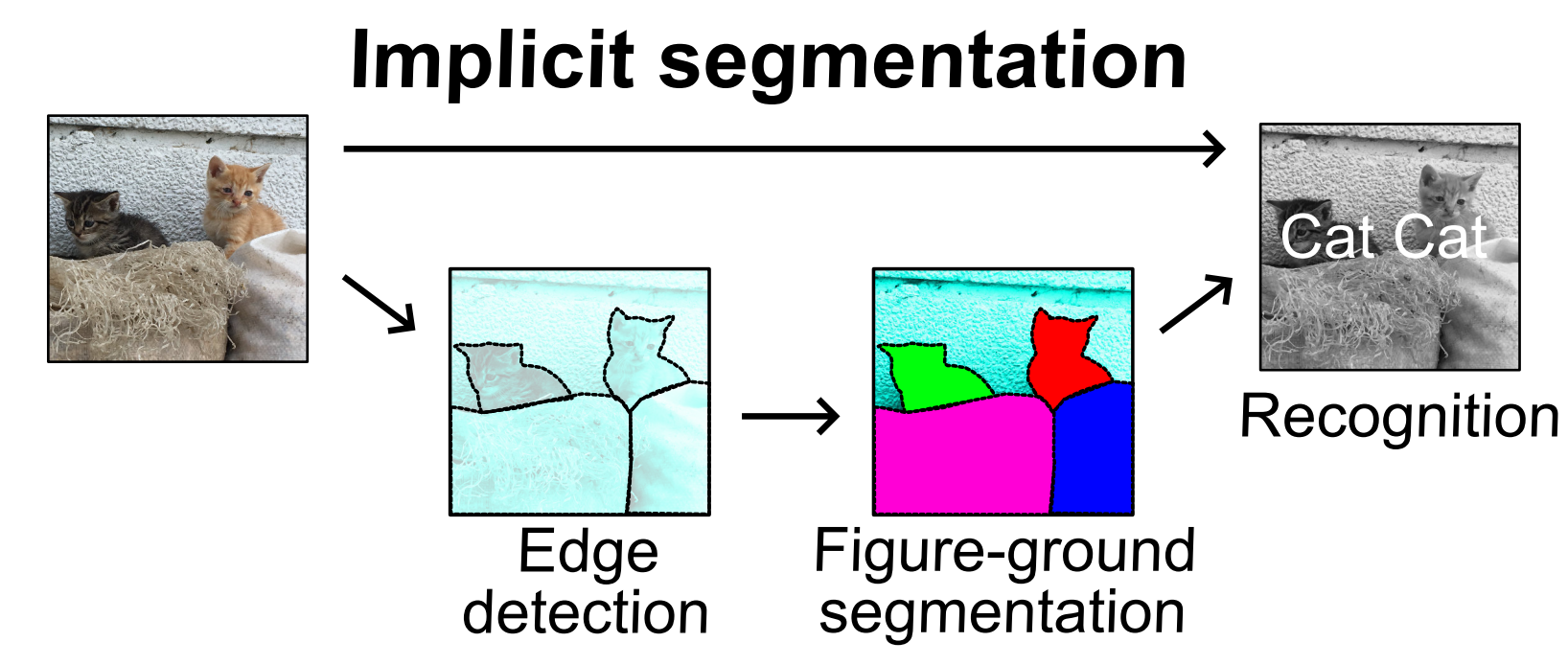
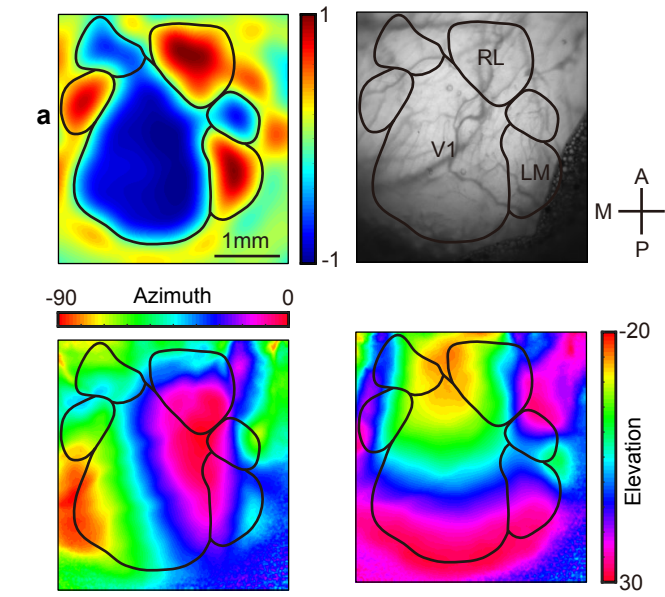
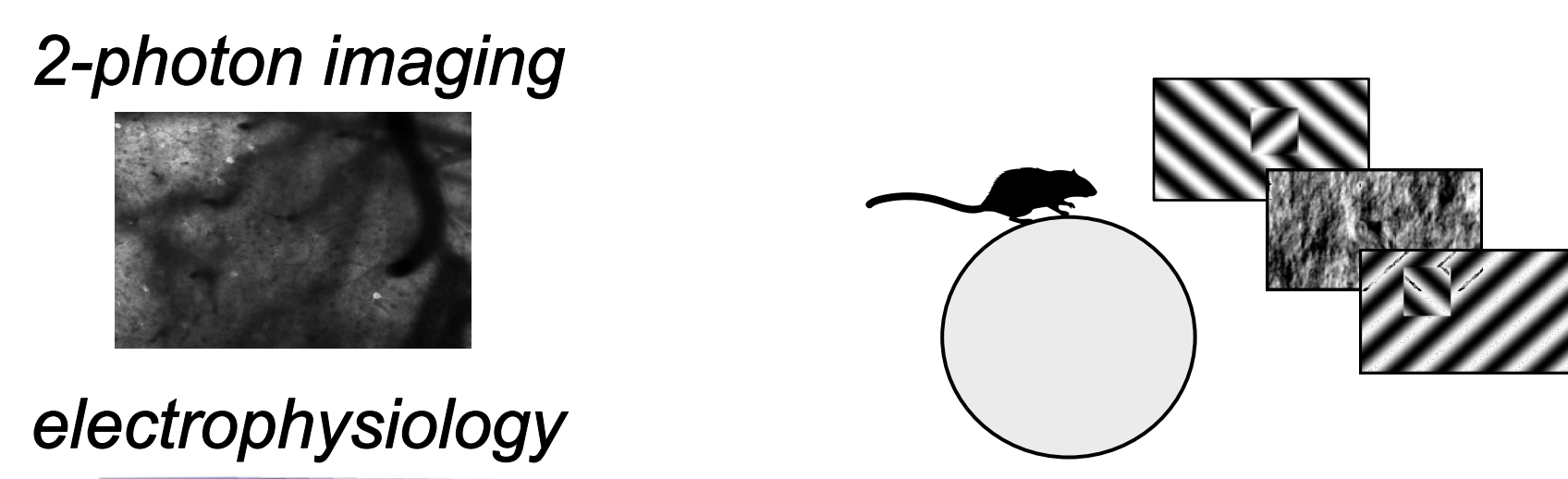


Background

Two avenues for recognizing objects



Explicit segmentation



► How does the mouse visual system segment visual objects?

► What constitutes a visual object for a mouse?

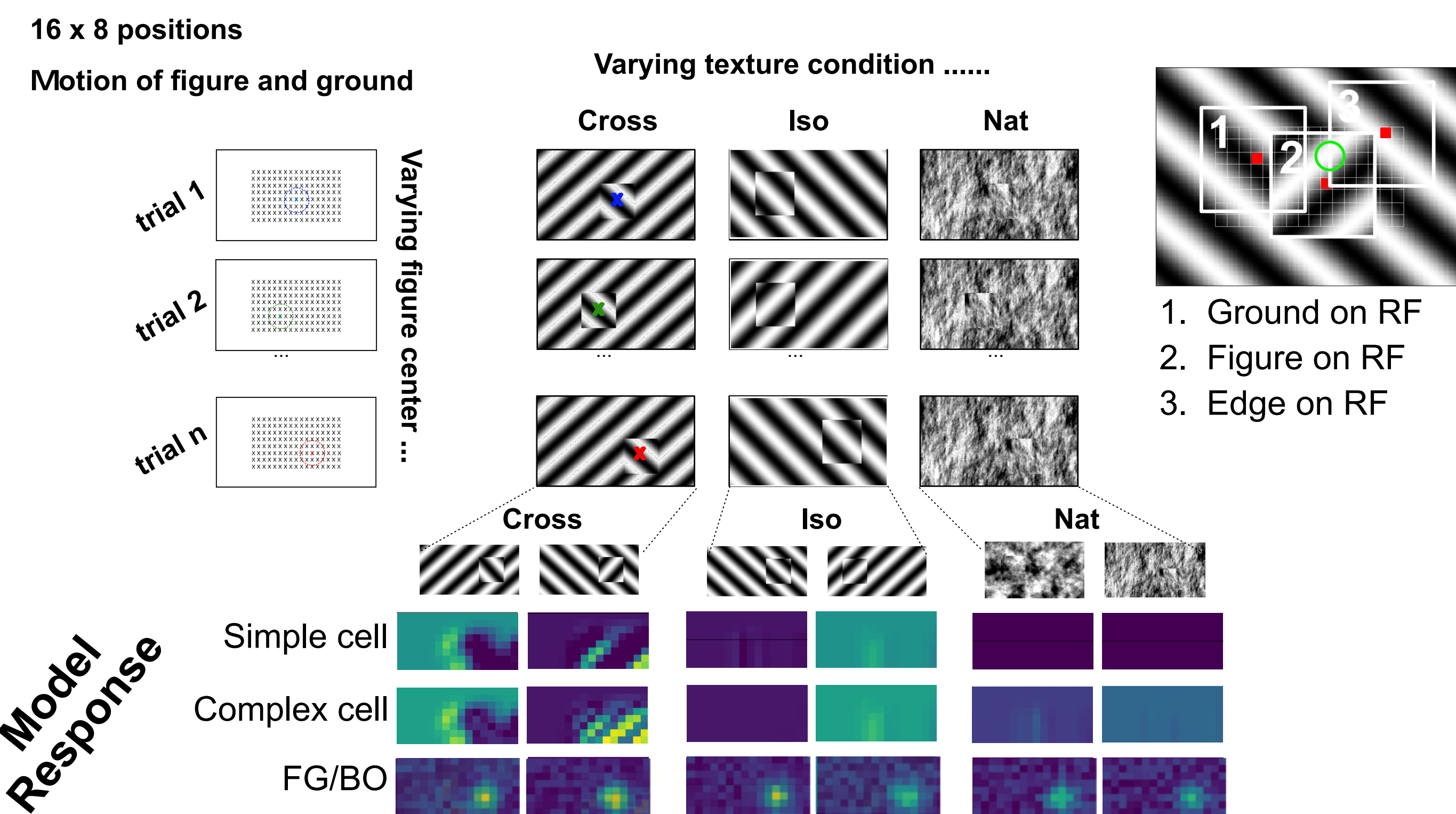
Figure-ground and border-ownership modulation



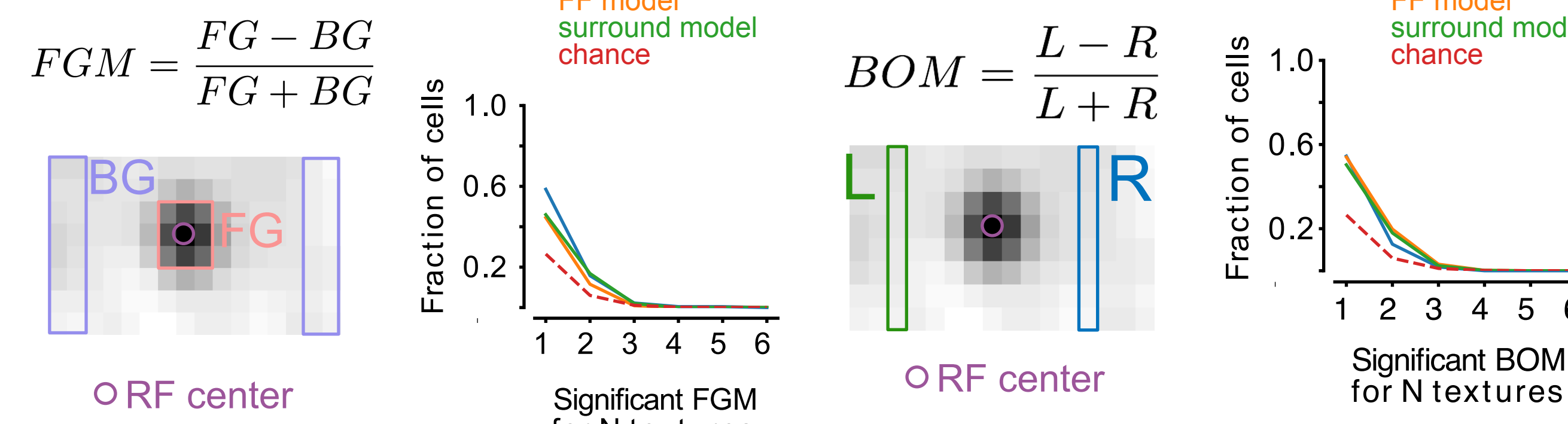
Evidence for such modulation has been reported across primate thalamus, primary, and higher order visual cortices.

*Qiu and von der Heydt, 2007 // Zhou, Freedman, and von der Heydt 2000 // Jeurissen, Self, Roelfsema 2013 // Jehes, Lamme, & Roelfsema, 2007 // Lamme 1995

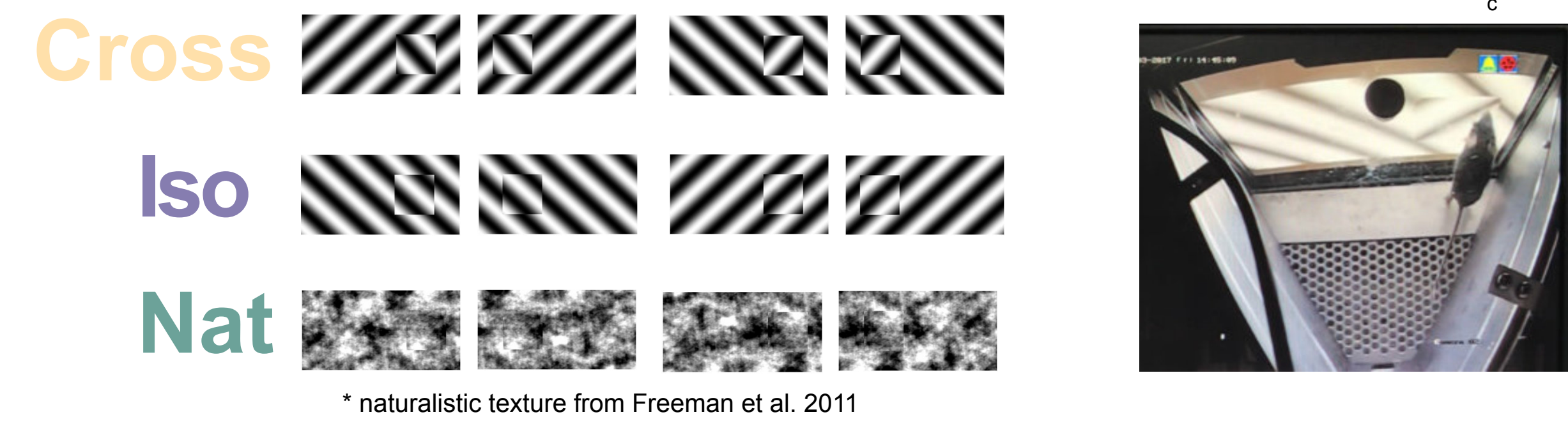
Stimuli for assaying FG and BO modulation



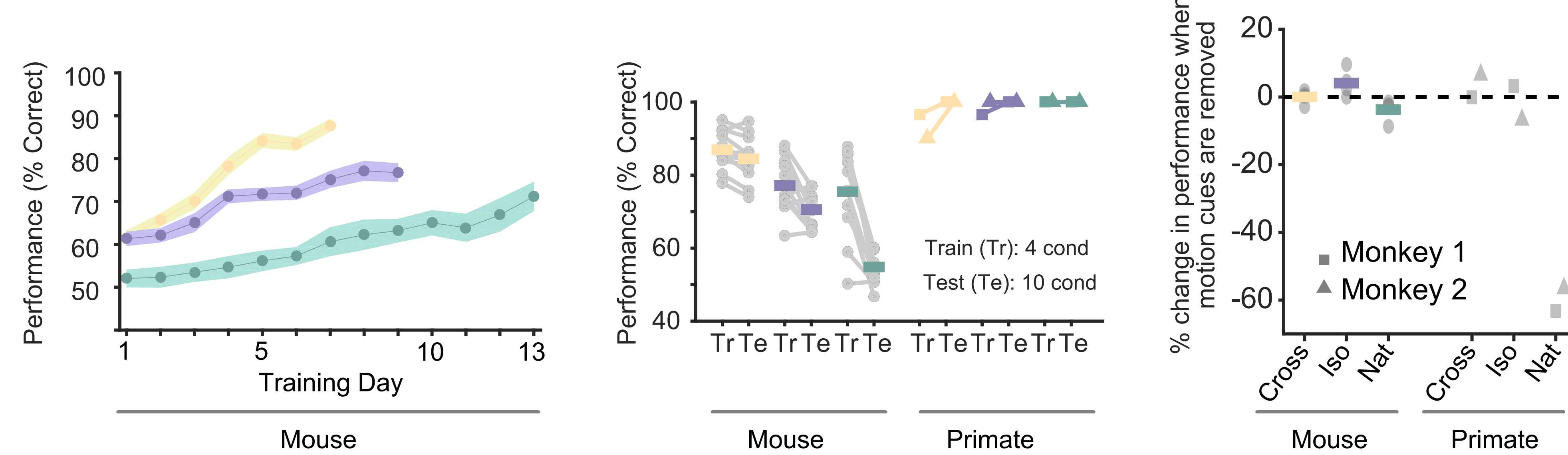
Texture-invariant FG/BO response modulation in single neurons is lacking in rodent visual cortex



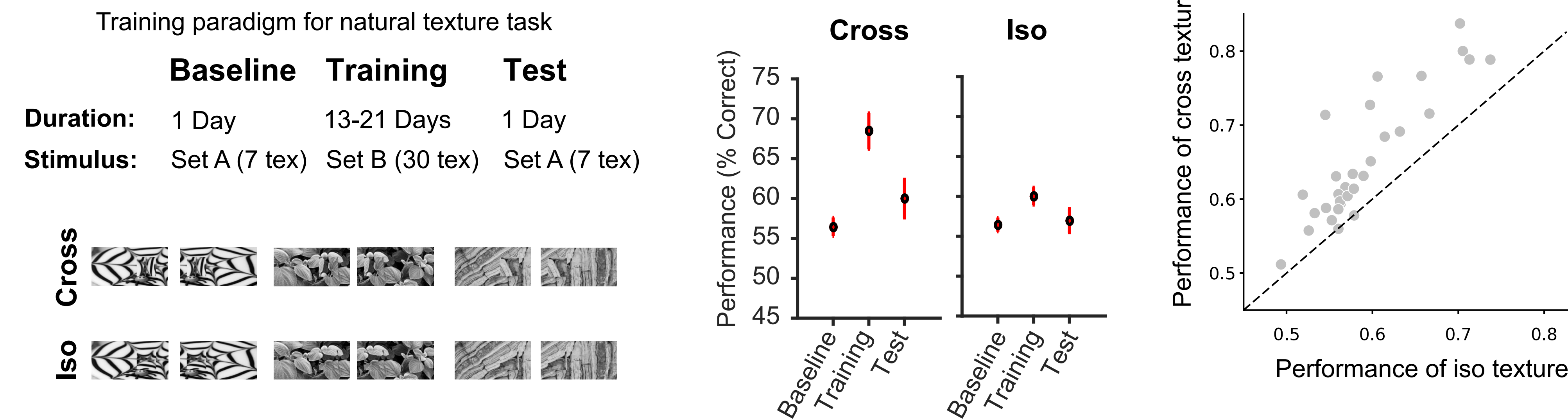
Mice can perform a texture-invariant object localization task using a touchscreen



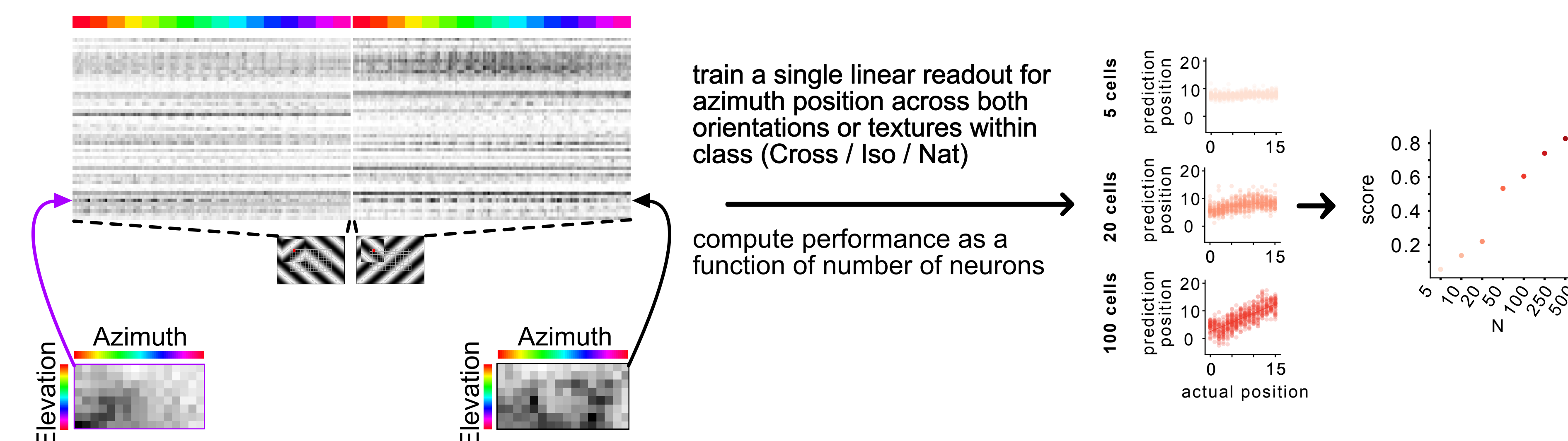
Mice show texture dependent performance and don't use motion in nat condition, suggesting a lookup table approach. Primates are texture independent and use motion cue in nat condition.



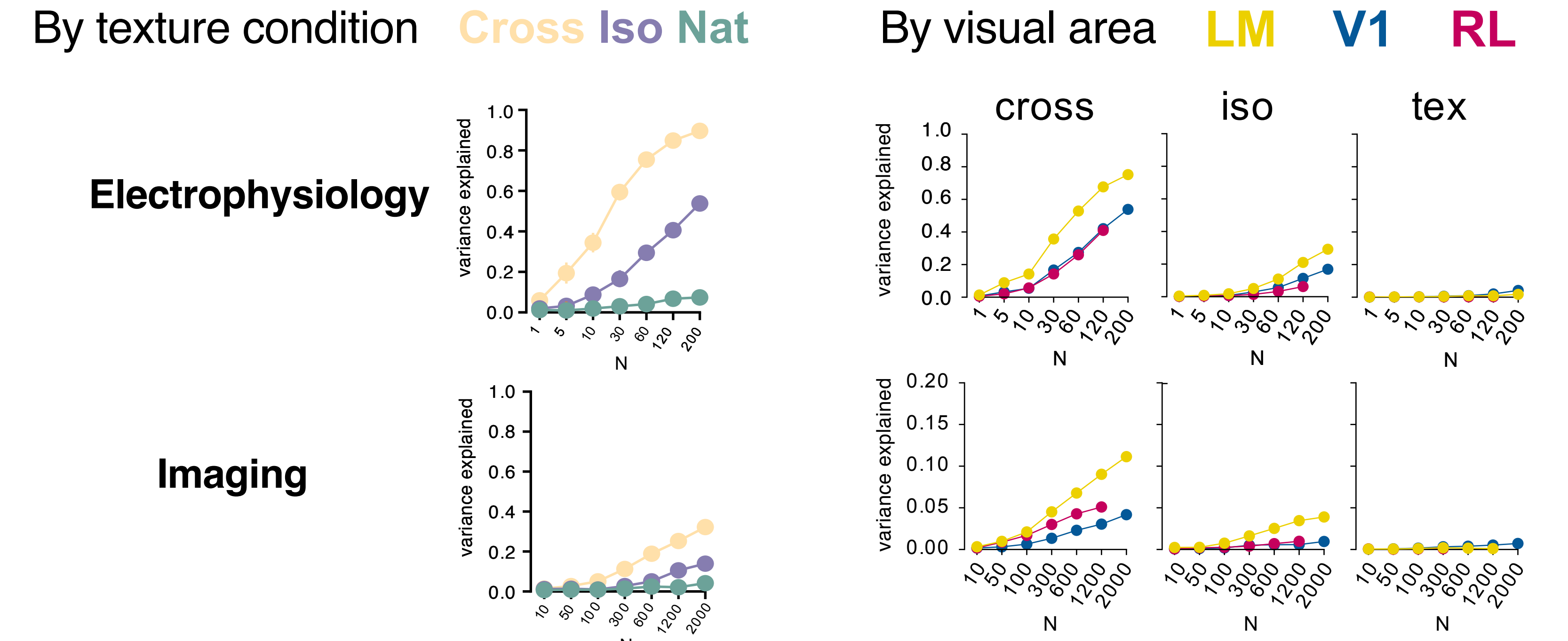
Performance on natural textures is improved by cross-orientations



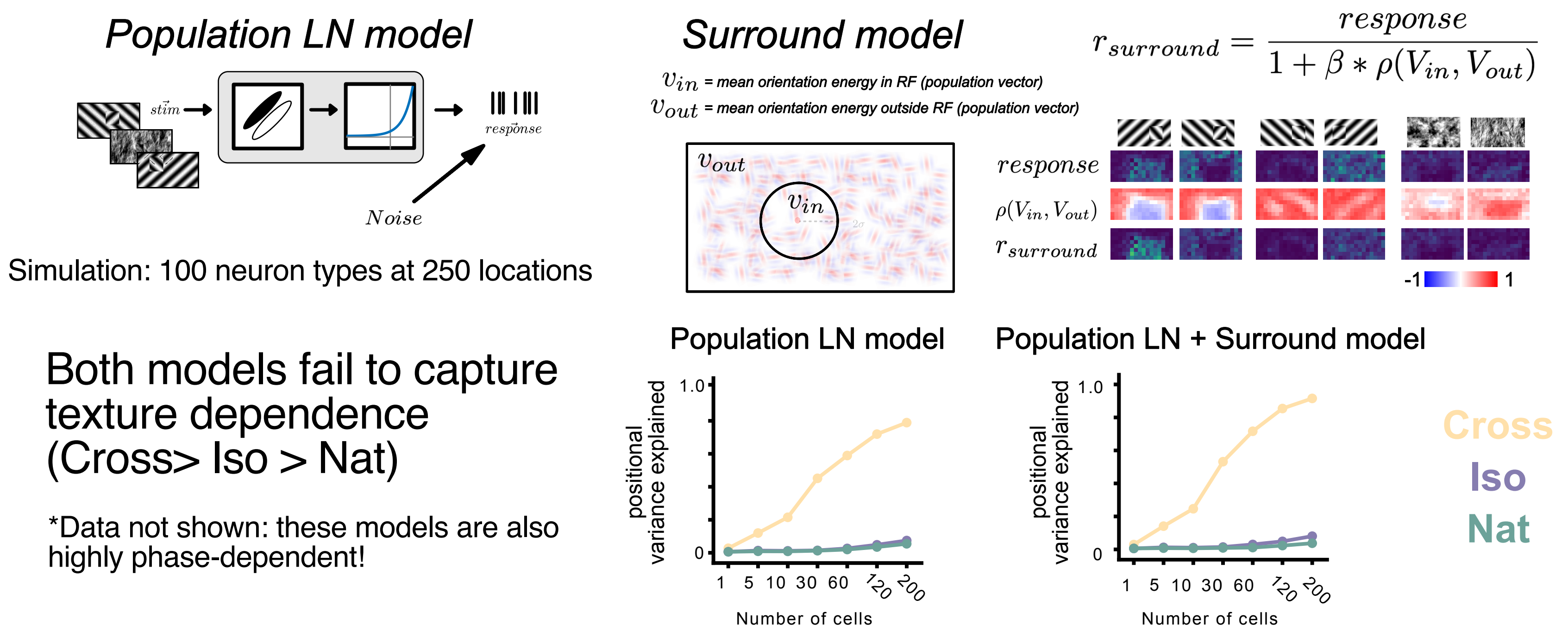
Reading out azimuth position across multiple textures using linear regression from a population of neurons



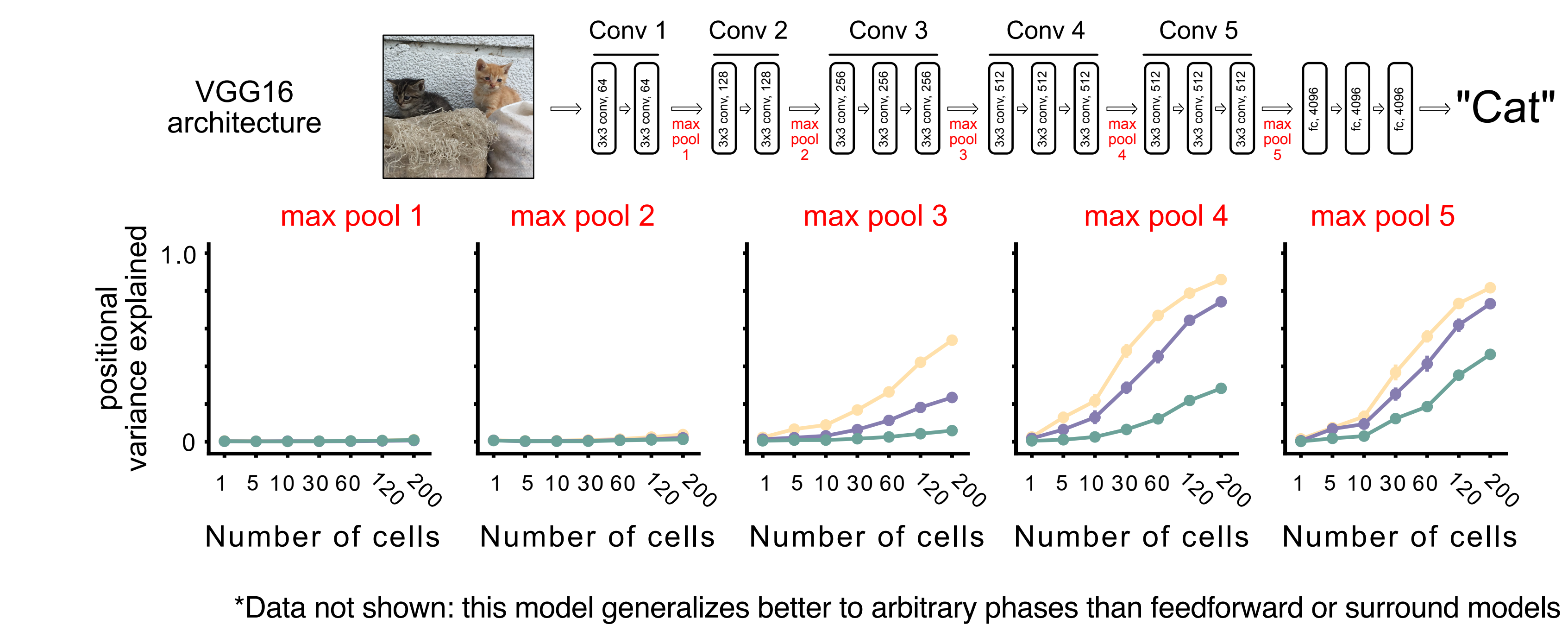
Readout of position using a linear decoder is best for cross-oriented textures, displaying a texture dependence similar to behavioral results. Decoding is most readily achieved from responses in LM.



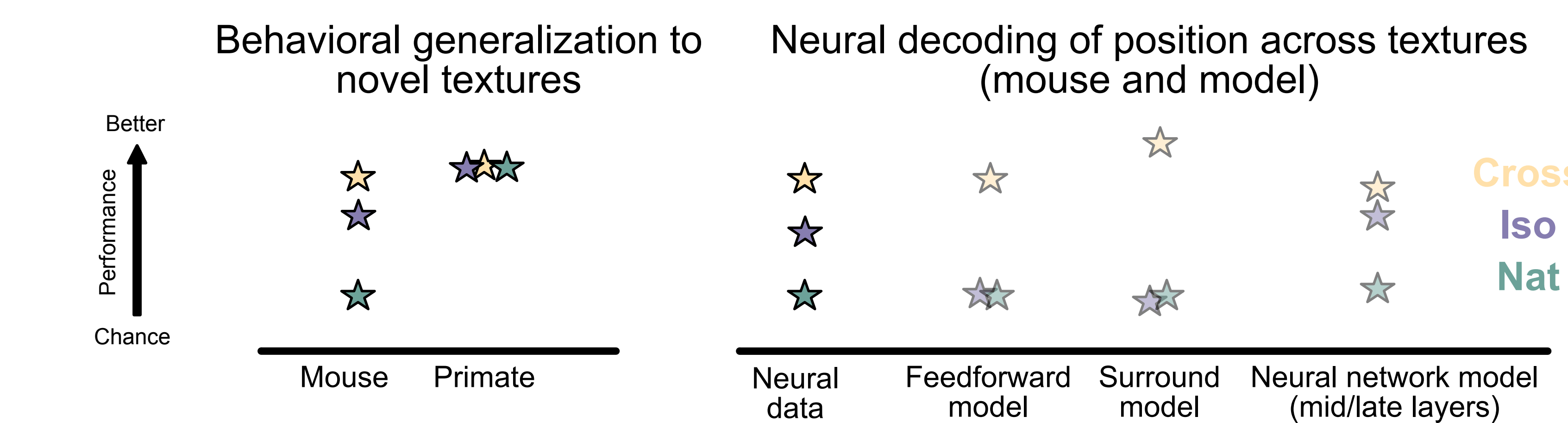
How much of the texture dependence (Cross > Iso > Nat) is explained by an LN model? Orientation tuned suppression?



Mid to late layers of a deep network (VGG16) show texture dependence consistent with behavior



Summary



Many thanks to funders

