



Using Closed-Loop Real-Time fMRI Neurofeedback to Induce Neural Plasticity and Influence Perceived Similarity

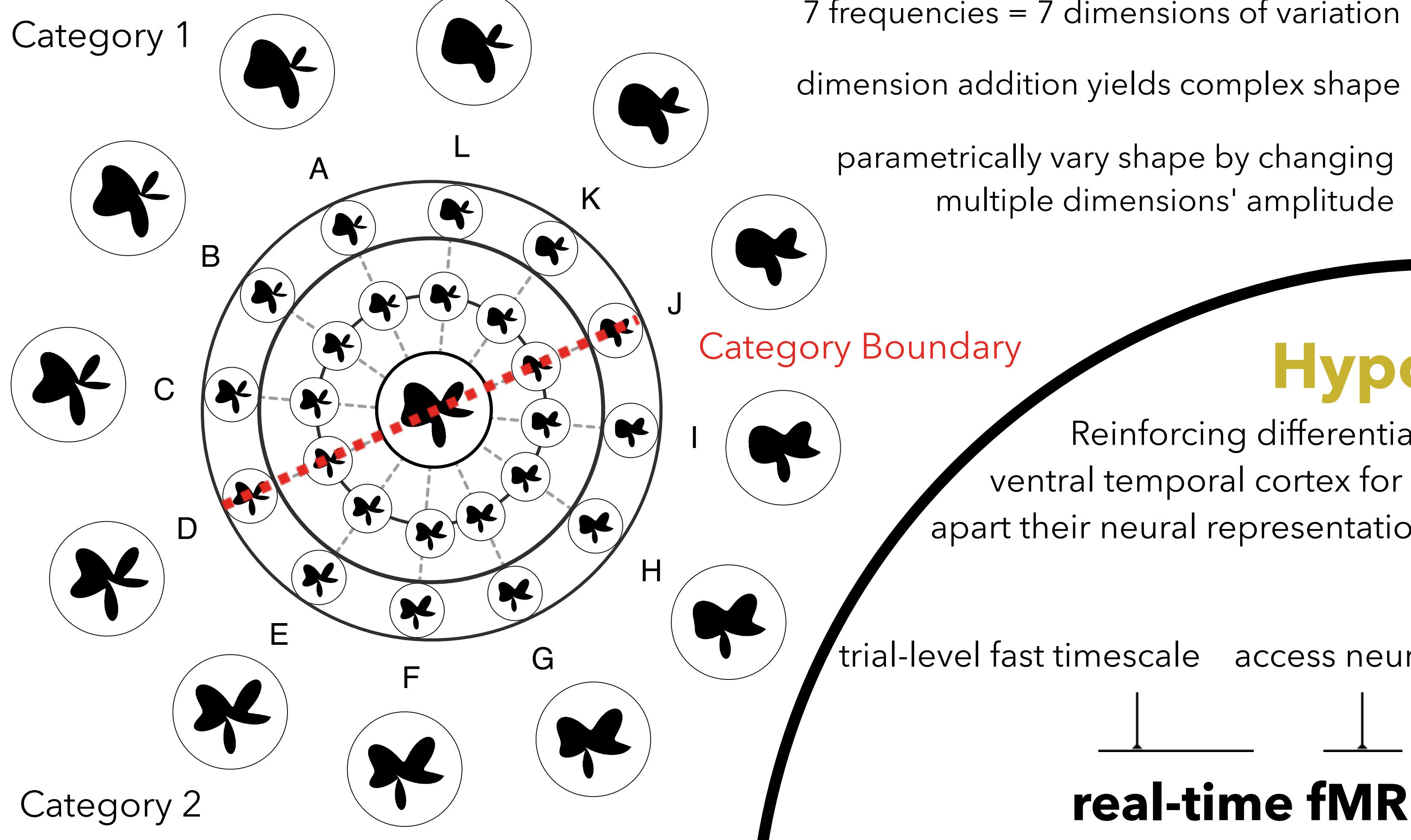
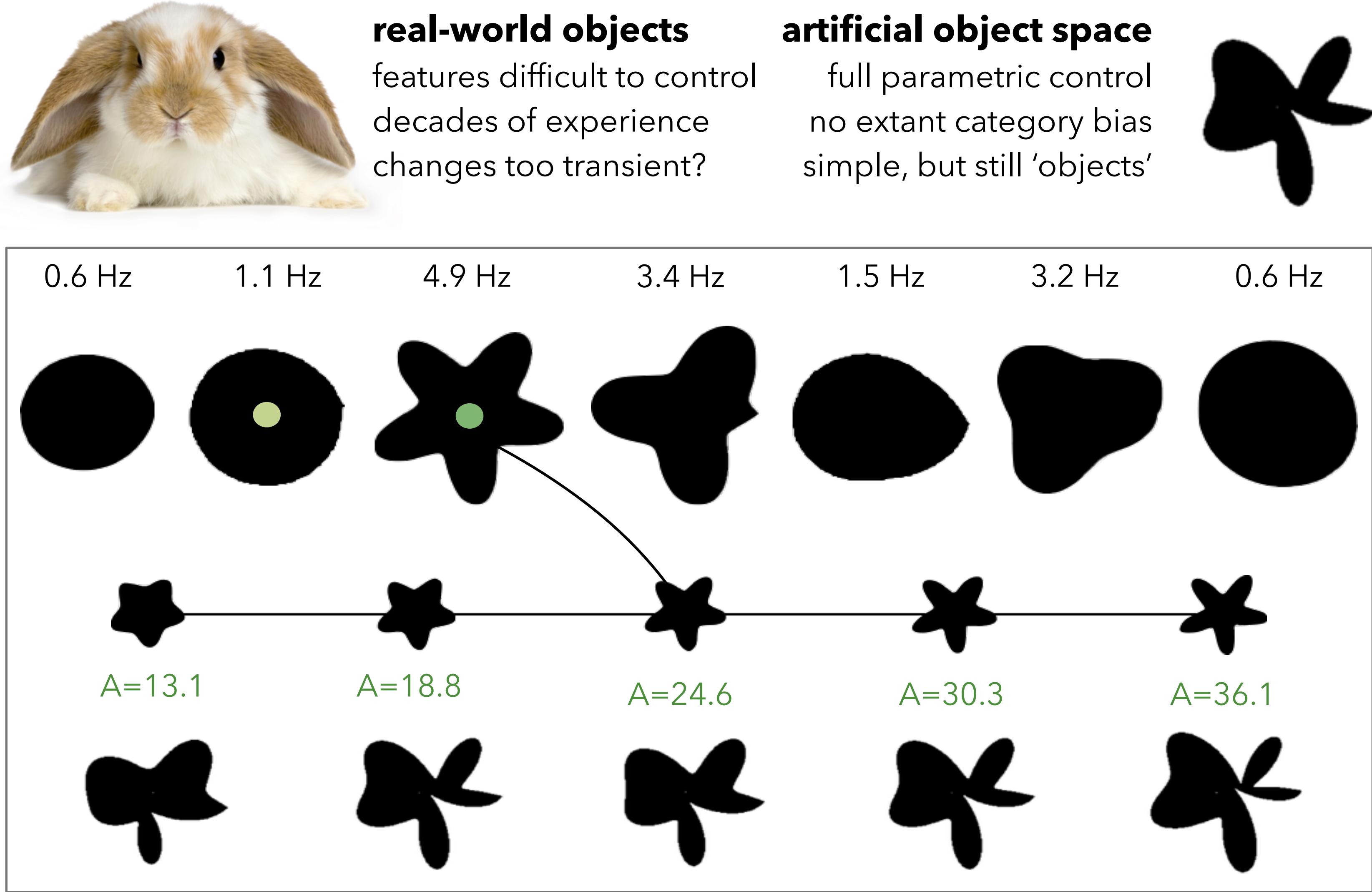
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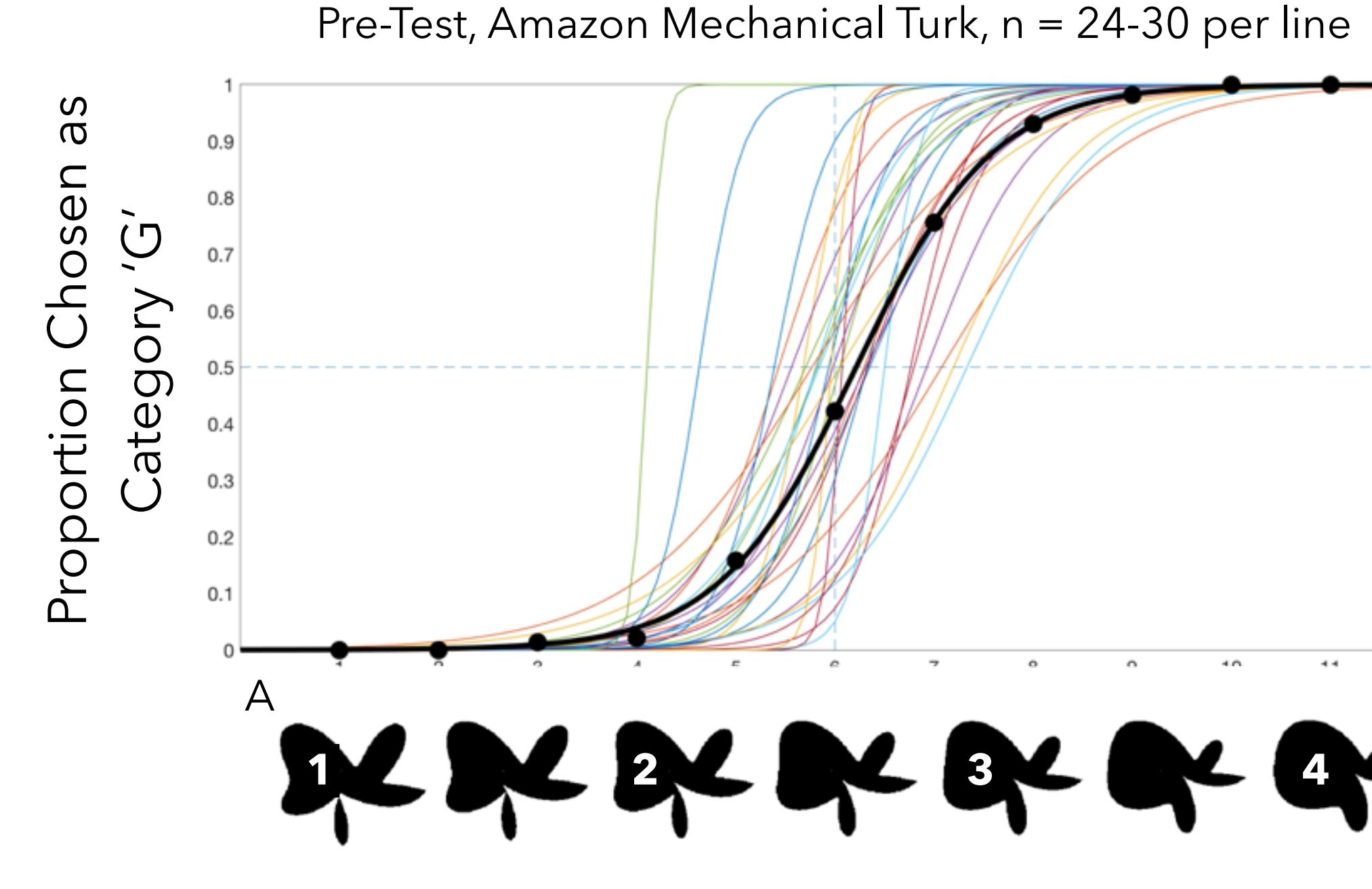
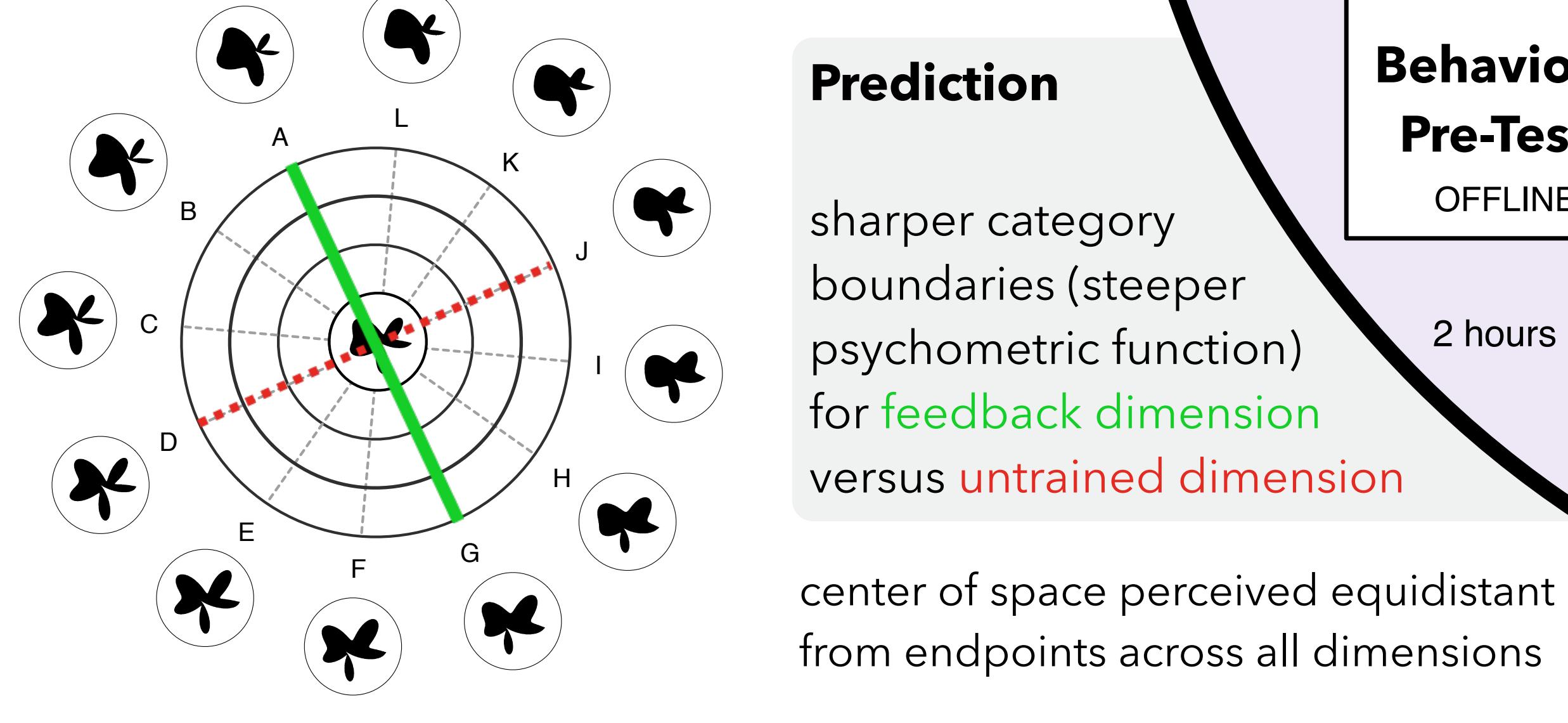
Abstract Multidimensional STIMULUS SPACE



Inducing and Measuring PERCEPTUAL CHANGES

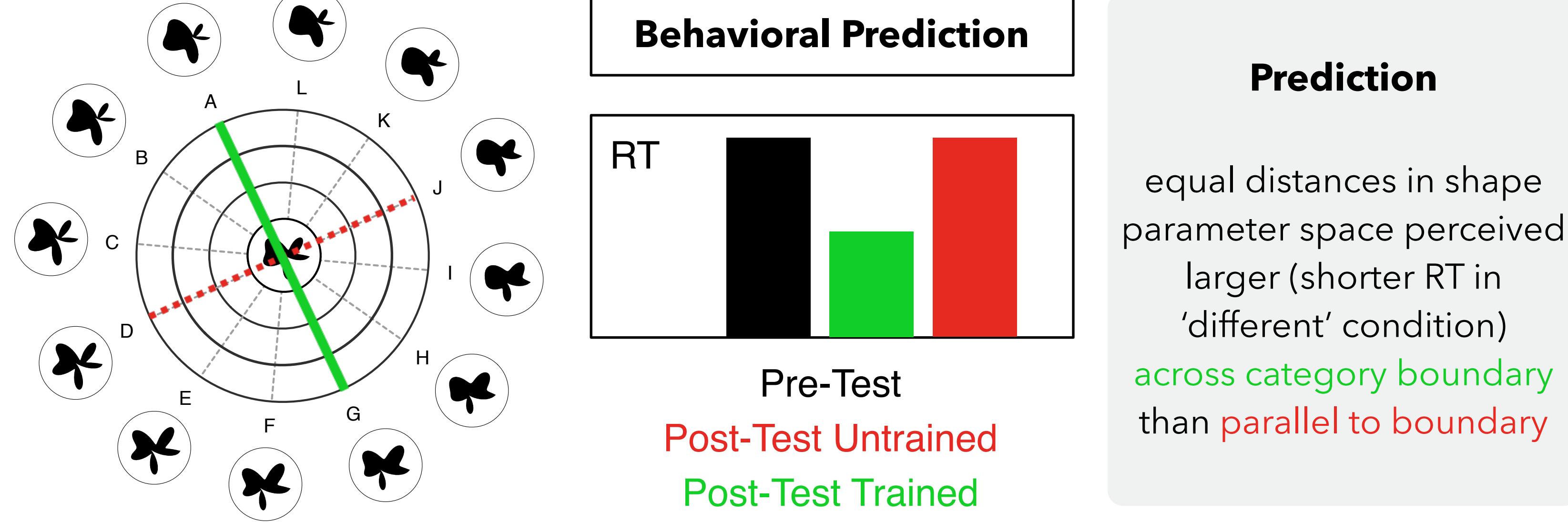
Categorical Perception of Space

2AFC between line endpoints | 8 lines



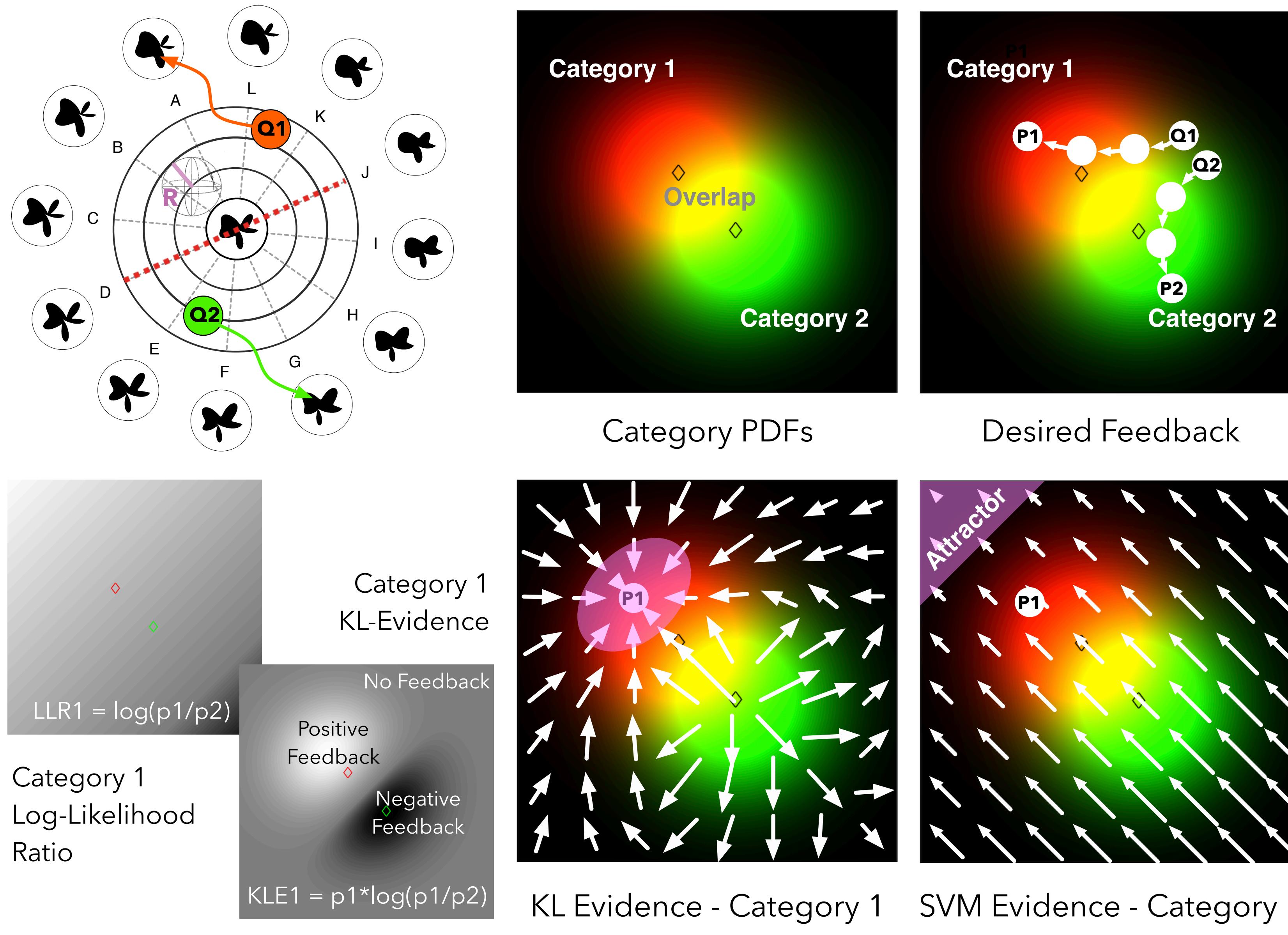
Perceived Distances Across Dimensions

RTs for same-different task



NEUROFEEDBACK: KL-Evidence Model & Training

if two shapes become more similar neurally, they may be perceived similarly
Drive neural activity for shapes near category boundary towards category prototypes



Feedback based on standard MVPA may drive activity away from boundary in arbitrary directions
KL-Evidence may shift patterns towards neural prototypes more accurately

Shape oscillates with variable radius, centered randomly **Task**
Push neural pattern of shape towards prototype **Goal**
Make the shape stop oscillating! **Instructions**

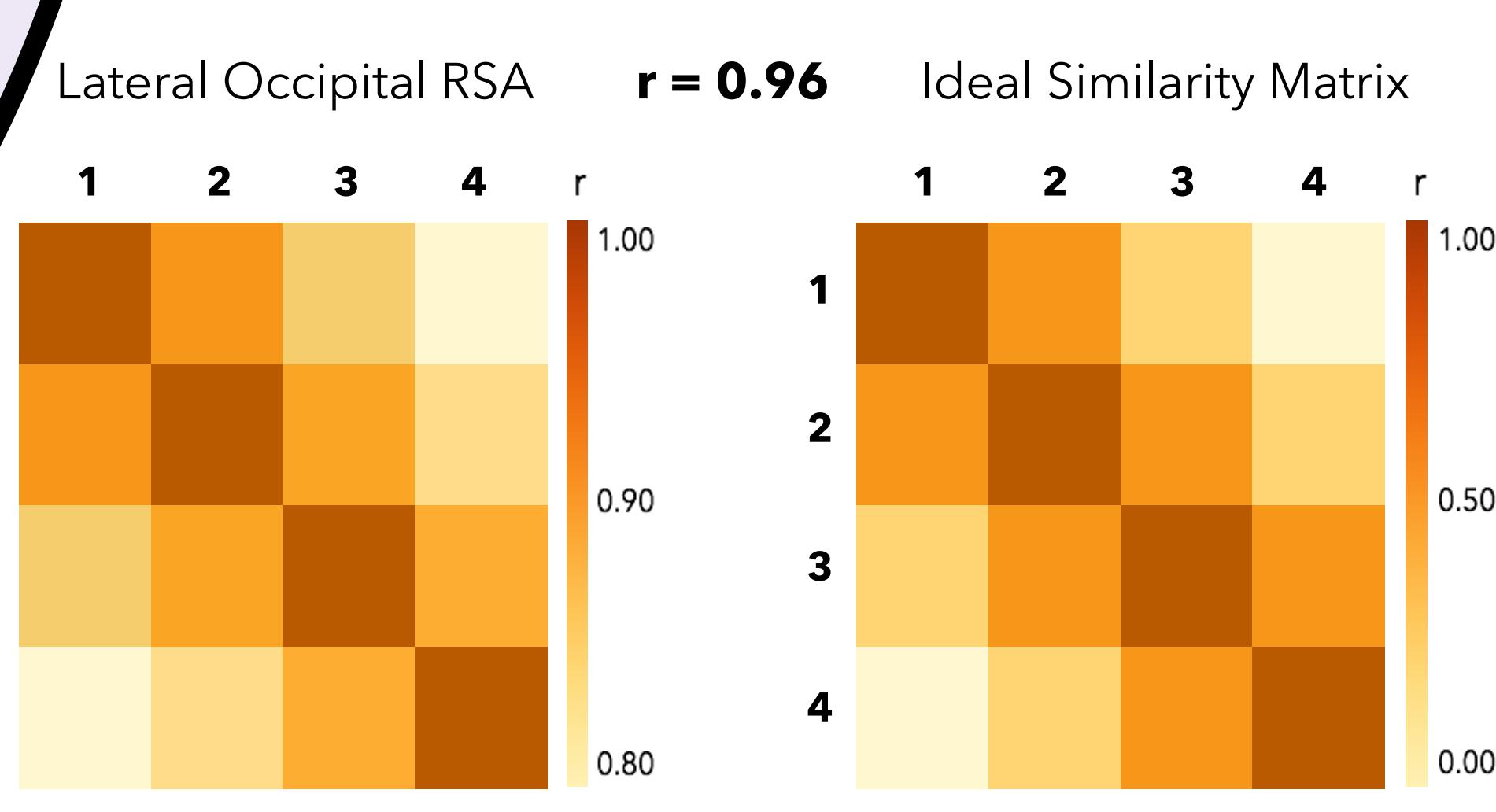
Radius R Neurofeedback Manipulation

Positive feedback: decrease R
Negative feedback: increase R

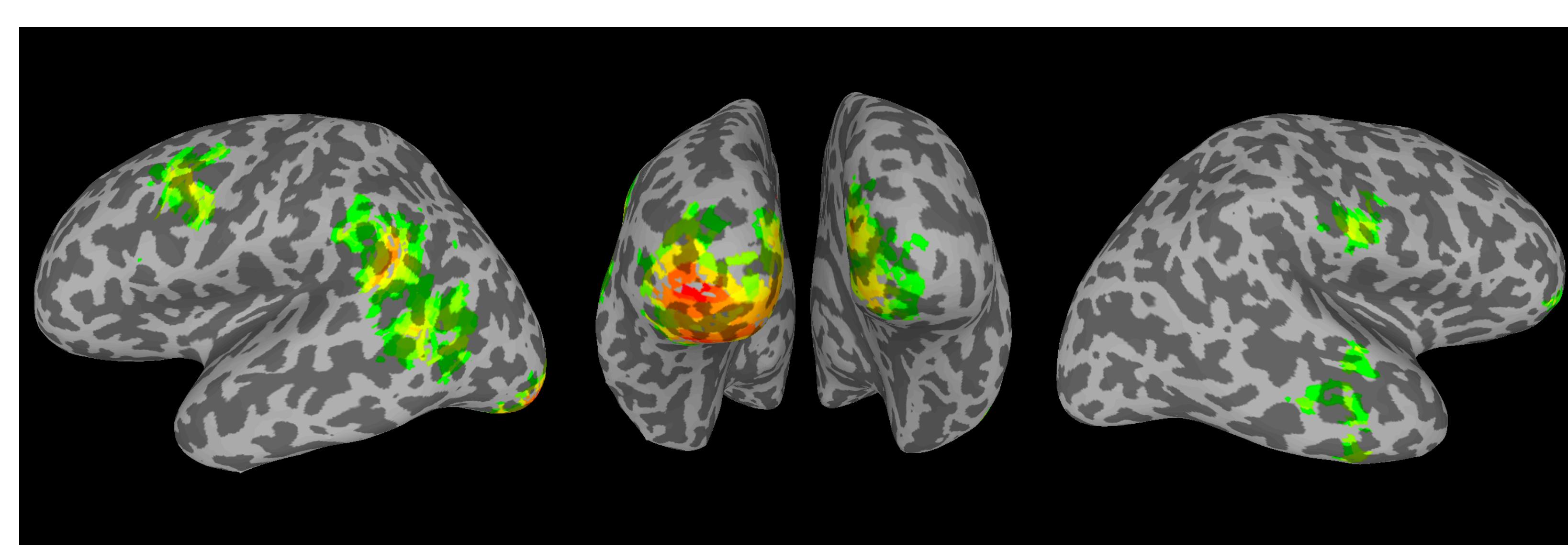
NEURAL REPRESENTATION of Shape Space

Cognitive Map Shape Localizer

average 6 lines | n=10 | anatomical ROI



Feedback Training ROI



Category Prototype Classification: A vs. G n=3 | LORO

