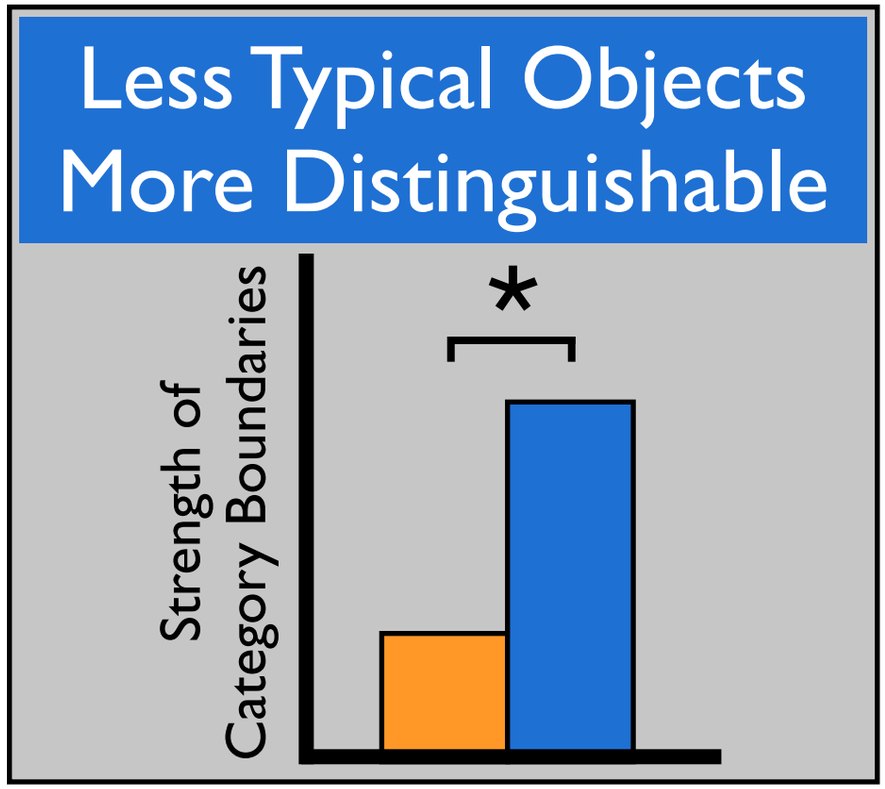
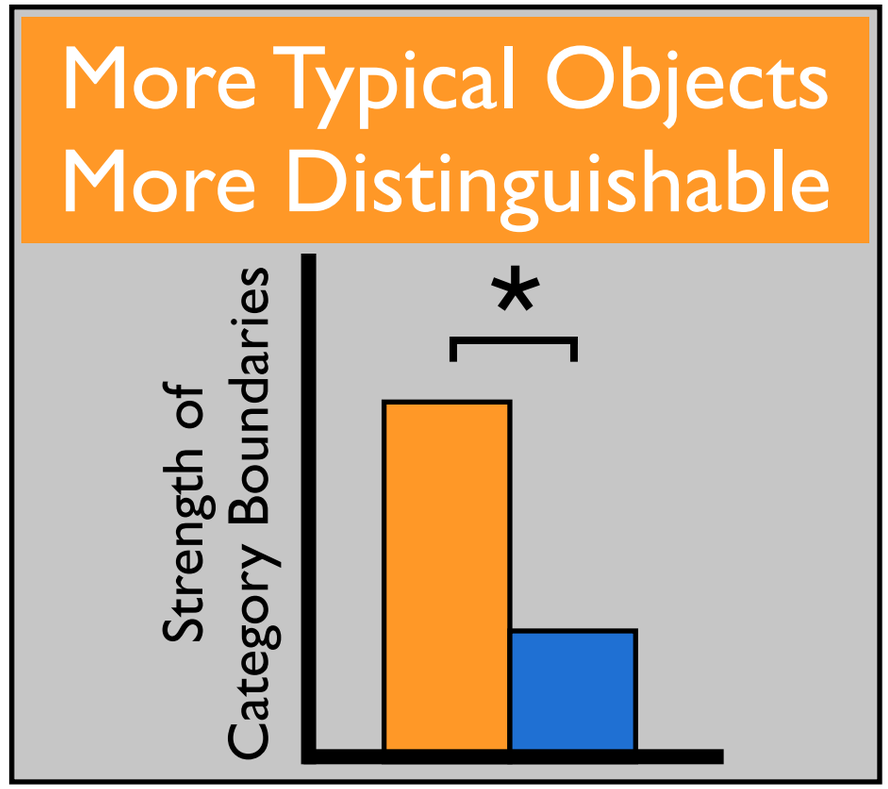
More Distinguishable







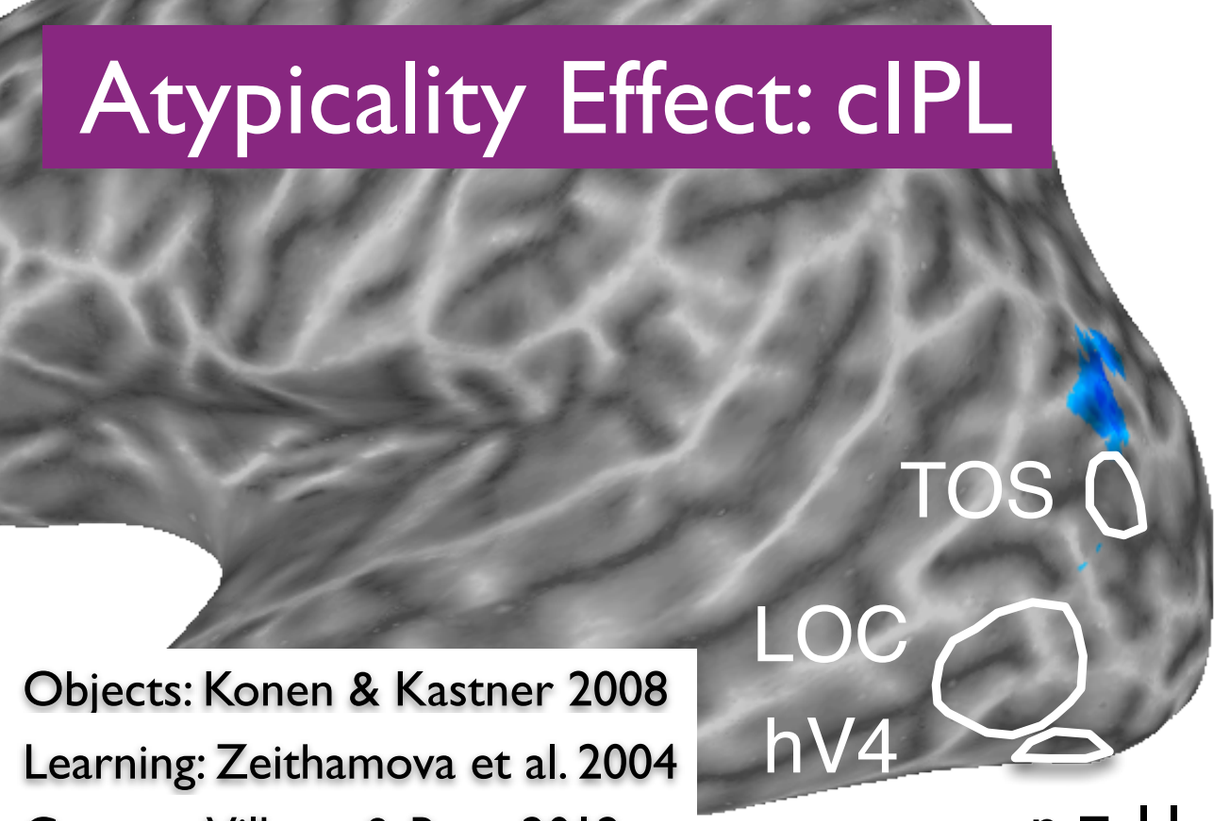


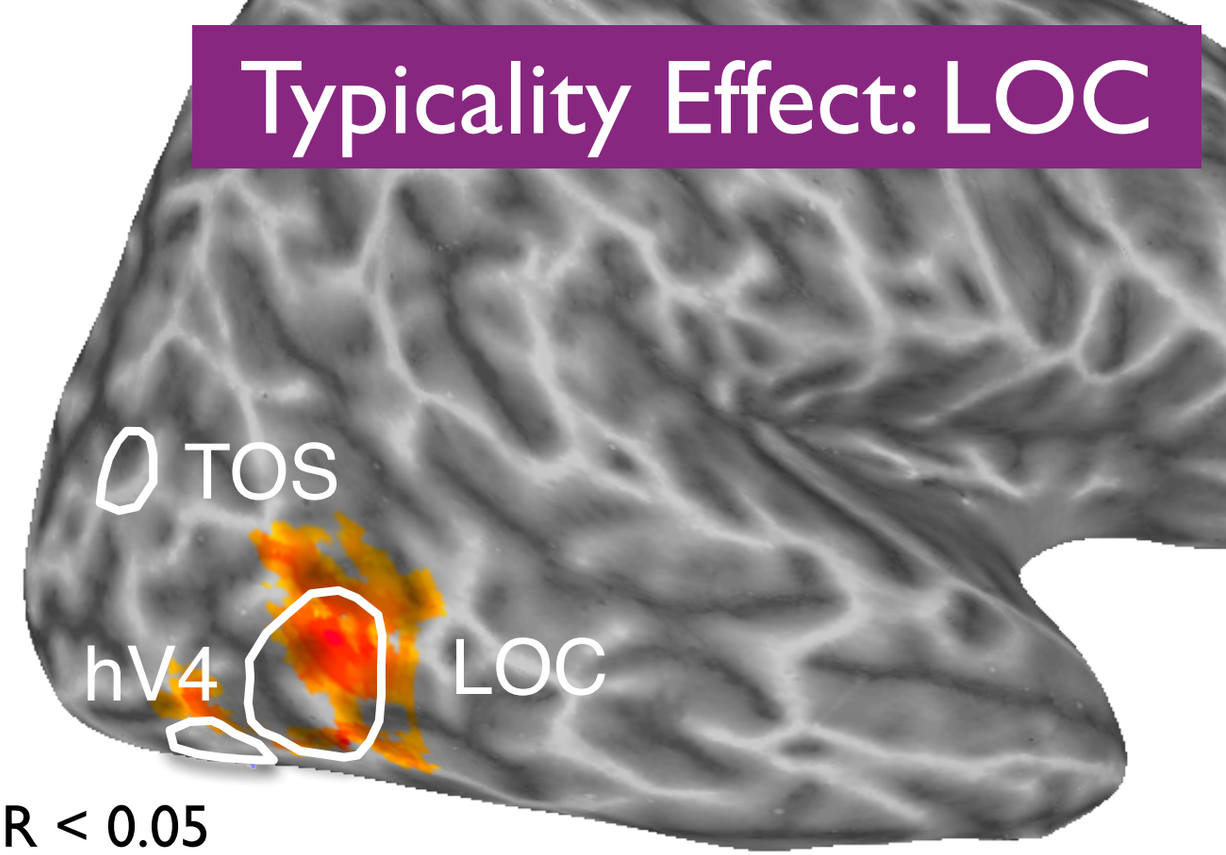
LH

RH

Atypicality Effect: cIPL

Typicality Effect: LOC





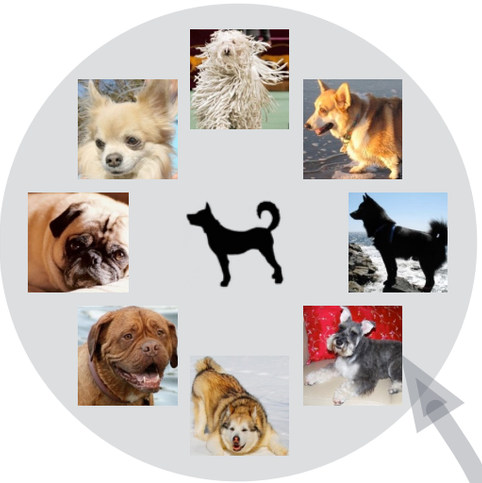
Objects: Konen & Kastner 2008
Learning: Zeithamova et al. 2004
Context: Vilberg & Rugg 2012

n = 11

FDR < 0.05

How does the neural representation of real-world objects vary across the typicality continuum ?

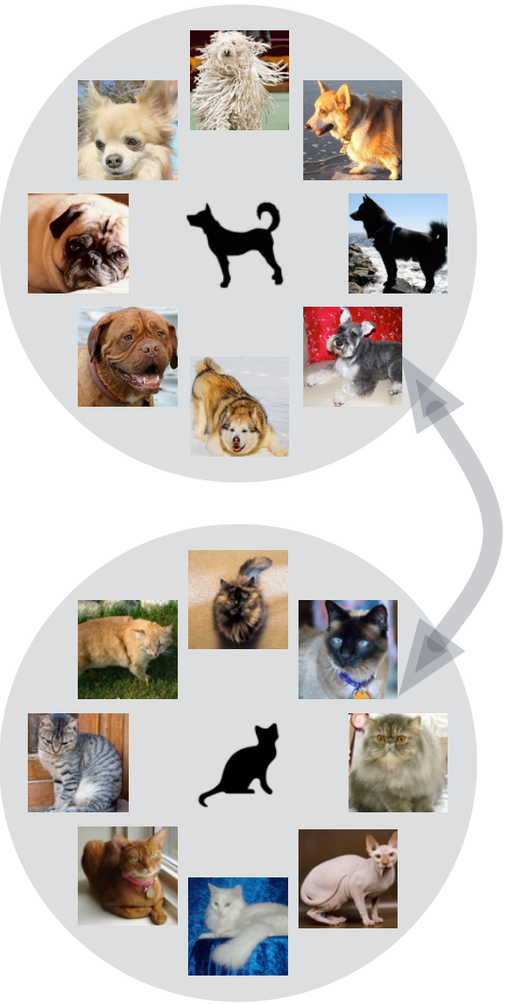
Typical exemplars are more similar to central category tendency in LOC



Typical exemplars distinguish more strongly between categories in LOC

How does the neural representation of real-world objects vary across the typicality continuum ?

Evidence for a prototype representation for real-world object categories in LOC



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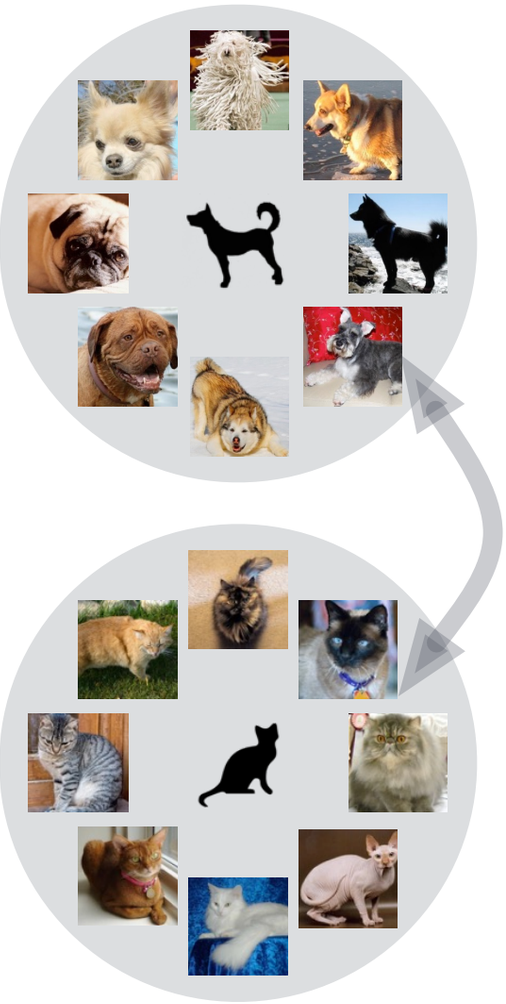
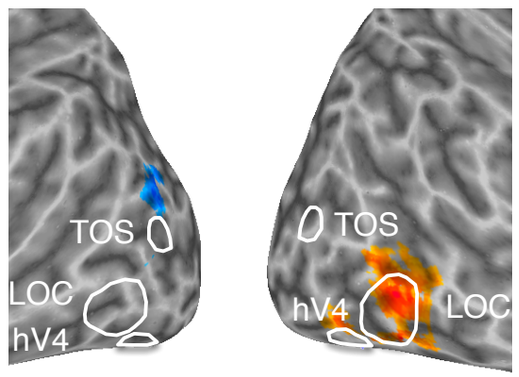


Less typical exemplars exhibit stronger category boundaries in cIPL



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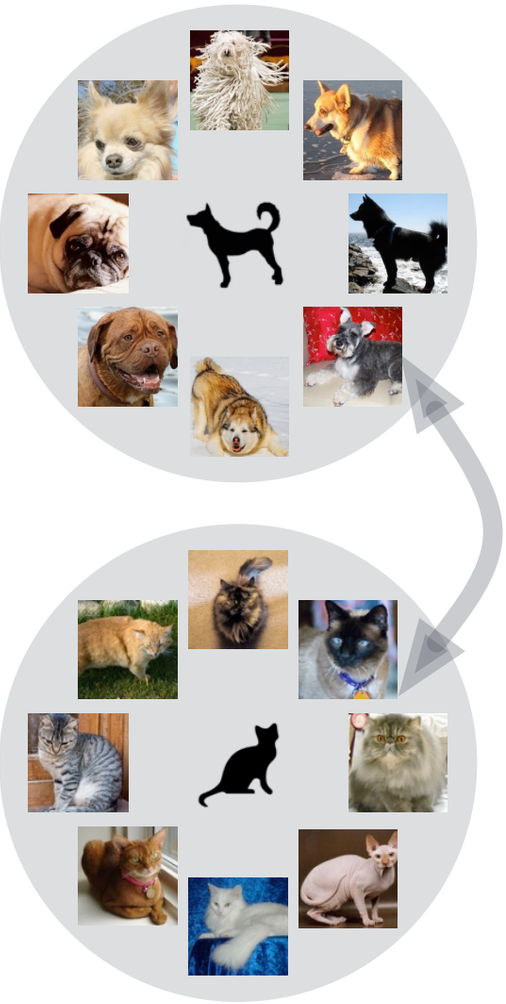
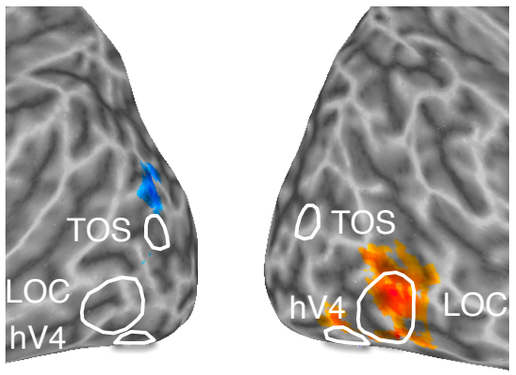


Suggests contextual facilitation of categorization for atypical exemplars in cIPL



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